STUDY MATERIAL

X Science

Support Material for Class X

UNIT 1 : Chemical Substances

1. Chapter 1. Chemical Reactions and Equations
2. Chapter 2. Acids, Bases and lts
3. Chapter 3. Metals and Non-Metals

UNIT 2 : World of Living

1. Chapter 6. Life Processes
2. Chapter 7. Control and Coordination

UNIT 3 : Effects of Current

1. Chapter 12. Electricity
2. Chapter 13. Magnetic Effects of Electric Current

UNIT 4 : Natural Resources

1. Chapter 14. Sources of Energy

CHAPTER- 1

CHEMICAL REACTIONS AND EQUATIONS

GIST OF THE LESSON

1) Chemical reaction— Chemical changes or chemical reactions are the changes in which one or more new substances are formed.

2)Chemical Equations – Representation of a chemical reaction in terms of symbols and formulae of the reactants and products is known as chemical equation.

3) Balanced Chemical equations – The chemical equation in which the no. of atoms of different elements is me on both sides of the arrow is called balanced chemical equation.

4) The chemical reactions can be classified into different types such as—

a) Combination reaction – The reactions in which two or more substances combine to form a new substance are called combination reaction. For example,

$2Mg(s) + O_2 (g) \rightarrow 2\ MgO\ (s)$

b) Decomposition reaction - The reaction in which a single compound breaks up into two or more simpler substances are called decomposition reactions. For example,

$2Pb\ (NO_3)_2\ (s) \rightarrow 2PbO\ (s) + 4NO_2\ (g) + O_2\ (g)$

The decomposition of a substance by passing electric current through it is known as electrolysis.

The decomposition of a substance on heating is known as thermal decomposition.

The decomposition of a substance by absorbing light energy is called photochemical decomposition.

c) Displacement reactions -The chemical reactions in which a more reactive element displaces a less reactive element from a compound are known as displacement reactions. For example,

i) $Zn\ (s) + CuSO_4\ (aq) \rightarrow ZnSO_4\ (aq) + Cu\ (s)$.

ii) $Cu\ (s) + 2AgNO_3\ (aq) \rightarrow Cu\ (NO_3)_2\ (aq) + 2Ag\ (s)$.

d) Double Displacement Reactions - The chemical reactions in which compounds react to form two different compounds by mutual exchange of ions are called double displacement reactions.

These reactions take place in solution two common types of this reaction are precipitation reactions and neutralization reactions

i) Precipitation reaction : In this reactions, aqueous solution of two lts are mixed whereby

Some lts precipitate due to mutual exchange of ions between the two lts. For example

$AgNO_3\ (aq) + NaCI\ (aq) \text{-----} > AgCl(s) + NaNO_3$.

ii) Neutralization reaction: In this type of reaction an acid reacts with a base to form lt and water by exchange of ions.

$NaOH\ (aq) + HCl\ (aq) \rightarrow NaCl\ (aq) + H_2O$.

e) **Redox reaction:** Chemical reaction which shows both oxidation and reduction reaction.

Oxidation: Reaction that involves the gain of oxygen or loss of hydrogen.

Reduction: Reaction that shows the loss of oxygen or gain of hydrogen.

Both oxidation and reduction take place simultaneously and hence called redox reaction.

$ZnO + C \rightarrow Zn + CO$

ZnO reduce to Zn ---- reduction

C oxidize to CO ------oxidation

f) **Exothermic reaction and endothermic reaction:** On the basis of energy changes during chemical reaction, they can be classified as

i) **Exothermic reaction:** A chemical reaction in which heat energy is produced.

$C + O_2 \rightarrow CO_2 (g) + heat$

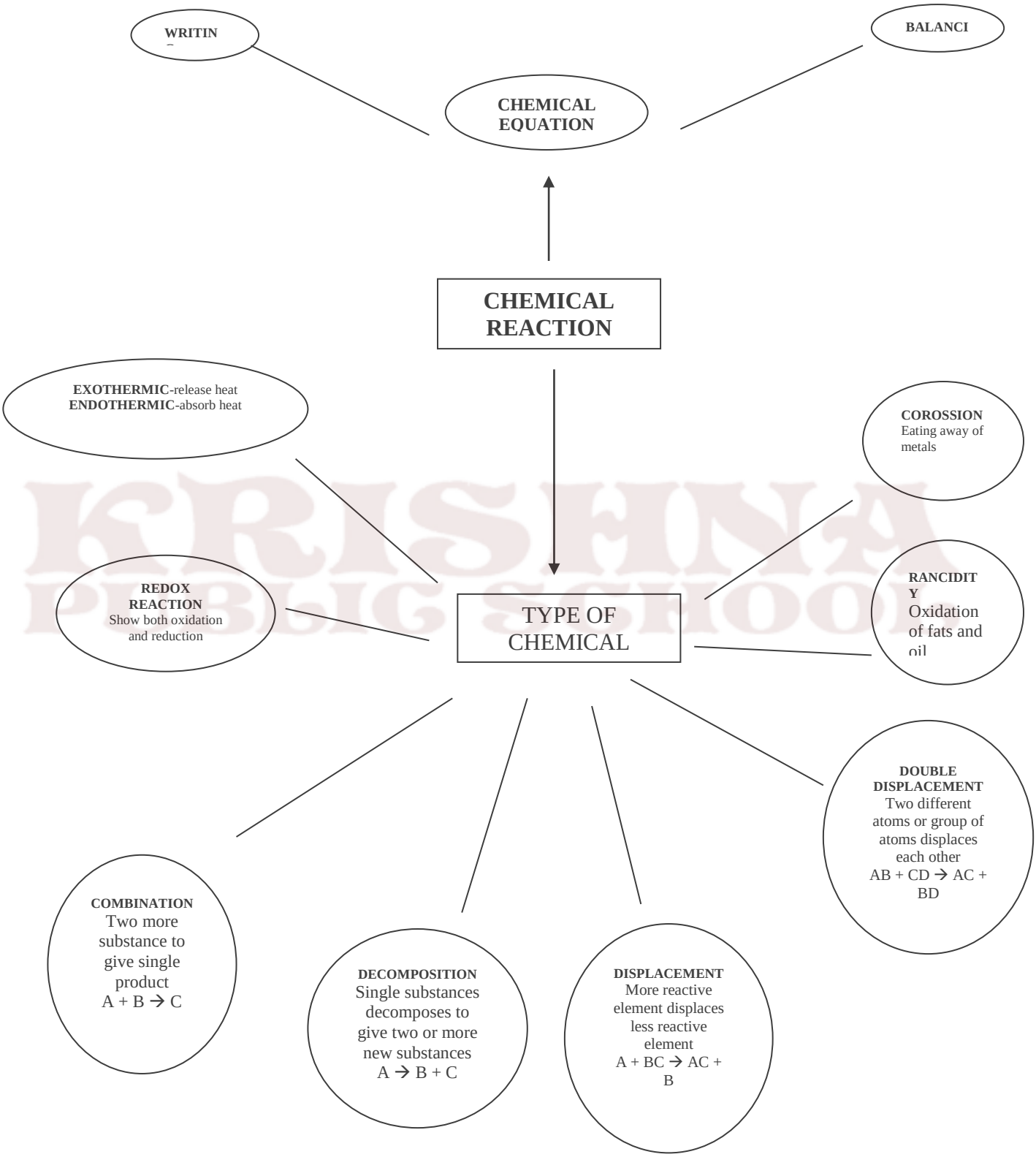
ii) **Endothermic reaction:** A chemical reaction in which heat energy is absorbed.

$CaCO_3 + Heat \rightarrow CaO + CO_2$

5 Corrosion – The process of slow conversion of metals into their undesirable compounds due to their reaction with oxygen, water, acids, gases etc. present in the atmosphere is called corrosion.
Rusting – Iron when reacts with oxygen and moisture forms red substance called rust.

6 Rancidity – The taste and odour of food materials containing fat and oil changes when they are left exposed to air for long time. This is called rancidity. It is caused due to oxidation of fat and oil present in food material.
It can be prevented by using various methods such as by adding antioxidants to the food materials, Storing food in air tight container and by flushing out air with nitrogen.

MIND MAP



I
CHEMICAL REACTIONS AND EQUATIONS
ASSESSMENT I
Q. PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1. On what chemical law, balancing of chemical equation is based?
2. Identify the compound oxidized in the following reaction:

$$H_2S_{(g)} + Cl_2 \rightarrow S_{(s)} + HCl_{(g)}$$

3. Give an example of photochemical reaction.
4. Name the reaction which forms insoluble lts.
5. Name the product obtained and type of reaction given below:

$$Na_2SO_4 + BaCl_2 \rightarrow \_\_\_\_\_ + \_\_\_\_\_$$

6. Explain the following in terms of gain or loss of oxygen with one example:
   a. Oxidation
   b. Reduction
7. A copper coin is kept in a solution of silver nitrate for some time, what will happen to the coin and the colour of the solution?
8. Why do we apply paint on iron articles?
9. What happens chemically when quicklime is added to water?
10. What is rancidity? Write the common methods to prevent it.
11. What is corrosion? State the conditions neces ry for rusting of iron. How rusting is harmful?
12. Name the type of reactions in the following cases:
    a. Garbage producing foul smell
    b. Burning of natural gas.
    c. Carbon dioxide gas passed through lime water.
13. Blue crystals of copper sulphate on heating in a dry test tube become colourless. Give reasons.

14.

a. Why can not a chemical change be normally reversed?
b. Why is it always essential to balance a chemical equation?
c. What happens when CO_2 gas is passed through lime water and why does it di ppear on passing excess CO_2?
d. Can rusting of iron take place in distilled water?

HOTS QUESTIONS (SOLVED)

Q.1. A water insoluble substance 'X' on reacting with dilute H_2SO_4 released a colourless and odourless gas accompanied by brisk effervescence. When the gas was passed through water, the solution obtained turned blue litmus red. On bubbling the gas through lime water, it initially became milky and milkyness di ppeared when the gas was passed in excess. Identify the substance 'X'. Write its chemical equations of the reactions involved.

Ans. The water insoluble substance 'X' is metal carbonate $CaCO_3$.

$CaCO_{3\,(S)} + H_2SO_{4\,(Aq)} \rightarrow CaSO_{4(Aq)} + H_2O_{\,(Aq)} + O_{2\,(G)}$

$Ca(OH)_2 + CO_{2\,(G)} \rightarrow CaCO_{3\,(S)} + H_2O_{\,(L)}$

(milky)

$CaCO_{3\,(S)} + CO_{2\,(G)} + H_2O_{\,(Aq)} \rightarrow Ca(OH)_2$

(milkiness)

Q.2. Ahmad took a magnesium ribbon (cleaned) and burned it on a flame. The white powder formed was taken in a test tube and water was added to it. He then tested the solution formed with red and blue litmus paper. What change was seen? Why?

Ans. Red litmus paper turned blue.
Blue litmus paper remained blue.
This is because the magnesium ribbon on burning in air forms the white magnesium oxide. Which dissolved in water, it forms magnesium hydroxide, which is Basic in nature.

Q.3. Give one example of a combination reaction in which an element combines with a compound to give you a new compound.

Ans. $O_2 + 2SO_2 \rightarrow 2SO_3$

$8NH_3 + 3Cl_2 \rightarrow 6NH_4Cl$

Q.4. Marble statues often slowly get corroded when kept in open for a long time. Assign a suitable explanation.

Q.5. Mohan tool pure water for the electrolytic decomposition of water but did not see any bubbles near the electrodes. Explain why?

Q. 6 Rancidity is a process used for spoiling of cooked food materials like vegetables, etc. When kept for long time in open. How can you prevent such process to proceed? Give an example.

Q. 7 A substance 'X' displaces 'Y' from its solution in water. It is called displacement reaction. What other chemical name can be given to such type of reactions? Explain, giving an example?

Q. 8 A grey coloured metal 'Z' (Atomic weight=65) is used in making dry cell. It reacts with dil. HCl to liberate a gas. What is the gas evolved? Calculate the minimum amount of 'Z' required to produce 100 l 0f gas?

Q. 9 Why is respiration considered an exothermic reaction? Explain.

Q. 10 Why is respiration considered an exothermic reaction? Explain.

Q. 11 Why are decomposition reactions called opposite of combination reactions? Write equations for these reactions.

Q. 12 A shiny brown colored element 'X' on heating in air becomes a black coloured compound. Name the element 'X'& black the coloured compound formed. Also write the equation

II
CHEMICAL REACTION AND EQUATIONS
Oral questions (Conver tion type)

1. a) How do you represent chemical changes in chemistry?
   b) What should you know to write a chemical equation?
   c) How are reactants and products separated in a chemical equation?

2. a) Is it essential to write balanced chemical equation?
   b) What will happen if it is not balance?
   c) How do you know that the equation is not balance?

3. a) What happens when calcium carbonate is heated?
   b) What is this reaction called?
   c) Does decomposition take place only on heating?

4. a) What is oxidation?
   b) Can we call a chemical reaction an oxidation reaction in which hydrogen is removed?
   c) Give an example of everyday life where redox reaction takes place.

5. a) What is corrosion?
   b) Give an example.
   c) What are the requirements for corrosion?

ORAL QUESTIONS

1. What is opposite to combination reaction?

2. To pack food articles, why do manufacturers flush out oxygen with nitrogen?

3. What is spoiling of food called when kept for a long time?

4. What is the chemical reaction called in which heat is evolved?

5. Silver articles get black coating. Name the phenomenon.

6. Which gas is evolved when acid is added to lime water?

7. When a more reactive metal displaces a less reactive metal in solution, what is the reaction called?

8. What sign (+ or -) is given to exothermic reaction?

9. Which of the two is a redox reaction?
   a) Displacement
   b) Double displacement
10. What is one important similarity between rusting and burning?

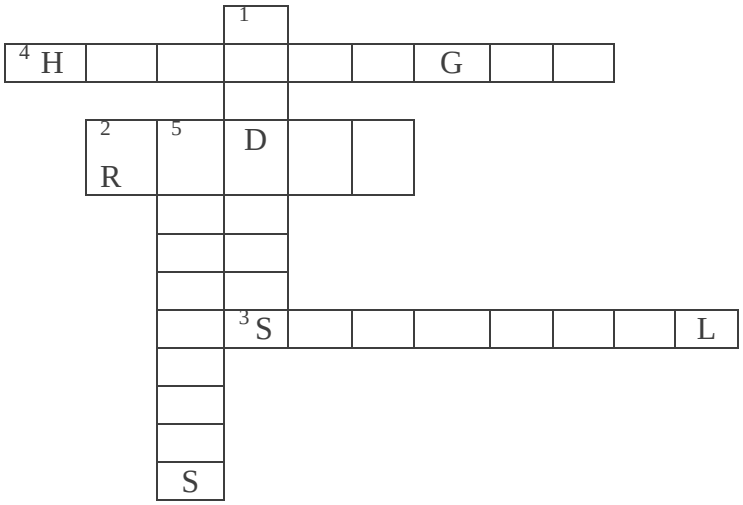
QUIZ - WHO AM I

1. I am symbolic representation of a chemical change.
2. I am a metal which go on losing weight when constantly exposed to air and moisture.
3. I conduct electric current and get a green coating when exposed to humid atmosphere for long.
4. My blue colour starts fading when zinc metal is added to my aqueous solution.
5. I get reduced in a redox reaction.
6. I am formed during a chemical change.
7. I separate reactants from products when a chemical reaction is represented by a chemical equation.
8. I give a name to the reaction between acids and bases.
9. I am a chemical reaction which represents digestion of food in our body/
10. I am a process which is used to prevent rusting of iron objects / articles.

PUZZLES

1. ⇓ **Down**
   1. Result of a chemical change (8)
   5. Particles lost (9) on oxidation

   ⇒**Across**
   2. A reaction in which oxidation and reduction takes place (5)
   3. An unbalanced equation (8)
   4. Substance add up on reduction (8)

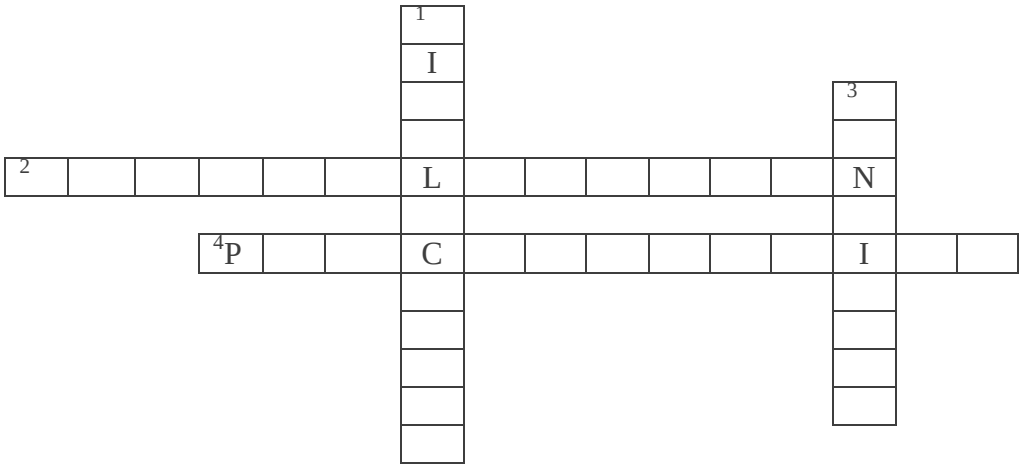


2. ⇓ D**own**

1. Phenomenon in which iron vessels get damaged on adding copper sulphate solution (12)
3. Phenomenon in which food material starts to smell badly on keeping (9)

⇒**Across**

2. A reaction between acids and bases (14)
4. A process in which one of the products become insoluble (13)



CHAPTER- 2
ACIDS, BASES AND LTS
GIST OF THE LESSON

1) Acids are sour in taste, turn blue litmus red, and dissolve in water to release H^+ ions e.g. HCl, H_2SO_4, HNO_3 etc.

2) Bases are bitter in taste, have soapy touch, turn red litmus blue and give hydroxide ions in solution.

e.g. NaOH, KOH etc.

3) A lt is a compound which is formed by neutralization reaction between an acid and base.
e.g. sodium chloride.

3) Indicators – Indicators are substances which indicate the acidic or basic nature of the solution by their colour change.

The colour of some acid – base indicators in acidic and basic medium are given below

Sr. No.	INDICATORS	COLOUR IN ACIDIC MEDIUM	COLOUR IN BASIC MEDIUM
1	Litmus solution	Red	Blue
2	Methyl Orange	Pink	Orange
3	Phenolphthalein	Colourless	Pink
4	Methyl red	Yellow	Red

5) Chemical properties of acids:

i) Acids react with active metals to give hydrogen gas.

$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$

ii) Acids react with metal carbonate and metal hydrogen carbonate to give carbon dioxide.

$NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$

iii) Acids react with bases to give lt and water. This reaction is called as neutralization reaction.

$NaOH + HCl \rightarrow NaCl + H_2O$

iv) Acids react with metals oxides to give lt and water.

$CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$

6) Chemical properties of Bases:

i) Reaction with Metals - Certain reactive metals such as Zinc, Aluminium, and Tin react with alkali solutions on heating and hydrogen gas is evolved.

$2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2$

ii) Reaction with acids -Bases react with acids to form lt and water.

$KOH + HCl \rightarrow KCl + H_2O$

iii) Reaction with Non -metallic oxides – These oxides are generally acidic in nature. They react with bases to form lt and water.

$2NaOH + CO_2 \rightarrow Na_2CO_3 + H_2O$

7) PH Scale: The concentration of hydrogen ion in solution is expressed in terms of pH. The pH of a solution is defined as the negative logarithm of hydrogen ion concentration in moles per liter.

$pH = - \log [H^+]$

For water or neutral solutions, pH = 7 ; For acidic solutions, pH < 7; For basic solutions, pH > 7

8) Some Important Chemical Compounds:

a) Common lt (NaCl)

Sodium chloride is known as common lt. Its main source is sea water. It is also exists in the form of rocks and is called rock lt.

Common lt is an important component of our food. It is also used for preparing sodium hydroxide, baking soda, washing soda etc.

b) Sodium Hydroxide or Caustic Soda (NaOH)

It is prepared by passing electricity through an aqueous solution of sodium chloride also known as brine.

$2NaCl\,(aq) + 2\,H_2O\,(l) \rightarrow 2NaOH\,(aq) + Cl_2\,(g) + H_2\,(g)$

This process is known as chlor-alkali process.

Properties:

1. It is white translucent solid.
2. Crystals of sodium hydroxide are deliquescent.
3. It is readily soluble in water and gives strong alkaline solution.

c) Bleaching Powder ($CaOCl_2$)

Its chemical name is calcium oxychloride. It is prepared by passing chlorine gas through dry slaked lime.

$$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$$

Uses –

1. For bleaching cotton and linen in textile industry and wood pulp in paper industry
2. For disinfecting drinking water.

d) Baking Soda ($NaHCO_3$)

Chemical name is Sodium hydrogen carbonate.

It is prepared by passing CO_2 gas through brine solution turated with ammonia.

$$NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$$

Properties:

1. It is white crystalline solid and sparingly soluble in water at room temperature.
2. On heating it decomposes to give sodium carbonate and carbon dioxide.
3. It reacts with acids to give carbon dioxide gas.
4. It aqueous solution is weak alkaline due to hydrolysis.

Uses:

1. It is used in soda – acid fire extinguisher.
2. It acts as mild antiseptic and antacid.
3. It is used as a component of baking powder. In addition to sodium hydrogen carbonate baking soda contains tartaric acid.

e) Washing Soda ($Na_2CO_3.10\ H_2O$)

Chemical name is sodium carbonate decahydrate.

It is prepared by heating baking soda. Recrystalli tion of sodium carbonate gives washing soda.

$$2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$$

$$Na_2CO_3 + 10\ H_2O \rightarrow Na_2CO_3.\ 10\ H_2O$$

Uses:

1. It is used for removing permanent hardness of water.
2. It is used in glass, soap and paper industries.
3. It can be used as a cleaning agent for domestic purposes.

f) Plaster of Paris ($CaSO_4.{}_{1/2}H_2O$)

Its chemical name is calcium sulphate hemihydrates. It is obtained by heating Gypsum upto 373K.

$$CaSO_4.2H_2O \rightarrow CaSO_4.{}_{1/2}H_2O + 1_{1/2}H_2O$$

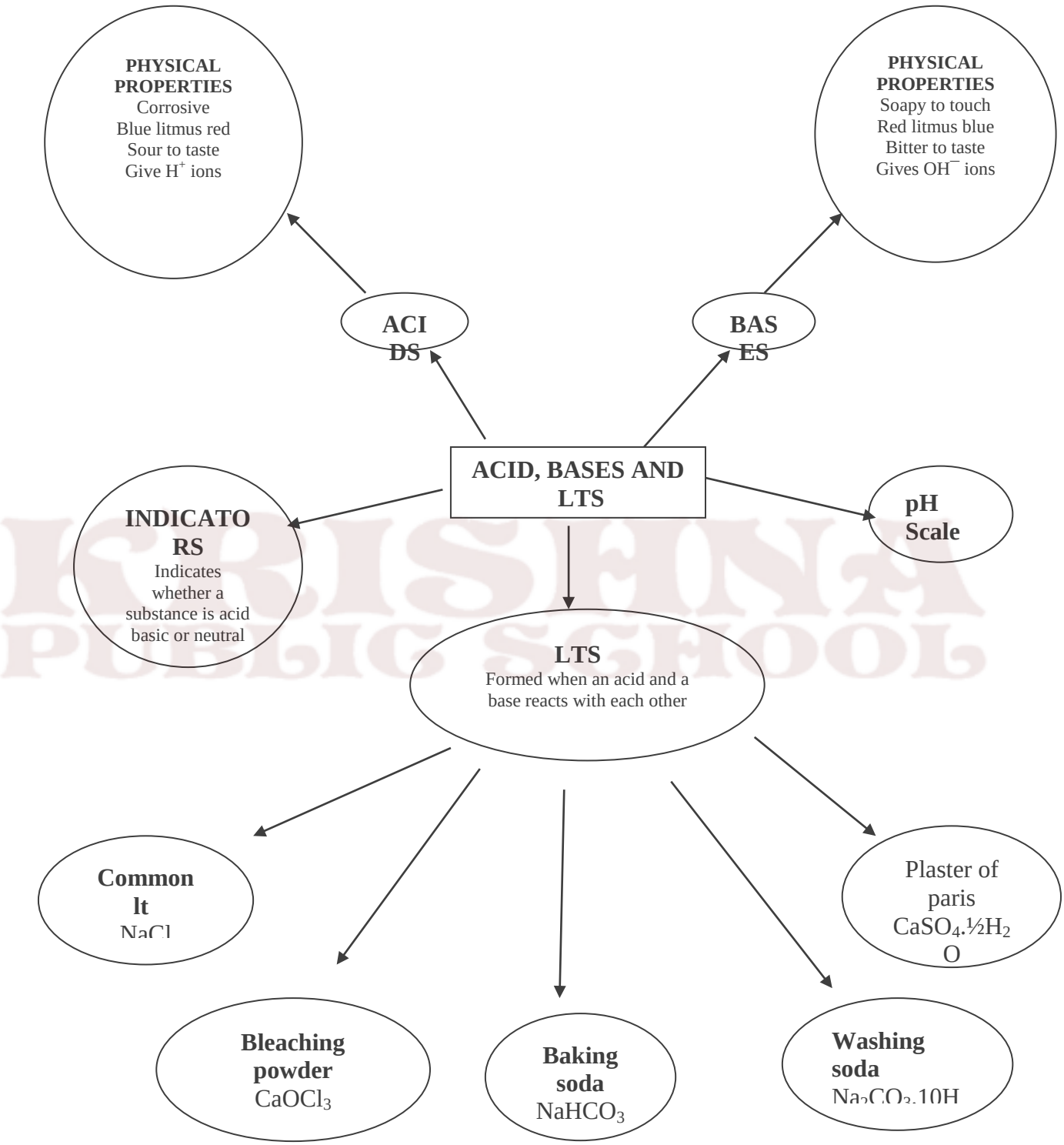
On treatment with water it is again converted into gypsum and sets as a hard mass.

$$CaSO_4.{}_{1/2}H_2O + 1_{1/2}H_2O \rightarrow CaSO_4.2H_2O$$

Uses:-

1. It is used by doctors for setting fractured bones.
2. It is used for making statues, models and other decorative materials.

MIND MAP



ACID, BASES AND LTS
ASSESSMENT I
Q.PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
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- Question 14 – 5 Marks

ii. Name the gas formed when sodium hydroxide reacts with zinc.

iii. Write the chemical name of baking soda.

iiii. What happens when gypsum is heated at 373K?

iiv. Which has a higher pH value 1M HCl or 1M NaOH solution?

iv. Hydrogen ion concentration of an acid is 1×10^{-2} mol/l. what is its pH?

ivi. What is meant by 'Water of Crystalli tion' of a substance? Describe an activity to show that.

ivii. Why does tooth decay start when the pH of mouth is lower than 5.5?

iviii. What is baking powder? How does it make the cake soft and spongy?

iix. Give Arrhenius definition of an acid and a base. Choose strong acid and strong base from the following:

CH_3COOH, NH_4OH, KOH, HCl

ix. What happens when nitric acid is added to egg shell? Give the chemical equation.

ixi. A student prepared solutions of an acid and a base in two separate beakers. She forgot to label the solutions and litmus paper is not available in the laboratory. Since both the solutions are colourless, how will she distinguish between the two?

ixii. Identify the compound 'X' on the basis of the reactions given below. Write the names and chemical formulae of A, B, C

Compound X	+ Zn	(A) + $H_{2\,(g)}$
	+HCl	(B) + H_2O
	+ CH_3COOH	(C) + H_2O

ixiii. How is plaster of Paris prepared? What is its chemical formula? Write is chemical name.

ixiv.

a) Define strong acid and weak acid.

b) A student working in the laboratory added some water to a syrupy liquid taken in tube. The tube immediately cracked and the liquid escaped out, that produced blisters on the skin of the student. Why?

HOTS QUESTIONS

Q.1. In one of the industrial process used for manufacture of sodium hydroxide, a gas 'X' is formed as by – product. The gas 'X' reacts with lime water to give a compound 'Y' which is used as a bleaching agent in chemical industry. Identify 'X' and 'Y' giving the chemical equation of the reaction.

Ans. In the manufacture of sodium hydroxide, hydrogen gas and chlorine gas (X) are formed as by products. When chlorine gas (X) reacts with lime water, it forms calcium oxy chloride (bleaching powder) Y.

$2NaCl_{(aq)} + 2H_2O_{(L)} \rightarrow 2NaOH_{(Aq)} + Cl_{2(G)} + H_{2(G)}$

'X' $\Rightarrow Cl_2$ gas

$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$

Q.2. Dry hydrogen chloride gas does not turn blue litmus, whereas hydrochloric acid does. Why?

Ans. In the dry state, hydrogen chloride (HCl) does not release H^+ ions. Therefore, it cannot behave as an acid. When dissolved in water, it forms hydrochloric acid. It dissociates to give H^+ ions in solution and behaves as an acid.

Q.3. Acid when react with metals release hydrogen gas but there is one acid which when reacts with metals does not release hydrogen except for two metals. Prove this statement.

Ans. Acid + Metal $\rightarrow$ lt + Hydrogen

e.g. $2HCl + 2Na \rightarrow 2NaCl + H_2$

$H_2SO_4 + 2Na \rightarrow Na_2SO_4 + H_2$

$HNO_3 + Na \rightarrow$ No hydrogen gas.

Because nitric acid is strong oxidising agent. Nitric acid reacts only with Mg and Mn to give hydrogen gas.

$Mg + 2HNO_3 \rightarrow Mg(NO_3)_2 + H_2$

$Mn + 2HNO_3 \rightarrow Mn(NO_3)_2 + H_2$

Q. 4 Name the properties responsible for the following uses of baling powder. (i) Baking industry (ii) As an antacid (ii) As soda-acid fire extinguisher.

Q. 5 What is meant by water of crystalli tion of a substance? What is its importance?

Q. 6 What effect does an increase in concentration of 'H' ions in a solution have on the pH of a solution

Q. 7 Fresh milk has a pH Of 6. When it changes to curd, will its pH value increase or decrease? Why?

Q. 8 How does the flow of acid rain water into a river make the survival of aquatic life in a river difficult?

Q. 9 Arrange in the increasing order of their pH values: NaOH solution, Blood, Lemon juice,

Q. 10 Two solutions A and B have pH values of 5 and 8 respectively. Which solution will be basic in nature?

Q. 11 Why does an aqueous solution of acid conduct electricity?

Q. 12 How is alkali different from a base?

II
ACIDS, BASES AND LTS
ORAL QUESTIONS – (Conver tion Type)

1. a) Acids are sour in taste. Is it a way to find whether a substance is an acid or a base?

   b) What is other physical test?

   c) Any test with solid acid?

   d) Can you check the evolution of CO_2 chemically?

2. a) What are acids?

   b) Can presence of H^+ ion in water be estimated? How?

   c) How is pH related to strength of an acid?

   d) Name one strong acid and one weak acid.

3. a) What are lts?

   b) How many types of lts are formed?

   c) What are neutral lts?

   d) What do you mean by acidic lts?

   e) Define basic lts.

   f) Give the corresponding acid and base from which sodium carbonate is formed.

4. a) What is common lt?

   b) Why does common lt become moist in rainy season?

   c) How is it used as a freezing mixture?

   d) Name two important laboratory chemicals prepared from common lt on large scale.

5. a) What is washing soda?

b) Name the process by which sodium carbonate is manufacture.

c) What are the raw materials used in the preparation of washing soda?

d) Sodium carbonate is obtained from another carbonate on heating. Name it.

6. a) Name the substance used for bleaching cotton and wood pulp in textiles.

b) What is its chemical name?

c) How is it manufactured?

d) What is slaked lime?

e) Why does bleaching powder smell of chlorine?

ORAL QUESTIONS

1. Name the acid present in lemon juice.
2. What is the chemical difference between washing soda and baking powder?
3. Name the acid present in ant sting.
4. What is the ideal pH of the soil for the healthy growth of a plant?
5. At what pH the mouth teeth start decaying?
6. How is pH of an acid solution affected when it is diluted?
7. Name the gas responsible for extinguishing fire in a soda – acid fire extinguisher.
8. Out of glucose and acetic acid which one will conduct electricity in water?
9. What is the pH of blood?
10. What is the chemical name of the compound which has the property of hardening when mixed with water?

QUIZ – WHO AM I

1. I can roughly measure pH value from 0 – 14.
2. I am called antichlor and am used to remove excess chlorine from clothes when treated with bleaching powder.
3. I am a product of gypsum and am used to making chalks and fire proof materials.
4. I am a compound of calcium and can be used for disinfecting drinking water as well as for decolouri tion.
5. I give different smell in acid and base solution.

6. I am an oxide capable of showing properties for both acids and bases.

7. I am a covalent compound and conducts electricity in aqueous medium.

8. I am a lt of potassium hydroxide and nitric acid.

9. I am the term used when a solid becomes liquid when exposed to moist air.

10. I am derived from tomato and turn blue litmus into red.

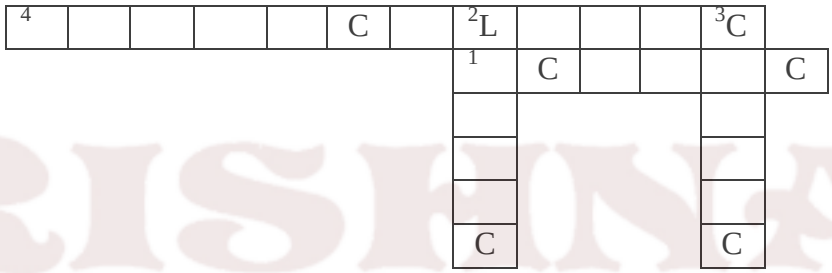
PUZZLES

1. ⇒ **Across**

1. Known as vinegar (6)
4. A mineral acid (12)

⇓ **Down**

2. Acid obtained from milk (6)
3. An acid obtained from lemon (6)

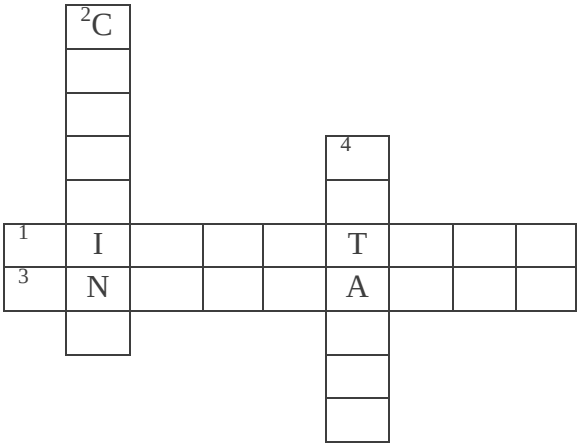


2. ⇒ **Across**

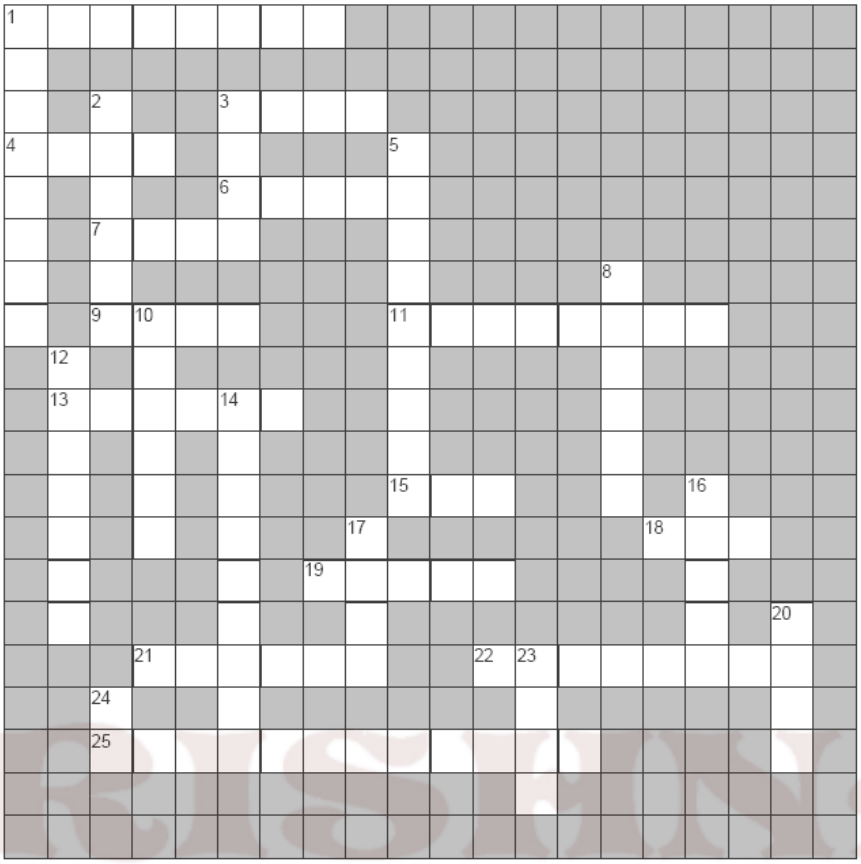
1. A stone used for manufacture of sodium carbonate (9)
3. A substance that changes colour in acid – base solution (9)

⇓ **Down**

2. A gas obtained in the electrolysis of sodium chloride (8)
3. A substance that gives relief from acidity (7)



Acids and Bases



Across

1. Name of acid in softdrink.[8]
3. Chemical containing hydroxide ions.[4]
4. Chemical that is corrosive, has a sour taste and a pH less than 7.[4]
6. Neutral substances have this pH.[5]
7. Alkalis have a pH ____ than 7.[4]
9. Acid and base neutralise to form ____ and water.[4]
11. Household bases are suitable for ____.[8]
13. Chemical with a soapy feel and pH more than 7.[6]
15. Acids change blue litmus paper ____.[3]
18. Sulphuric acid turns litmus paper ____.[3]
19. Salt has this pH.[5]
21. Alkalis turn ____ paper blue.[6]
22. Carbon dioxide and water form ____ acid.[8]
25. Stomach acid.[12]

Down

1. Many household ____ products are bases.[8]
2. Indicator made from lichens.[6]
3. Chemical that neutralises an acid.[4]
5. Chemical that changes colour in acids and bases.[9]
8. Common indicator used in liquid or paper form.[6]
10. Soluble base.[6]
12. Common name for sodium hydroxide is ____ soda.[7]
14. Common name for calcium hydroxide.[9]
16. Distilled water has this pH.[5]
17. Acids have a pH that is ____ than 7.[4]
20. ____ rain is an environmental problem in industrial areas.[4]
23. Reacts with a metal to form hydrogen gas and a salt.[4]
24. Measure of amount of hydrogen ions released in solution.[2]

CHAPTER – 3

METALS AND NON – METALS
GIST OF THE LESSON

Elements are classified broadly into two categories on the basis of properties:
Metals: Iron, Zinc, Copper, Aluminium etc.
Non – metals: Chlorine, Nitrogen, Hydrogen, Oxygen, Sulphur etc.
Apart from metals and non-metals some elements show properties of both metals and non – metals, e.g. Silicon, Arsenic, Germanium .They are called **metalloids**

Comparison of physical and chemical properties of metals and non – metals:-

Sr. No.	Property	Metals	Non-Metals
1	Physical State	Metals are solid at room temperature. Except mercury and gallium.	Non-metals generally exist as solids and gases, except Bromine.
2	Melting and boiling points	Metals generally have high m.pt and b.pt except gallium and cesium.	Non-metals have low m.pt and b.pt except diamond and graphite.
3	Density	Generally high.	Generally low.
4	Malleability and Ductility	Malleable and ductile.	Neither malleable nor ductile.
5	Electrical and thermal conductivity	Good conductors of heat and electricity.	Generally poor conductors of heat and electricity except graphite.
6	Luster	Poses shining luster.	Do not have luster except iodine.
7	Sonorous sound	Give sonorous sound when struck.	Does not give sonorous sound.
8	Hardness	Generally hard except Na, K	Solid non-metals are generally soft except diamond.

Comparison of Chemical Properties of Metals and Non-metals:-

1	Reaction with Oxygen	Metal + Oxygen→ Metal oxide $4Na(s) + O_2(g) \rightarrow 2Na_2O(s)$ $4Al(s) + 3O_2(g) \rightarrow 2Al_2O_3$ Metals form basic oxides Zn and Al form amphoteric oxides (they show the properties of both acidic and basic oxides) Most of the metal oxides are insoluble in water Some of them dissolve to form Alkali $Na_2O(s) + H_2O(l) \rightarrow 2NaOH(aq)$	Non-metal + Oxygen → Non-metal oxide $C + O_2 \rightarrow CO_2$ $S + O_2 \rightarrow SO_2$ Non-metals form acidic oxides CO and H_2O are neutral oxides(they are neither acidic nor basic in nature) Non-metal oxides are soluble in water They dissolve in water to form acids $SO_2 + H_2O \rightarrow H_2SO_3$
2	Reaction with water	Metals react with water to form metal oxides or metal hydroxide and H_2 gas is released. $2Na(s) + 2H_2O(l) \rightarrow 2NaOH + H_2(g)$ + heat	Non-metals do not react with water, steam to evolve hydrogen gas. Because Non-metals cannot give electrons to hydrogen in water so that it can be released as H_2 gas.
3	Reaction with dilute Acids	Metal + Acid → Metal lt + Hydrogen **HCl** $Mg(s) + 2HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$ **H_2SO_4** $2Na(s) + H_2SO_4 \rightarrow Na_2SO_4(aq) + H_2(g)$ **HNO_3** Metal + HNO_3 → H_2 gas is not displaced. **Reason-** HNO_3 is strong oxidizing agent.	Non-metals do not react with acids to release H_2 gas **Reason-** Non-metals cannot loose electrons and give it to Hydrogen ions of acids so that the gas is released. $Mn + 2HNO_3 \rightarrow Mn(NO_3)_2 + H_2$ H_2 gas from HNO_3
4	Reaction with lt solutions	When metals react with lt solution, more reactive metal will displace a less reactive metal from its lt solution. $CuSO_4(aq) + Zn(s) \rightarrow ZnSO_4(aq) + Cu(s)$	When non-metals react with lt solution, more reactive non-metal will displace a less reactive non-metal from its lt solution. $2NaBr(aq) + Cl_2(g) \rightarrow 2NaCl(aq) + Br_2(aq)$
5	Reaction	Metal + Chlorine → Metal	Non-metal + Chlorine →

	with Chlorine	Chloride ionic bond is formed. Therefore Ionic compound is obtained. 2Na + Cl_2 → 2NaCl	Non-metal Chloride covalent bond is formed. Therefore covalent compound is obtained. $H_2(g) + Cl_2$ → 2HCl
6	Reaction with Hydrogen	Metals react with hydrogen to form metal hydride This reaction takes place only for most reactive metals. 2Na(s) + $H_2(g)$ → 2NaH(s)	Non-metals react with hydrogen to form hydrides $H_2(g)$ + S(l) → $H_2S(g)$

Properties of ionic compounds

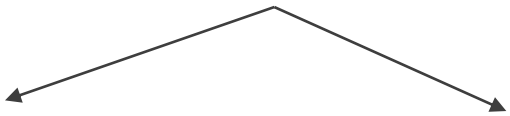
1. **Physical nature:**solid and hard due to strong force of attraction. (generally brittle)
2. **Melting point and boiling point:**have high M.P and B.P, as large amount of heat energy is required to break strong ionic attraction.
3. **Solubility:** soluble in water and insoluble in kerosene and pertrol.
4. **Conduction of electricity:**ionic compounds in solid state-----does not conduct electricity.

   Reason—Ions can not move due to rigid solid structure. Ionic compounds conduct electricity in molten state.

   Reason-- Ions can move freely since the electrostatic forces of attraction between the oppositely charged ions are overcome due to heat.

Occurrence of metals.

It occurs in Earths crust, sea-water



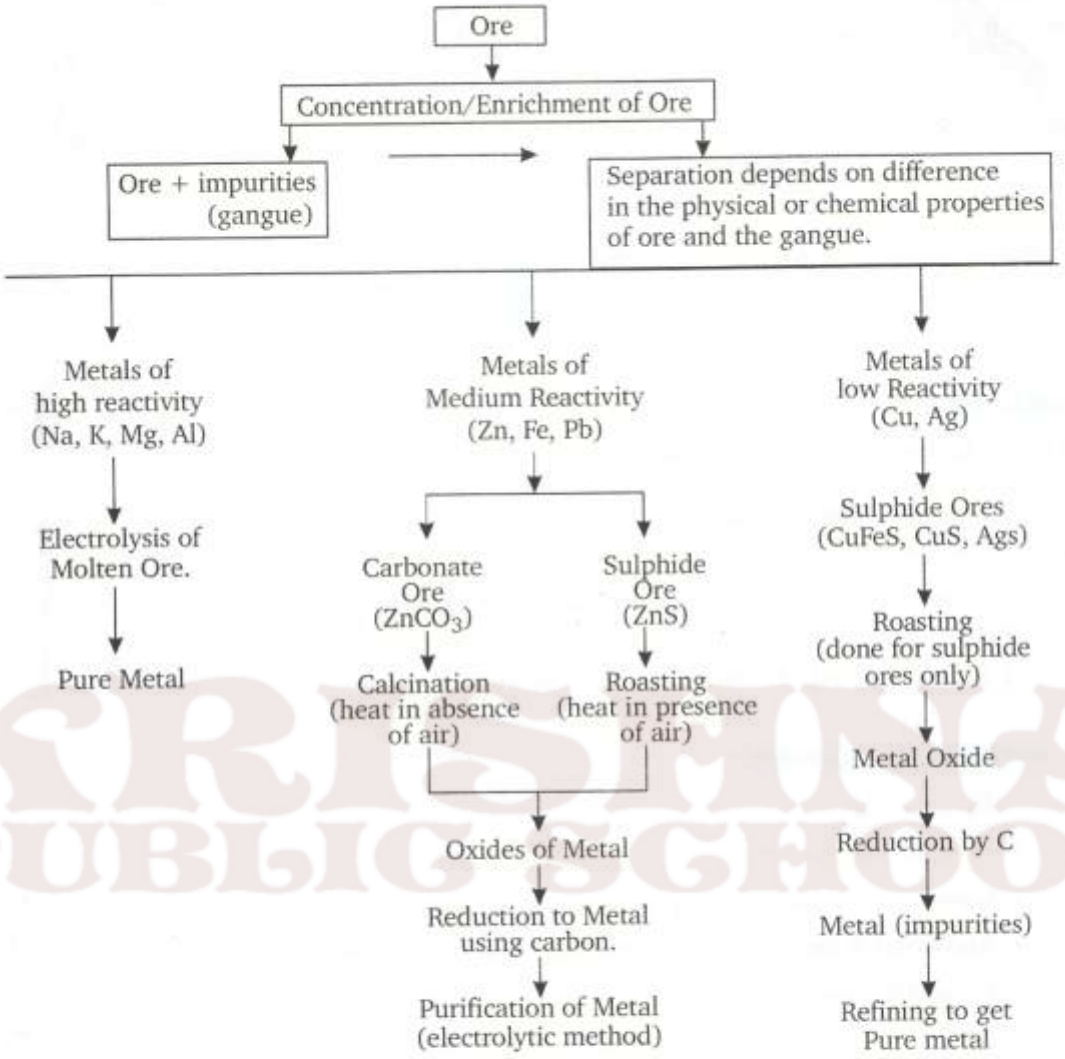
Minerals

Elements or compounds, occuring naturally in the earth's crust

Ores

Minerals that contain very high percentage of a perticular metal and these metals can be extracted economically on a large scale.
e.g Bouxite ore → Aluminium
Haematite → Iron

Extraction of Metals based on their reactively. The various steps involved are as follows.

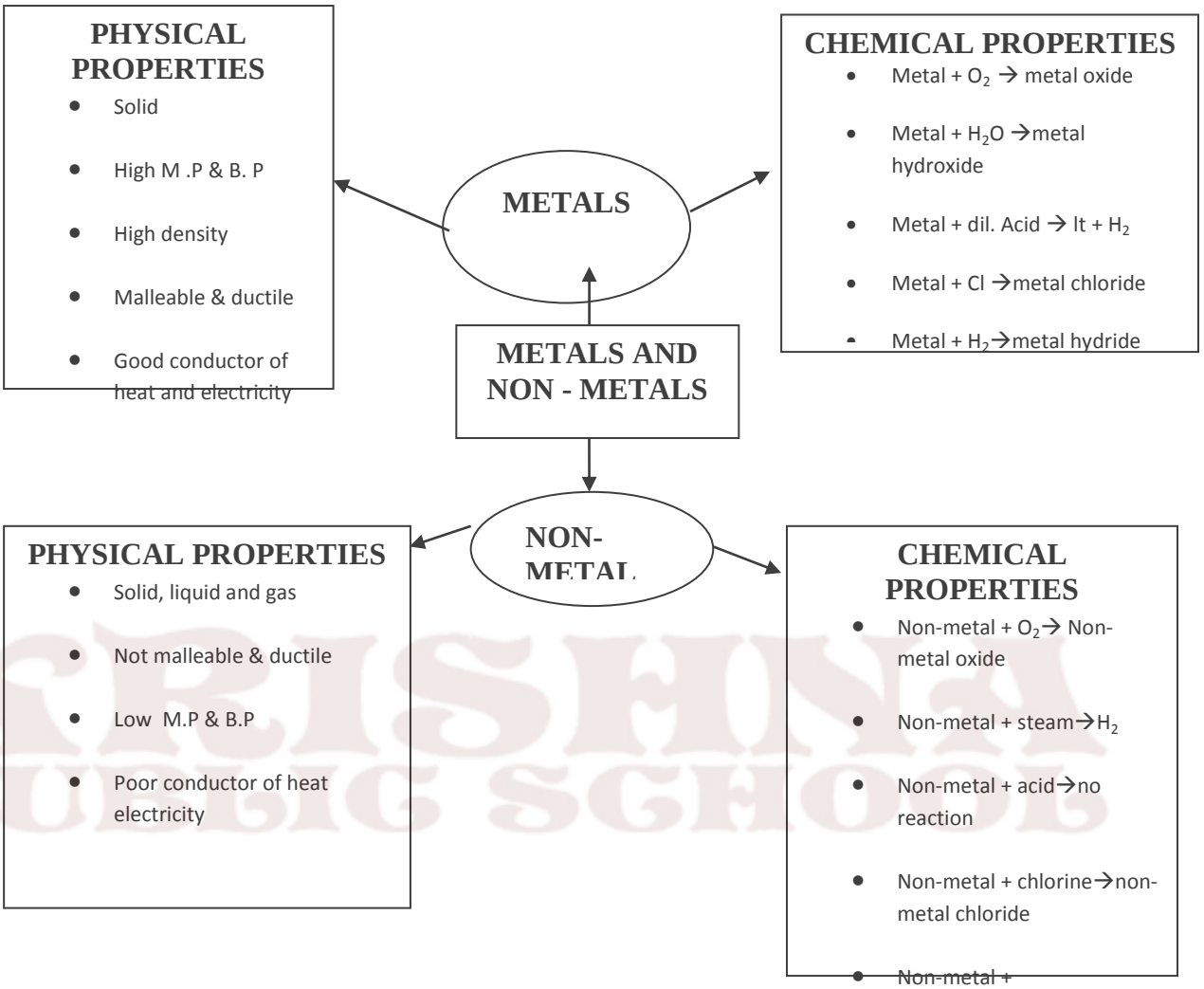


Calcination	***Roasting***
It is done for carbonate ores. Heating of ores in absence of oxygen. CO_2 gas is released and Metal oxide is obtained $ZnCO_2(s) \xrightarrow{heat} ZnO(s) + CO_2(g)$	It is done for sulphide ores. Heating of S. ore in presence of oxygen. SO_2 gas is released and Metal oxide is obtained. $2ZnS(s) + 3O_2(g) \xrightarrow{heat} 3ZnO(s) + SO_2(g)$

Refining of Metals

To obtain pure metal electrolytic refining of metals is done.

MIND MAP



METALS AND NON – METALS
ASSESSMENT I
Q.PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1) Which metal other than mercury is liquid at room temperature?

2) Why the item made of silver turns black when exposed to air?

3) Which non – metal is lustrous?

4) What is an amalgam?

5) What is the nature of oxides of metal?

6) Give reasons for the following:
   a) Na, K and Ca metals form hydrides by combination with hydrogen gas, but most other metals do not.
   b) Metals conduct electricity.

7) Write the equations for the reactions of:
   a) Iron with steam.
   b) Calcium and potassium with water.

8) What is activity series? How does it help us in predicting the relative reactivities of various metals?

9) What is the difference between sodium atom and sodium ion?

10)
   a) Write electron dot structure for sodium and oxygen.
   b) Show the formation of Na_2O by electron transfer.
   c) What are the ions present in these compounds?

11) Write three properties of ionic compounds.

12) Explain how a metal low in the activity series can be extracted. Write suitable example.

13) Give reasons:
   a) Platinum, gold and silver are used to make jewellery.
   b) Sodium, potassium and lithium are stored under oil.
   c) Aluminium is a highly reactive metal; still it is used to make utensils for cooking.

14) Name the following:
   a) A non – metal that is a good conductor of electricity.
   b) A metallic oxide which cannot be reduced by coke.
   c) A metallic oxide which is amphoteric in nature.
   d) A non – metallic oxide which is neutral.
   e) Principal ore of aluminium.

HOTS QUESTIONS (SOLVED / UNSOLVED)

Q.1 a) What are amphoteric oxides? Choose the amphoteric oxides from amongst the following: Na_2O, ZnO, Al_2O_3, CO_2, H_2O
   b) Why is it that non metals do not displace hydrogen from dilute acid?

Ans. a) The oxides which are acidic as well as basic in nature are called amphoteric oxides. ZnO and $Al_2O_3$are amphoteric oxides.
   b) Non metals can not loose electrons so that H^+ ions become hydrogen gas.

Q.2. What is anodizing? What is its use?

Ans. The process of forming thick oxide layer of aluminium oxide that makes it resistant to further corrosion.

Q.3. What is Aqua regia? What is its use?

Ans. It is a mixture of concentrated HCl and concentrated HNO_3 in the ratio 3:1. It can dissolve gold and platinum.

Q.4. Give reason: Aluminium is highly reactive metal, but it is used to make utensils for cooking.

Q.5. Explain why (a) Iron articles are frequently painted. (b) Iron sheets are coated with Zinc layer.

Q.6 On adding dilute HCl acid to copper oxide powder, the solution formed is blue – green. Predict the new compound formed which imparts a blue – green colour to the solution? Write its equation.

Q.7. Name the property of metal used in the following cases- (i) Aluminium foil (ii) Meta jewellery (iii) Cable wires (iv) Bells

Q.8. How can you prove that Zinc is more reactive than Copper?

Q.9. Draw and explain the electrolytic refining of impure Copper.

Q.10. Why is Aluminium extracted from Alumina by electrolytic reduction and not by reducing it with Carbon?

Q.11 Write 3 points of difference between Calcination & Roasting?

Q.12 Write 5 points of difference between Ionic compound and covalent compound.

Q.13 What is thermit reaction? Give its one use.

Q.14 What is amalgam?

Q. 15 Magnesium when reacts with hot water, starts floating. Why?

II
METALS AND NON – METALS

ORAL QUESTIONS

1. Name the metal which is a liquid.
2. Name the non – metal which shows lustre.
3. Name the lightest metal.
4. Name the metal with highest density.
5. Name the property of the metals by virtue of which these can be beaten into sheets
6. Name the property of the metals by virtue of which these can be drawn into wires.
7. Name the material which is kept in water.
8. Name the metal used for galvani tion of iron.
9. Mercury is liquid and a good conductor of heat. How is this property utilized?

QUIZ – WHO AM I

1. I am a property of metals which appears at lower temperatures.
2. I am noble conductor of heat and electricity.
3. Though I get corroded in atmosphere but still find wide applications for making kitchen utensils.
4. I am a metal but very soft and cannot be kept in the open.
5. I am called a series and play a significant role when a metal reacts with solutions of other metal lts.
6. Scientists / Industrialists use me to extract metals profitably and economically.
7. I am a process to refine metals of high reactivity.
8. I am a process associated with wasting away of metals by the action of atmospheric gases and moisture
9. I am homogenous and not a compound though my formation least to altering the properties of metals involved.
10. We belong to the me category of elements but still combine to form molecules / compounds.

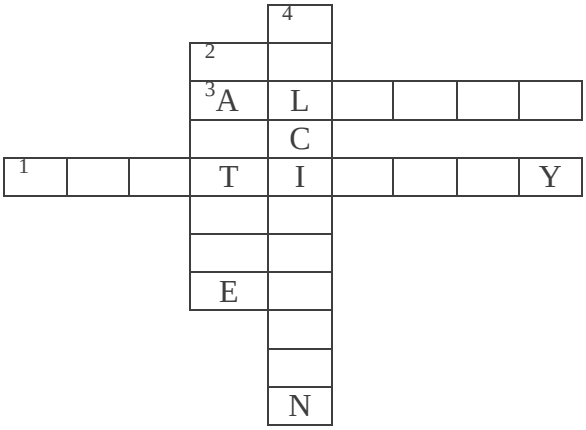
PUZZLES

1. ⇒ **Across**

1. Property of metals to give long wires. (9)
3. Solid solution of metal (6)

⇓ **Down**

2. Three dimensional networks of ionic compounds (7).
3. Process of heating concentrated ores in the absence of air (11)

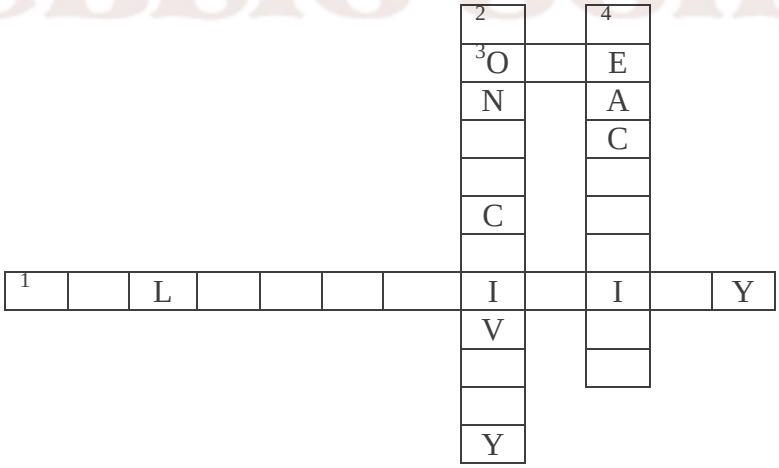


2. ⇒ **Across**

1. Property of metals to give sheets. (12)
4. Refined naturally occurring inorganic solid from which metal is extracted economically(3)

⇓ **Down**

2. Property of metals to allow pas ge of heat or electricity (12).
3. A series determined by electropositive character of metals (10)



CHAPTER 6 -LIFE PROCESSES

KEY CONCEPTS & GIST OF THE LESSON

- Life processes – The processes that are neces ry for an organism to stay alive. Eg. Nutrition, respiration, etc.
- Criteria of life- (i) Growth (ii) Movement
- Nutrition- The process in which an organism takes in food, utilizes it to get energy, for growth, repair and maintenance, etc. and excretes the waste materials from the body.
- **Types of nutrition**

1. **Autotrophic nutrition** (Auto =self: trophos = nourishment) E.g. Plants, Algae, blue green bacteria.
    - Process – Photosynthesis(Photo=light; Synthesis= to combine)
    - Raw materials- (i) Carbon dioxide (ii)Water
    - Equation- sunlight
    - $6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyll}]{\text{sunlight}} C_6H_{12}O_6 + 6O_2$
    - Energy conversion- Light/Solar energy to Chemical energy
    - Role off Chlorophyll- To trap the sun's energy for photosynthesis
    - Factors- (i) Carbon dioxide (ii) Water(iii) Light (iv) Temperature
    - Events/ Steps of photosynthesis-
        (i) Absorption of light energy by chlorophyll
        (ii) Conversion of light energy to chemical energy & Splitting of water molecule into Hydrogen & oxygen
        (iii) Reduction of Carbon dioxide to Carbohydrate
    - Gaseous exchange- (i) Gas used- Carbon dioxide
        (ii) By product - Oxygen
    - Source of raw materials-
        (i) Carbon dioxide –Land plants- Air, Aquatic plants- Water
        (ii) Water & Minerals - Soil

2. **Heterotrophic nutrition** (Hetero =others: trophos = nourishment) Eg. Animals, plants lacking chlorophyll like fungi.

(a) **prophytic nutrition**: Organisms feeds on dead decaying plants or animals material. E.g. Fungi, Bacteria

(b) **Parasitic nutrition**: Organisms obtain food from the body of another living (host)

- Endoparasite : Parasite lives inside the body of the host e.g. tapeworm, roundworm.
- Exoparasite : Parasite lives on the body of the host. E.g. lice, leech.

Note- The parasite benefits while the host is usually harmed e.g. Cuscutta-plant parasite (amar bel), plasmodium (malarial parasite).

(c) **Holozoic nutrition**: Organism (mostly animals) take in whole food and then digest it into smaller particles with enzyme. Eg. Amoeba, Paramoecium. Animals, human beings.

- Steps in Holozoic nutrition
    (i) Ingestion: taking in of food.
    (ii) Digestion: breaking down of complex food into simpler, absorbable form.
    (iii) Assimilation: Utilization of digested food from the body.
    (iv) Egestion: Removing undigested food from the body

- Nutrition in human beings

- Alimentary canal-
  Mouth → Oesophagus → Stomach → Small intestine → Large intestine
- Important gland/juices

(Refer to figure 6.6 page no.97 of N.C.E.R.T Text book)

Organ	Gland	Enzyme/Juice	Function
Mouth	livary glands	livary Amylase	Converts starch into sugar
Stomach	Gastric glands	Gastric juice- (i) Hydrochloric acid → (ii) Pepsin → (iii) Mucus →	 (a) Kills harmful bacteria that enters with the food. (b) Makes the medium alkaline for the action of Pepsin Digests proteins Protects the inner lining of the stomach from the corrosive action of Hydrochloric acid.
Small intestine	1) Liver 2) Pancreas	(i) Bile juice → (ii) Pancreatic Juice ▪ Amylase → ▪ Trypsin → ▪ Lipase →	(a) Makes the medium acidic for the action of Pancreatic enzymes. (b) Breaks down large fat molecules into smaller globules so that enzymes can act upon them. Converts Carbohydrates to glucose Converts Proteins to Amino acids Converts Fats into Fatty acids & Glycerol

- Peristaltic movements- Rhythmic contraction of muscles of the lining of Alimentary canal to push the food forward.
- Sphincter muscle- Helps in the exit of food from the stomach.

- Villi- Small finger like projections on the walls of-
  (v) Small intestine- To increase the surface area for the absorption of food.
  (vi) Large intestine- For absorption of water.

❖ **Respiration**- The process by which digested food is broken down with the help of Oxygen to release energy.

- Types of respiration- (i) Aerobic respiration (ii) Anaerobic respiration

Aerobic respiration	**Anaerobic respiration**

1. Takes place in presence of Oxygen.	1. Takes place in absence of Oxygen.
2. End products- Carbon dioxide & Water	2. End products- Ethanol & Carbon dioxide
3. More energy is released.	3. Less energy is released.
4. Takes place in Cytoplasm & Mitochondria	4. Takes place in only in Cytoplasm.
5. Complete oxidation of glucose takes place.	5. Incomplete oxidation of glucose takes place.
6. It occurs in most organisms.	6. It occurs in certain bacteria, yeast & certain tissues of higher organisms. E.g. In humans during vigorous exercise, when the demand for Oxygen is more than the supply, muscle cells respire anaerobically for some time.
7. Equation- Glucose→ Pyruvate→ CO_2 + H_2O + Energy	7. Equation- <u>In Yeast-</u> Glucose→ Pyruvate→ Ethanol + H_2O + Energy <u>In muscle cells -</u> Glucose→ Pyruvate→ Lactic acid + Energy

- Some common features of Respiratory organs-
  (i) Large surface area- for greater rate of diffusion of respiratory gases.
  (ii) Thin permeable walls – to ensure easy diffusion & exchange of gases.
  (iii) Extensive blood supply- Respiratory organs are richly supplied with blood vessels for quick transport of gases.
- Gaseous exchange in plants-
  - Process – Diffusion
  - Direction of diffusion depends on- (i) Environmental conditions
    (ii) Requirement of the plant.
  - Day time- Carbon dioxide given out during respiration is used for photosynthesis. Therefore only Oxygen is released, which is a major activity during the day.
  - Night time – Only respiration takes place. Therefore only Carbon dioxide is released, which is a major activity during the night.

- Gaseous exchange in animals-
  - Terrestrial animals- take Oxygen from the atmosphere.
  - Aquatic animals- take Oxygen dissolved in water. (Oxygen content is low in water, therefore they breathe faster.
- Human Respiratory system-
  External nostrils → Na l cavity → Trachea→ Bronchi → Bronchioles →Alveoli
  - Rings of cartilage present in the throat ensure that the trachea (air pas ge) does not collapse when there is less air in it.
  - Lungs – (i) Present in the thoracic cavity.
    (ii) They are spongy, elastic bags consisting of Bronchi, Bronchioles and Alveoli

Refer to figure 6.9 page no. 104 of N.C.E.R.T Text book)

- Respiration occurs in two phases-
- (i) External-Breathing, which is a mechanical process.
  (ii) Internal - Cellular respiration
- Mechanism of breathing – It includes : (i)Inhalation (ii) Exhalation
- Exchange of gases-
  - Unicellular organisms- By Diffusion
  - Animals- (i) As the body size is large, diffusion alone is not enough.
    (ii) Respiratory pigments also required.
    (iii) Respiratory pigment in human beings is Haemoglobin, which is present in red blood corpuscles.
    (iv) It has very high affinity for Oxygen.
    (iv) Carbon dioxide is more soluble in water than Oxygen, so it Gets dissolves in blood and is thus transported.

❖ Transportation

- Transportation in human beings-
  - Blood- (i) It is a fluid connective tissue.
    (ii) Components- (1) Fluid medium- Plasma
    (2) Red blood corpuscles
    (3) White blood corpuscles
    (4) Platelets suspended in plasma
    (iii) Plasma transports food, Oxygen, Carbon dioxide, Nitrogenous wastes, etc.
  - Functions of blood- (i) Transport of respiratory gases.
    (ii) Transport of nutrients.
    (iii) Transport of waste products.
    (iv) Defence against infection
  - Blood vessels- (i) Arteries (ii) Veins (iii) Capillaries

Arteries	Veins
1. Thick walled.	1. Thin walled.
2. Deep seated.	2. Superficial.
3. Carry blood away from the heart.	3. Carry blood to the heart.
4. Carry Oxygenated blood.	4. Carry Deoxygenated blood.
5. Valves absent.	5. Valves present

  - Heart- (Refer to figure 6.10 page no. 106 of N.C.E.R.T Text book)
    (i) It is a muscular organ, which works as a pump in the circulatory system.
    (ii) It is the size of our fist.
    (iii) It has two sides, which are separated by a partition so that the oxygenated and deoxygenated blood do not get mixed up.
    (iv) It has four chambers-
    Two upper chambers called Atria.
    Two lower chambers called Ventricles.
  - Working of heart-
    Left side- (i) Left atrium relaxes & the Oxygenated blood enters it from the lungs through the pulmonary vein.
    (ii) Left atrium contracts & the blood enters the left ventricle through the valve.
    (iii) Left Ventricle contracts and the blood is pumped into the largest artery 'Aorta' and is carried to all parts of the body.

Right side- (i) Right atrium relaxes & the deoxygenated blood from the body enters it through superior and inferior Vena cava.
(ii) Right atrium contracts & the blood enters the right Ventricle through the valve.
(iii) Right Ventricle contracts and the blood is pumped into the Pulmonary artery and is carried to lungs.

- Valves- Unidirectional to prevent the backward flow of blood.
- Pulmonary vein is the only vein that carries Oxygenated blood.
- Aorta is the only artery that carries Deoxygenated blood.
- Double circulation in man- because the blood passes through the heart twice in one complete cycle of the circulation.
- Capillaries- (i) Form the connection between arteries & veins.
(ii) Walls are one cell thick only for easy exchange of blood.
- Platelets- Plug the leaks of arteries and veins by clotting the blood.
- Lymph- Extracellular fluid similar to plasma but colourless with lesser protein.
- Function of lymph- (i) Transportation of digested & absorbed fats from the small intestine.
(ii) Drains excess fluid from the intercellular spaces back in the blood.
- Higher animals- E.g., birds, mammals.
  (i) Oxygenated blood & Deoxygenated blood are completely separate for efficient Oxygen supply.
  (ii) This is to fulfil higher energy needs and to maintain body temperature (warm blooded animals).
- Amphibians & reptiles- have 3 chambered heat where little mixing of Oxygenated blood & Deoxygenated blood takes place. Therefore their body temperature varies with the temperature of the environment. (cold blooded animals)

- Transportation in plants-
  - Plants need less energy needs- because they do not move and therefore have a slow transport system
  - Transport of water-
    (i) Takes place by xylem tissue present in roots, stem, leaves and is therefore interconnected.
    (ii) Root cells take up ions from the soil, which creates a concentration difference between root and soil. Column of water therefore rises upwards.
  - In very tall plants- transpiration creates a suction pressure, which pulls the water upwards.
  - Importance of transpiration-
    (i) Helps in upward movement of water in plants.
    (ii) It regulates the temperature in plants.
  - Transport of food-
    (i) Takes place by phloem tissue.
    (ii) Movement of prepared food in plants is called translocation.

❖ Excretion- The biological process of removal of harmful metabolic wastes in living organisms.

❖ Excretion in human beings-

(Refer to figure 6.13 page no. 110 of N.C.E.R.T Text book)

- Organs of excretory system- (i) Kidneys (iii) Urinary bladder
  (ii) Ureters (iv) Urethra
- Kidneys-
  - (i) Two in number
  - (ii) Bean shaped
  - (iii) Present in abdomen on either side of the backbone
  - (iv) Basic unit is nephron.
    a. Glomerulus- Group of capillaries (cluster) present in Bowman's capsule to receive blood from renal artery and filters it.
    b. Bowman's capsule- Cup shaped structure, which contains glomerulus.
    c. Convoluted tubule- is long and reabsorbs vital nutrients like glucose, amino acids, lts, urea and water.

Note-Vital functions of kidneys- (a) Filtration & removal of Nitrogenous wastes
(b) Reabsorption of vital nutrients

- Ureters- Transport the urine formed in the kidneys to the urinary bladder.
- Urinary bladder- Muscular bag like structure to store urine.
- Urethra- Helps in removal of urine when the Urinary bladder is full.
- Artificial kidney- Principle: Dialysis

❖ Excretion in plants-

- Gaseous wastes- CO_2 in respiration & O_2 in photosynthesis are removed by the process of diffusion.
- Excess water- is removed by transpiration.
- Other wastes- (i) Stored in cellular vacuoles or in leaves, which fall off or as gums, resins, etc. in old xylem.
  (ii) Excreted in soil.

❖ Important diagrams-

1. Open & close stomata
2. Steps of nutrition in Amoeba
3. Alimentary canal of human beings/ Digestive system of human beings
4. Respiratory system of human beings
5. Structure of heart.
6. Excretory system of human beings
7. Structure of nephron

❖ Important activities-

1. To prove that chlorophyll is neces ry for photosynthesis.
2. To prove that Carbon dioxide is neces ry for photosynthesis.
3. To prove that light is neces ry for photosynthesis.
4. To prove that product of fermentation is Carbon dioxide.
5. To prove that leaves lose water by transpiration.
6. To study the action of livary amylase on starch.
7. To demonstrate that Carbon dioxide is present in exhaled air.
8. To demonstrate the process of transpiration in plants.

LIFE PROCESS
ASSESSMENT I
Q.PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1. Name the site of photosynthesis.
2. What is osmoregulation?
3. Name the excretory unit of kidney.
4. What is neuron?
5. Name the term for transport of food from leave to other parts of the plant.
6. Draw the diagram of cross – section of a lead and label the following in it:
    a. Chloroplast
    b. Guard cell
    c. Lower epidermis
    d. Upper epidermis
7. What do you mean by double circulation of blood?
8. Explain why Bile juice does not contain any digestive enzymes, yet it is essential for digestion.
9. How would non – secretion of hydrochloric acid in our stomach affect food digestion? Explain.
10. How does nutrition takes place in Amoeba?
11. Draw a diagram of cross section of human heart. Show the path of flow of blood with the help of arrows.
12. How water is transported upwards in plants?
13. Descried the functioning of nephrons.
14.
    a. Draw a diagram of human alimentary canal.
    b. Label the following – oesophagus, liver, gall bladder, and duodenum.
    c. What is the function of liver in human body?

HOTS QUESTIONS (SOLVED / UNSOLVED)

Q1. Why is it neces ry to separate oxygenated and deoxygenated blood in mammals and birds?
Ans. The mammals and birds are warm-blooded animals which have high energy needs because they constantly require energy to maintain their body temperature. It is neces ry to separate oxygenated blood and deoxygenated blood in mammals and birds because such a separation allows a highly efficient supply of oxygen to the body cells which is required for producing a lot of energy needed by them.
Q2. How is small intestine designed to absorb digested food?
Ans. The inner surface of small intestine has millions of tiny, finger like projections called Villi. The presence of villi gives the inner walls of the small intestine a very large surface area. The large inner surface area of small intestine helps in the rapid absorption of the digested food.

LIFE PROCESSES
ORAL QUESTIONS

1. Do plants also need oxygen?
2. How does food passes through alimentary canal?
3. What regulate the exit of food from the stomach into small intestine?
4. In which part of the alimentary canal food is completely digested absorbed?
5. In which cell organelle breakdown of pyruvate takes place using oxygen?
6. Which structures stop backward flow of blood in atria and ventricles?
7. The filtered urine is collected in which part of nephron?
8. Which part of the plant excretes some waste substances into the soil?
9. Name the process used to remove urea from the blood.
10. The process by which evaporation of water from the plants mainly through the stomata.

QUIZ

1. Digestion of starch in humans takes from which organ?
2. Absorption of energy takes place in sunlight by the pigment.
3. Is chloroplast is non – lining structure?
4. What is the function of amylase?

5. Name the organ responsible for respiration in fish.

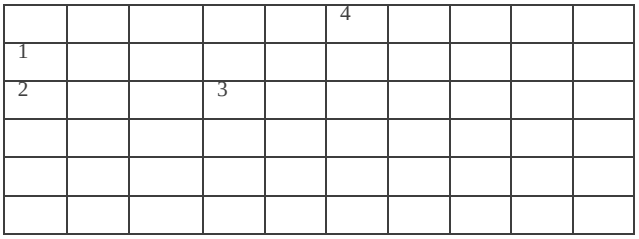
6. Which is more harmful urea or ammonia?

7. Which contains less nitrogenous wastes, the renal vein or renal artery?

PUZZLES

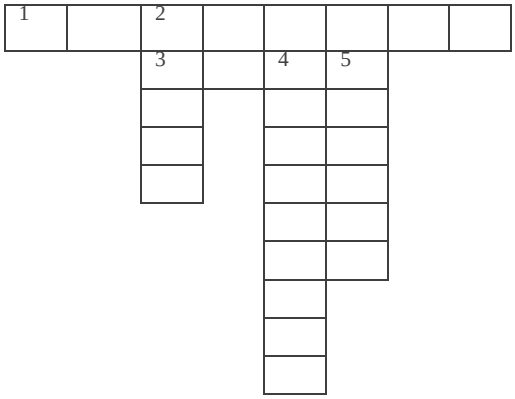
1. ⇒ **Across**
   2. Aerial part which eliminates waste from the plant body
   4. Unicellular plant that carryout fermentation.

   ⇓ **Down**
   1. Transports oxygen in the body.
   3. Carry impure blood.

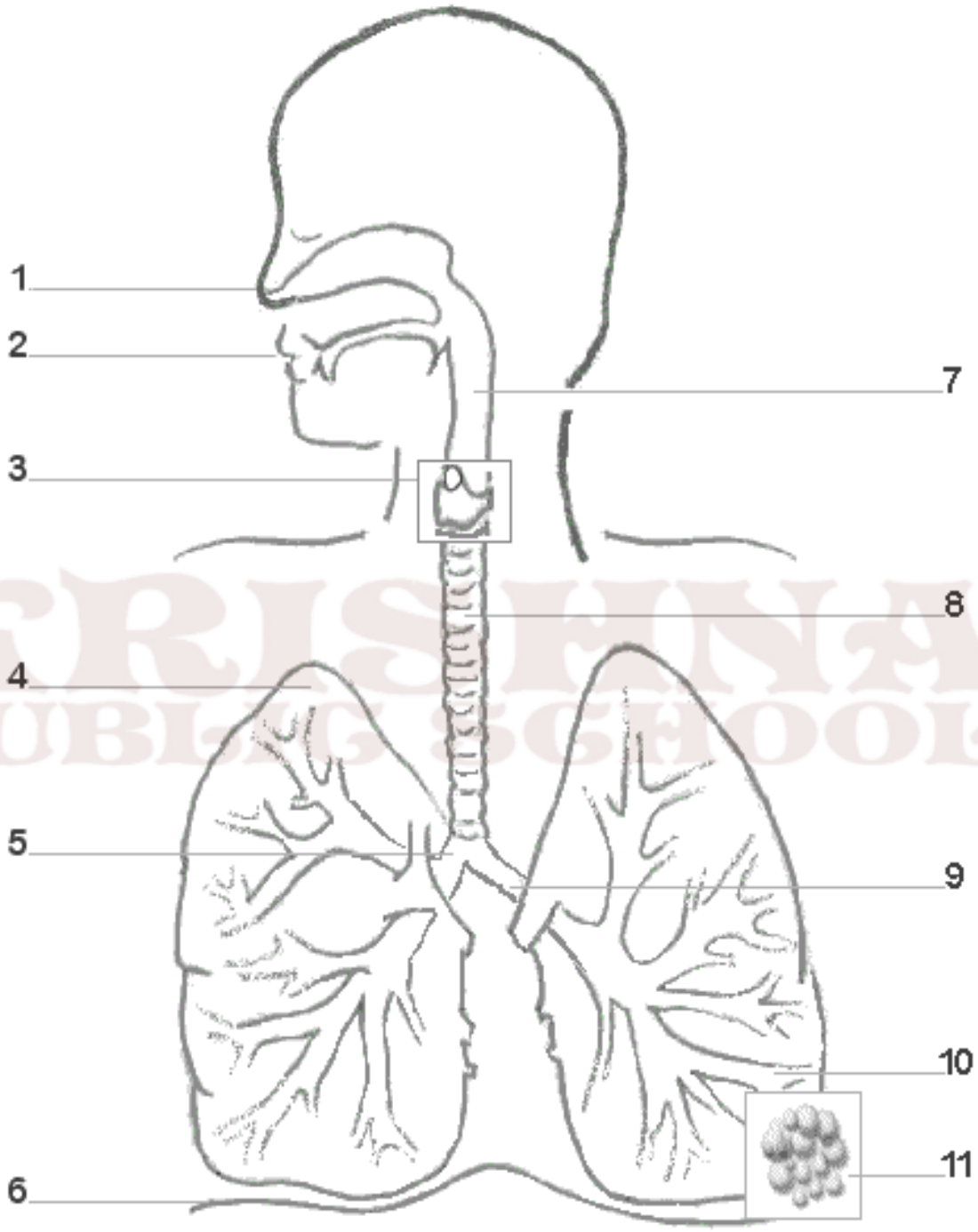


2. ⇒ **Across**
   1. Help in respiration in water.
   5. Removed through urine.

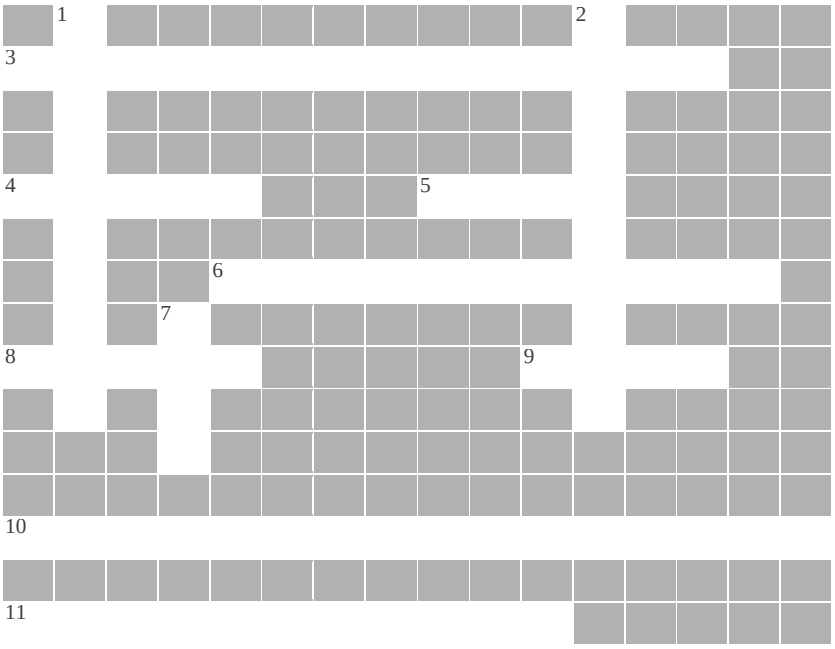
   ⇓ **Down**
   2. Help to breath in air
   3. The process by nitrogenous waste is removed.
   4. Organism that takes in food with the help of pseudopodia.



Label The Diagram Of Respiratory System



- Cross word puzzle- Circulatory system



Clues for solving the cross word puzzle

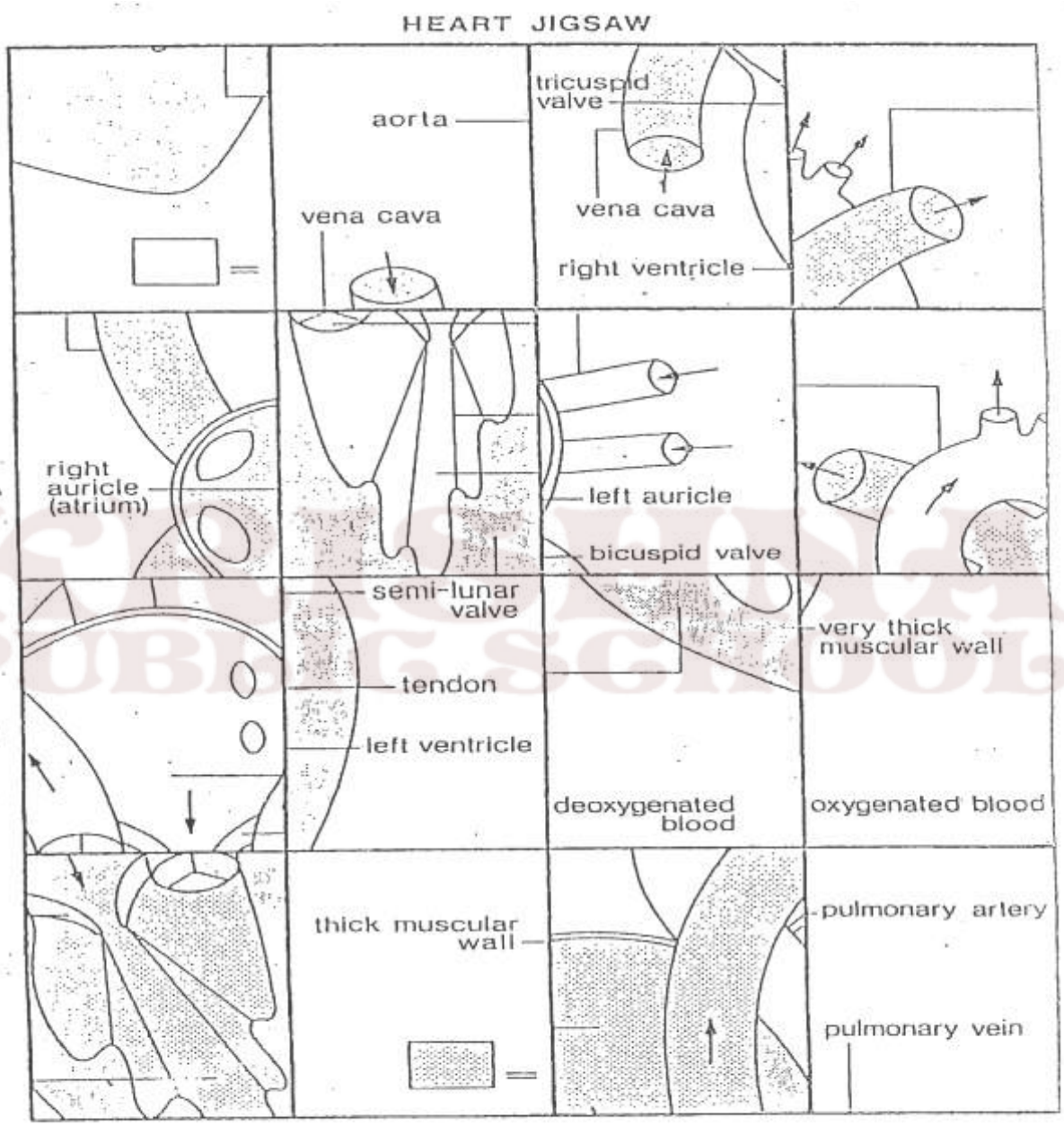
ACROSS

3. The only vein that carries oxygenated blood to the heart
4. The organ which beats continously to act as a pump for the transport of blood.
5. The number of chambers in the human heart.
6. A doctor uses this instrument to amplify the sound of the heart.
8. The two upper chambers of the heart.
9. The heart is located on this side of the chest cavity.
10. The only artery that carries deoxygenated blood from the heart.
11. They form the connection between the arteries and veins

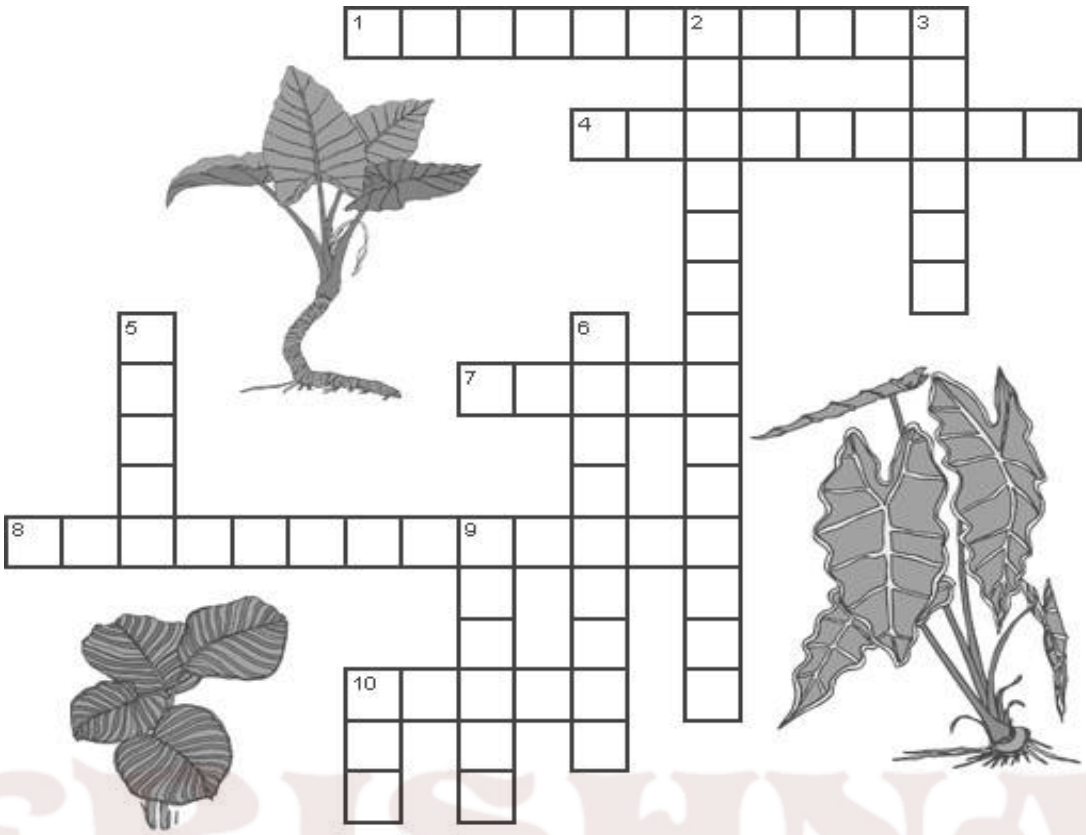
DOWN

1. The number of heart beats per minute.
2. The two lower chambers of the heart.
7. The heart is roughly the size of your _____.

- To understand the structure of heart the students can the following jig- w puzzle.



Photosynthesis – Crossword puzzle



Across

1 A plant pigment that absorbs sunlight. (11)

4 The links between the energy that carnivores get from eating to the energy captured by photosynthesis. (4,5)

7 Chlorophyll absorbs every color of sunlight except this. (5)

8 A compound needed for photosynthesis. (6,7)

10 The product of photosynthesis. (5)

Down

2 The process by which plants and some bacteria use the energy from sunlight to produce sugar. (14)

3 Part of the plant where photosynthesis generally occurs. (6)

5 A compound needed for photosynthesis. (5)

6 An animal that eats plants. (9)

9 A by-product of photosynthesis. (6)

10 Number of molecules of oxygen produced along with one molecule of sugar. (3)

CHAPTER 7 – CONTROL & COORDINATION

KEY CONCEPTS & GIST OF THE LESSON

- Coordination-The working together of various organs of the body of an organism in a proper manner to produce appropriate reaction to a stimulus is called coordination.

- Stimulus- The changes in the environment to which an organism responds and reacts is called Stimulus

- Control & coordination in animals- takes place by (i) Nervous system & (ii) Endocrine system

- Nervous system

  Stimulus → Receptor organ → Sensory nerve → Brain/Spinal cord
  ↓
  Response ← Effector organ ← Motor nerve

- Endocrine system

  Stimulus → Endocrine organ → Secrete hormone → Hormone in blood
  ↓
  Response ← Target organ

- Parts of the Nervous system – (i) Brain (ii) Spinal cord (iii) Nerves (Neurons)

- A Neuron is the structural & functional unit of Nervous system

- Parts of a neuron- (i) Dendrites (ii) Cell body (iii) Axon

- Synapse- Space/junction between two adjacent nerves is called Synapse.

- Passing of information takes place –(i) By Electric impulse (inside the neuron) and (ii) In the form of chemicals (At synapse)

- Reflex action- Spontaneous, involuntary and automatic response to a stimulus to protect us from harmful situations. Eg. On touching a hot object unknowingly we instantly withdraw our hand.

- Reflex arc- The pathway of the reflex action is called Reflex arc.
  Stimulus → Receptor organ → Sensory nerve → Spinal cord →→Effector organ→ Response
  Refer to figure 7.2 page no. 117 of N.C.E.R.T Text book)

- Nervous system- (1) Central Nervous system (CNS) (2) Peripheral Nervous system (PNS)

(i) Brain	(i) Autonomic Nervous system
(ii) Spinal cord	(ii) Voluntary Nervous system

- Brain (i) Centre of coordination of all activities (ii) Thinking is involved (iii) Complex process
- Parts of brain- Refer to figure 7.3 page no. 118 of N.C.E.R.T Text book

Fore brain	Mid brain	Hind brain
(i) Cerebrum (ii) Thalamus (iii) Hypothallamus	----------	(i) Cerebellum (ii) Pons (iii) Medulla oblongata

- ❖ Fore brain
  Cerebrum- (i) Main thinking and largest part of the brain.
  (ii) It has 3 main areas-
  a. Sensory area- to receive impulses from sense organs via Receptors
  b. Motor area- control voluntary movements.
  c. Association areas- Reasoning, learning & intelligence.
  Thalamus – It relays sensory information to the Cerebrum
  Hypothallamus- It forms the link between Nervous system & Endocrine system

- ❖ Mid brain- It connects Fore brain and Hind brain. Controls reflex of eyes & ears

- ❖ Hind brain- Connects the Fore brain & Hind brain
  Cerebellum – Controls & coordinates muscular movements, maintaining body posture and equilibrium.
  Pons- Acts as a bridge between brain & spinal cord
  Medulla oblongata- Controls involuntary actions like blood pressure, livation, vomiting, etc.

- ❖ Spinal cord- Cylindrical or tubular structure extending downwards from the Medulla oblongata.

- ❖ Protection of the brain & the spinal cord-
  (i) Bony outer covering: skull for the brain & vertebral column for the spinal cord.
  (ii) Cerebrospinal fluid present in between the three membranes.

- ❖ Action caused by Nervous tissue
  Information → Nervous tissue → Brain Muscles → Causes action
- ❖ Path or action-
  Nerve impulse → Muscle cell → Changes shape due to special proteins
  ↓
  Action caused ← Shorter form of muscles ← Change shape & arrangement of cell
- ❖ Chemical communication by hormones- (advantages)
  (i) Electrical impulses have their limitations because they reach only those cells connected to the nervous tissue.
  (ii) Also the nerve cells cannot generate & transmit impulses continuously.
  (iii)Electrical communication is slower.

- ❖ Hormones- (i) are chemical messengers secreted by endocrine glands
  (ii) Are secreted in small amounts & may act in nearby places or distant places.
  (iii) Do not take part in the reaction & are destroyed immediately.

- Hormones are secreted by- Endocrine glands & Exocrine glands

S. No.	Endocrine glands	Exocrine glands
1.	Ducts absent	Ducts present
2.	Secrete hormones	Secrete enzymes
3.	Secreted in blood	Secreted in ducts of glands
4.	Situated away from the site of action	Situated near the site of action

- Some glands which act as both endocrine & exocrine

Gland	Endocrine function	Exocrine function
Pancreas	Produces insulin & Glucagon hormone.	Produces digestive enzyme. (pancreatic amylase)
Testes	Produces hormone Testosterone	Produces male gametes (reproductive cells)
Ovaries	Produces hormone Oestrogen	Produces female gametes (reproductive cells)

- Important Endocrine glands, the hormone they secrete & their function
  Refer to figure 7.7 page no. 124 of N.C.E.R.T Text book)

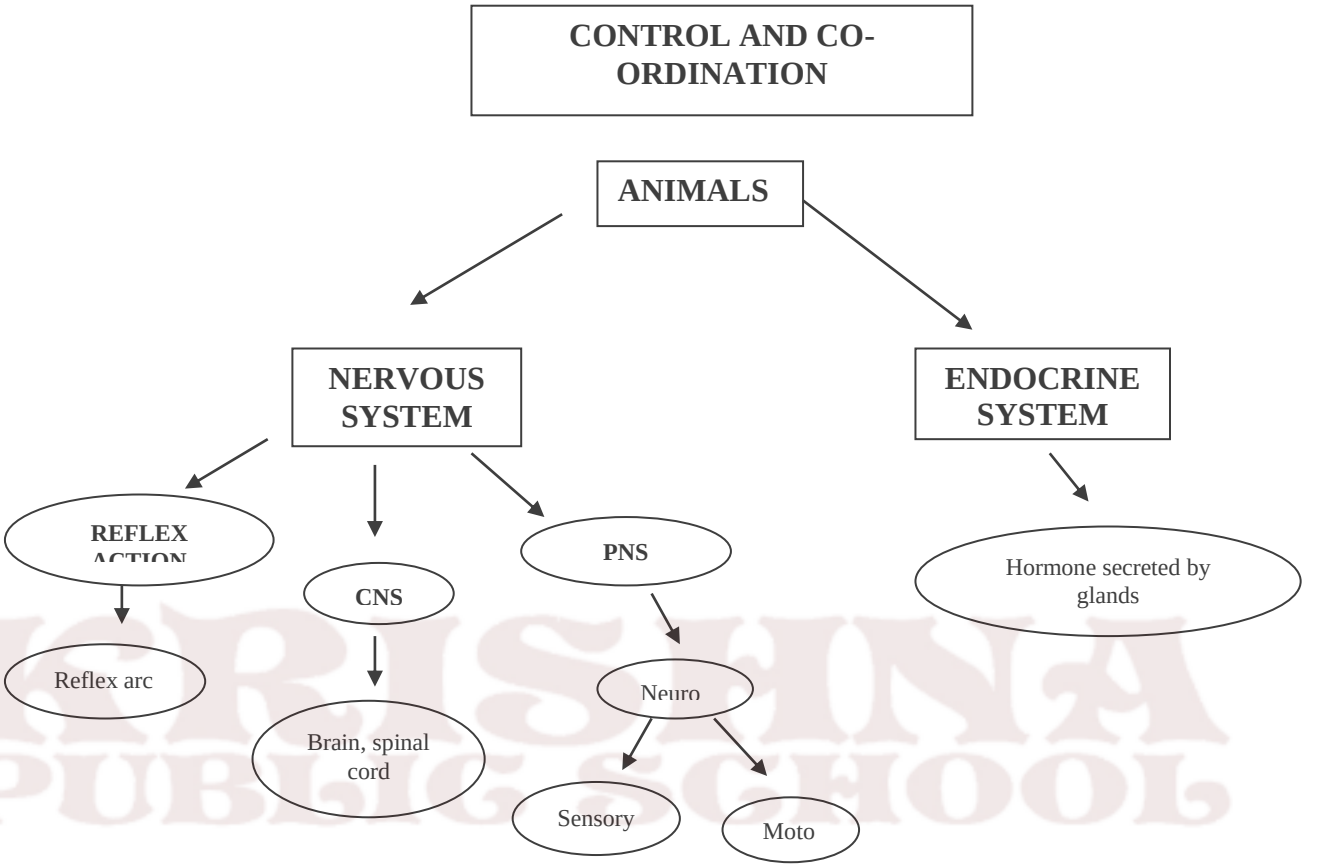
Endocrine gland	Hormone	Function
Pituitary gland	Growth hormone	Body growth, development of bones & muscles (If excess- Gigantism) (If less- Dwarfism)
Thyroid gland	Thyroxine	Regulates carbohydrate, protein & fat metabolism(If less- Goitre_
Pancreas	Produces insulin & Glucagon hormone	Regulates blood sugar levels (if less diabetes is caused)
Testes in males	Produces hormone Testosterone	Development of secondary male characters like deep voice, beard, etc.
Ovaries in females	Produces hormone Oestrogen	Development of secondary female characters like mammary glands, menstrual cycle, maintenance of pregnancy.

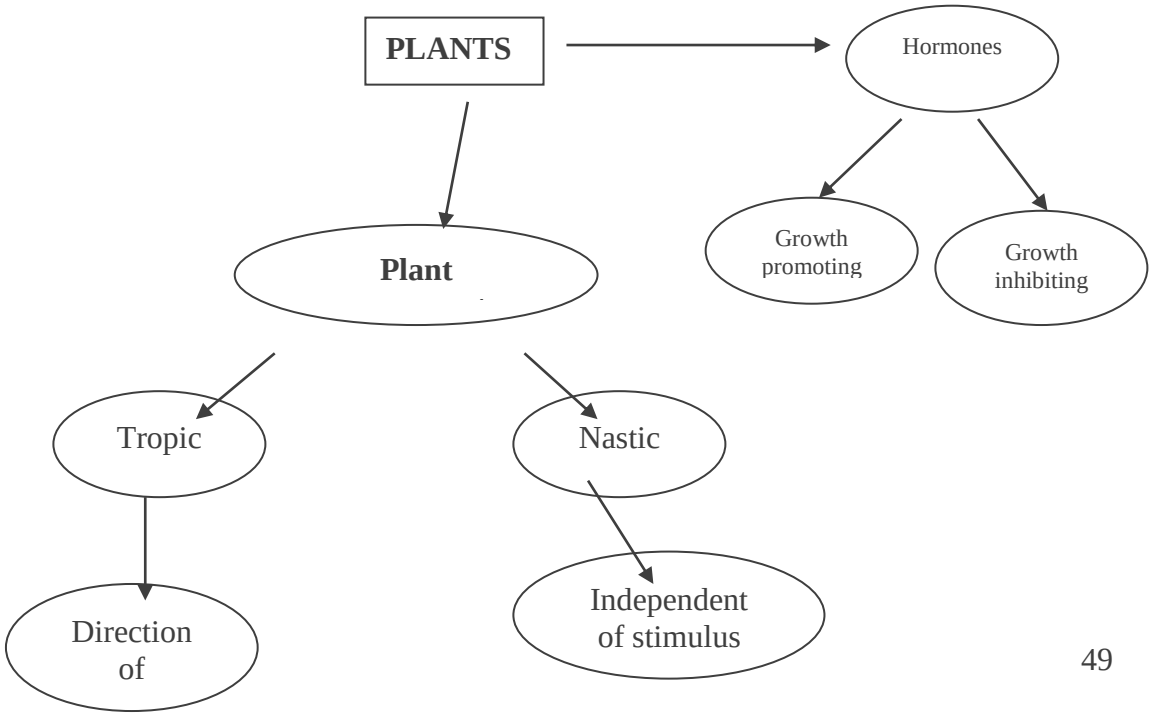
- Coordination in plants- Only chemical coordination is present in plants.
- Tropic movements- The movements of plants in the direction of stimulus (positive) or away from it (negative) are called tropic movements. E.g. Phototropism, Geotropism. Chemotropism.
  Refer to figure 7.4 & 7.5 page no. 121 of N.C.E.R.T Text book)
- Nastic movements -The movements of plants independent of stimuli are called nastic movements. E.g.- Touch me not plant leaves close when touched.
- Plant hormones (Phytohormones)
  Examples- 1. Auxins- Help in growth of root & shoot tips.
  2. Gibberellins- Help in vegetative growth
  3. Cytokinins- Promote cell division
  4. Abscissic acid - Inhibits growth & causes wilting (falling) of leaves
- Important diagrams-
  1. Structure of neuron (nerve cell)2.Reflex arc 3.Human brain4.Endocrine glands .

❖ Important activities-

1. To compare taste of sugar and food with open & blocked nostrils.
2. To demonstrate the response of a plant to the direction of light.
3. To demonstrate hydrotropism.

MIND MAP





CONTROL AND CO - ORDINATION
ASSESSMENT I
Q. PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1. Which endocrine gland is unpaired?
2. Which part of the brain controlled posture and balance of the body?
3. Where in a neuron, conversions of electrical signal to a chemical signal occur?
4. Which gland secretes digestive enzyme as well as hormones?
5. We suddenly withdraw our hand when a pin pricks. Name the type of response involved in this action.
6. What is a tropic movement? Explain with an example.
7. What will happen if intake of iodine in our diet is low?
8. Draw the structure of neuron and label the following on it:
    a. Nucleus
    b. Dendrite
    c. Cell body
    d. Axon
9. Why are some patients of diabetes treated by giving injections of insulin?
10. Why is the flow of signals in a synapse from axonal end of one neuron but not the reverse?
11. What are reflex actions? Explain reflex arc.
12. What are the major parts of the brains? Mention the functions of each.
13. How does chemical co – ordination take place in animals?
14.
    a. Name the various plant hormones.
    b. Give physiological effects of hormones on plant growth and development.

HOTS QUESTIONS (SOLVED / UNSOLVED)

Q1. Which hormone:

1. prepares the body for action?

2. controls the amount of sugar (glucose) in blood?

3. brings about changes in boys at puberty?

4. brings about changes in girls at puberty?

Ans. a) Adrenaline b) Insulin

c) Testosterone d) Oestrogen

Q2. i) Name the hormone produced by thyroid gland.

ii Which mineral is neces ry for the synthesis of the above hormone?

iii Name the disease suffer from the deficiency of this mineral.

iv Write the function of the above hormones?

Q3. What is chemotropism? Give one example of chemotropism.

ORAL QUESTIONS

1. What is the basic unit of nervous system?
2. How do neuron conduct mes ge from brain to other parts?
3. What do you mean by CNS?
4. What are its main parts?
5. Which part controls reflex action?
6. What are endocrine glands?
7. What is the secretion of endocrine gland called?
8. Name a gland of human body which secretes both enzymes and hormone.
9. Which plant hormone helps in cell division?
10. Which hormones help on stem elongation?

QUIZ

1. Which system of our body is made of organised network for conducting information in the body?

2. Which part of the neuron receives information?

3. What is the name of the neuron which remains between the sensory neuron and the motor neuron? Where is it located?

4. Which part of the brain helps us to do activities like riding a cycle and walking in a straight line?

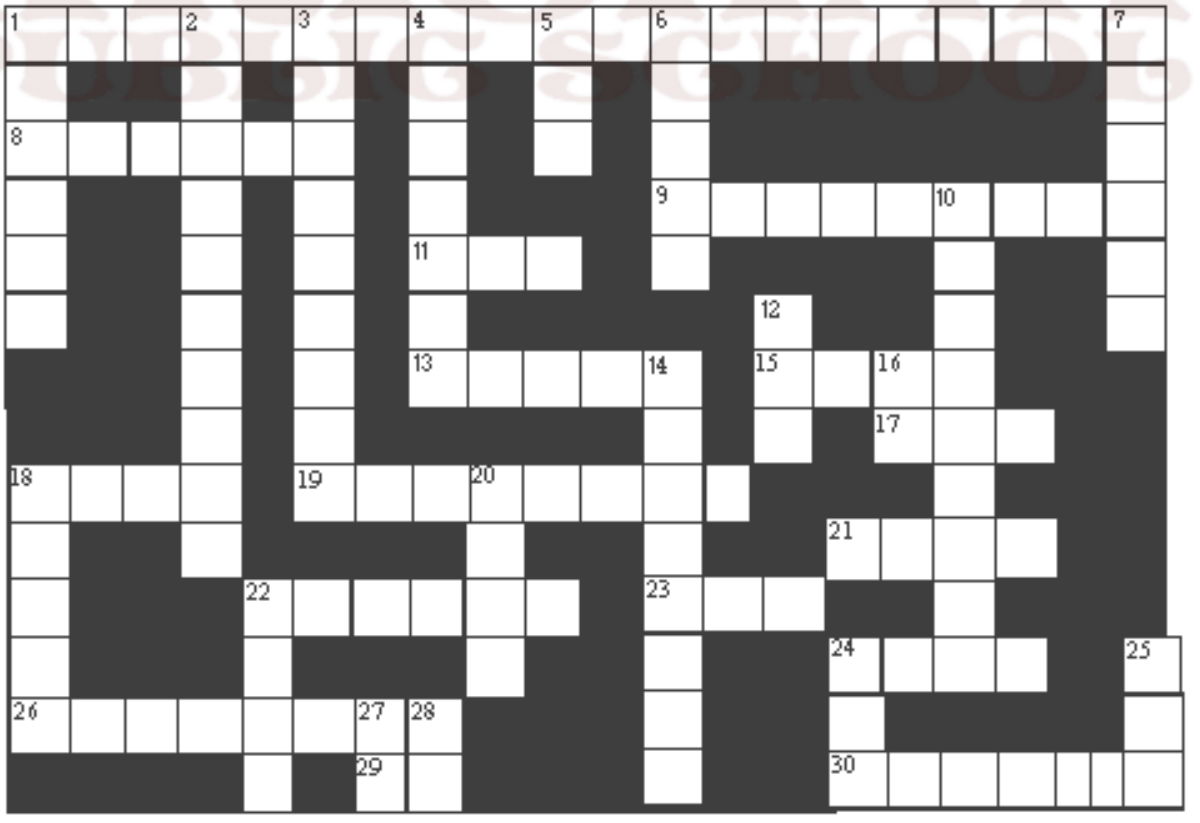
5. What are two major types of muscles we have?

6. What causes change in leave of 'touch me not' plant?

7. Which hormone helps us to prepare to combat adverse condition?

8. Name a female sex organ which produces gametes as well as female hormone.

CROSS WORD PUZZLE: NERVOUS SYSTEM



Clues

ACROSS

1. Composed of the brain and spinal cord (3 words).
8. Contains photoreceptors; on the inner posterior portion of eye.
9. "Inside the mouth"
11. Electrical brain activity recorded with scalp or brain electrodes (abbreviation).
13. Neces ry for hearin
17. Neurotransmitter in brain, spinal cord and peripheral nervous system (abbreviation).
18. Outermost layer of meninges.
19. Neurotransmitter lacking in patients with Parkinson's disease.
21. Supportive cells of the nervous system; "glue".
22. Nerve cell.
23. Photoreceptor that is not used for color vision.
24. Photoreceptor that is used for color vision.
26. The sense of hearing.
29. Opposite of "Yes"
30. Junction between two neurons.

DOWN

1. In the brain, it is the outermost layer of the gray matter.
2. The fifth cranial nerve.
3. The middle layer of the meninges.
4. The part of the cell containing chromosomes.
5. Period of sleep when dreams occur (abbreviation).
6. The second cranial nerve.
7. Fat-like substance that surrounds some axons.
10. The first cranial nerve.
12. Fluid that fills the ventricles (abbreviation).
14. Part of neuron that takes information TO the cell body.
16. Short for "mother".
18. Electrical brain activity between 2 and 4 Hz.
20. Part of neuron that takes information AWAY from the cell body.
22. A short written letter.
24. Abbreviation for 1 across.
25. Organ for vision.
27. Opposite of "off".
28. Opposite of "yes".

ANSWERS: CROSS WORD PUZZLE: NERVOUS SYSTEM

ELECTRICITY

GIST OF THE LESSON

1. **Positive and negative charges:** The charge acquired by a glass rod when rubbed with silk is called positive charge and the charge acquired by an ebonite rod when rubbed with wool is called negative charge.

2. **Coulomb:** It is the S.I. unit of charge. One coulomb is defined as that amount of charge which repels an equal and similar charge with a force of 9×10^9 N when placed in vacuum at a distance of 1 meter from it. Charge on an electron = -1.6×10^{-19} coulomb.

3. **Static and current electricities:** Static electricity deals with the electric charges at rest while the current electricity deals with the electric charges in motion.

4. **Conductor:** A substance which allows pas ge of electric charges through it easily is called a 'conductor'. A conductor offers very low resistance to the flow of current. For example copper, silver, aluminium etc.

5. **Insulator:** A substance that has infinitely high resistance does not allow electric current to flow through it. It is called an 'insulator'. For example rubber, glass, plastic, ebonite etc.

6. **Electric current:** The flow of electric charges across a cross-section of a conductor constitutes an electric current. It is defined as the rate of flow of the electric charge through any section of a conductor. Electric current = Charge/Time or $I = Q/t$
   Electric current is a scalar quantity.

7. **Ampere:** It is the S.I. unit of current. If one coulomb of charge flows through any section of a conductor in one second, then current through it is id to be one ampere.
   1 ampere = 1 coulomb/1 second or $1\ A = 1C/1s = 1Cs^{-1}$
   1 milliampere = $1\ mA = 10^{-3}\ A$
   1 microampere = $1\mu A = 10^{-6}\ A$

8. **Electric circuit:** The closed path along which electric current flows is called an 'electric circuit'.

9. **Conventional current:** Conventionally, the direction of motion of positive charges is taken as the direction of current. The direction of conventional current is opposite to that of the negatively charged electrons.

10. **Electric field:** It is the region around a charged body within which its influence can be experienced.

11. **Electrostatic potential:** Electrostatic potential at any point in an electric field is defined as the amount of work done in bringing a unit positive charge from infinity to that point. Its unit is volt. Positive charges move from higher to lower potential regions. Electrons, being negatively charged, move from lower to higher potential regions.

12. **Potential difference between two points:** The Potential difference between two points in an electric field is the amount of work done in bringing a unit positive charge from one to another. Potential difference = Work done/Charge or $V = W/Q$

13. **One volt potential difference:** The Potential difference between two points in an electric field is id to one volt if one joule of work has to be done in bringing a positive charge of one coulomb from one point to another. 1 volt = 1 joule/1 coulomb or $1\ V = 1J/1C$

14. **Galvanometer:** It is device to detect current in an electric circuit.

15. **Ammeter:** It is device to measure current in a circuit. It is always connected in series in a circuit.

16. **Voltmeter:** It is a device to measure potential difference. It is always connected in parallel to the component across which the potential difference is to be measured.

17. **Ohm's law:** This law states that the current passing through a conductor is directly proportional to the potential difference cross its ends, provided the physical conditions like temperature, density etc. remains unchanged.

$$V \alpha I \quad \text{or} \quad V = RI$$

The proportionality constant R is called resistance of conductor.

18. **Resistance:** It is a property of a conductor by virtue of which it opposes the flow of current through it. It is equal to the ratio of the potential difference applied across its ends and the current flowing through it.

Resistance = Potential difference/Current or $R = V/I$

19. **Ohm:** It is the S.I. unit of resistance. A conductor has a resistance of one ohm if a current of one ampere flows through it on applying a potential difference of one volt across its ends.
1 ohm = 1 volt/1 ampere or $1\Omega = 1V/1A$

20. **Factors on which resistance of a conductor depends:** The resistance R of a conductor depends

    i) Directly on its length L i.e. $R \alpha L$.
    ii) inversely on its area of cross-section A i.e. $R \alpha 1/A$
    iii) on the nature of material of the conductor on.
    On combining the above factors, we get
    $R \alpha L/A$
    $R = \rho * L/A$ The proportionality constant ρ is called resistivity of conductor.

21. **Resistivity:** It is defined as the resistance offered by a cube of a material of side 1 m when current flows perpendicular to its opposite faces. Its S.I. unit is ohm-meter (Ωm).
Resistivity, $\rho = RA/L$

22. Equivalent resistance: If a single resistance can replace the combination of resistances in such a manner that the current in the circuit remains unchanged, then that single resistance is called the equivalent resistance.

23. Laws of resistances in series:

i) Current through each resistance is me.

ii) Total voltage across the combination = Sum of the voltage drops.

$V = V_1 + V_2 + V_3$

iii) Voltage drops across any resistor is proportional to its resistance.

$V_1 = IR_1$, $V_2 = IR_2$, $V_3 = IR_3$

iv) Equivalent resistance = Sum of the individual resistances.

$R_s = R_1 + R_2 + R_3$

v) Equivalent resistance is larger than the largest individual resistance.

24. Laws of resistances in parallel:

i) Voltage across each resistance is me and is equal to the applied voltage.

ii) Total current = Sum of the currents through the individual resistances.

$I = I_1 + I_2 + I_3$

iii) Currents through various resistances are inversely proportional to the individual resistances.

$I_1 = V/R_1$, $I_2 = V/R_2$, $I_3 = V/R_3$

iv) Reciprocal of equivalent resistance = Sum of reciprocals of individual resistances.

$1/R_p = 1/R_1 + 1/R_2 + 1/R_3$

v) Equivalent resistance is less than the smallest individual resistance.

25. Joule's law of heating: It states that the heat produced in a conductor is directly proportional to (i) the square of the current I through it (ii) proportional to its resistances R and (iii) the time t for which current is passed. Mathematically, it can be expressed as

$H = I^2Rt$ joule $= I^2Rt/4.18$ cal

or

$H = VIt$ joule $= VIt/4.18$cal

26. Electric energy: It is the total work done in maintaining an electric current in an electric circuit for given time.

$$\text{Electric energy, } W = VIt = I^2Rt \text{ joule}$$

27. Electrical power: Electrical power is the rate at which electric energy is consumed by an appliance.

$$P = W/t = VI = I^2R = V^2/R$$

28. Watt: It is the S.I. unit of power. The power of an appliance is 1 watt if one ampere of current flows through it on applying a potential differences of 1 volt across its ends.

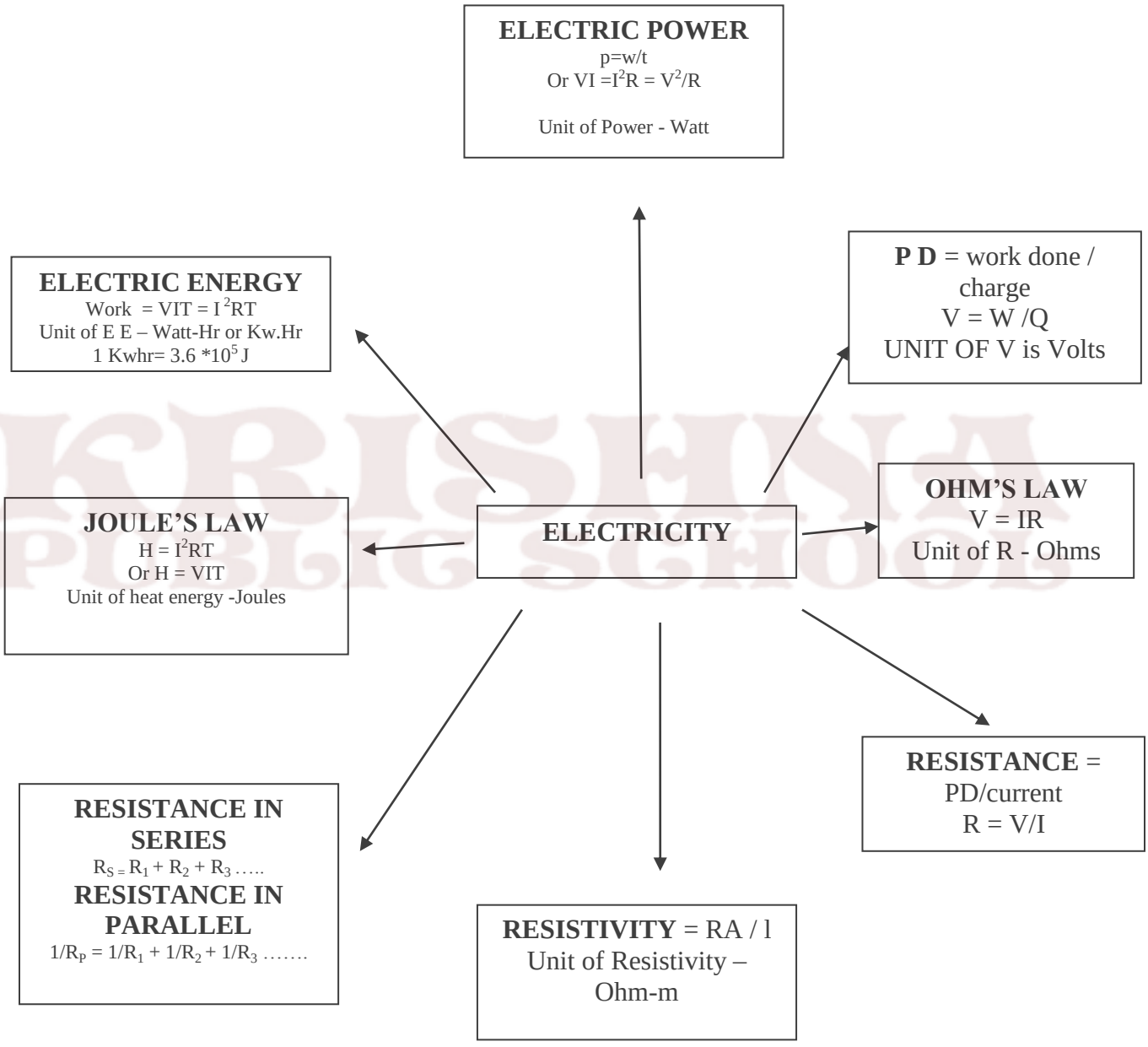
1 watt = 1 joule/1 second =1 volt x 1 ampere

or $1\ W = 1\ Js^{-1} = 1\ VA$

1 kilowatt = 1000 W

29. Kilowatt hour: It is the commercial unit of electrical energy. One kilowatt hour is the electric energy consumed by an appliance of 1000 watts when used for one hour.
1 kilowatt hour (kWh) = 3.6×10^6 J

MIND MAP



ELECTRICITY
ASSESSMENT I
Q. PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1. Define resistivity of material.

2. What is the power of torch bulb rated at 2.5V and 500mA?

3. Why series arrangement not used for connecting domestic electrical appliances in a circuit?

4. Which has higher resistance – a 50W bulb or a 2.5W bulb and how many times?

5. What is the direction of flow of conventional current?

6. Why is it not advi ble to handle electrical appliances with wet hands?

7. Two electric bulbs marked 100W 220V and 200W 200V have tungsten filament of me length. Which of the two bulbs will have thicker filament?

8. How does the resistance of a wire vary with its area of cross section?

9. Draw the following symbols

   i) Battery ii) Switch closed
   iii) Resistor of resistance R iv) Voltmeter

10. A geyser is rated 1500W, 250V. This geyser is connected to 250V mains. Calculate –
    i) The current drawn
    ii) The energy consumed in 50hrs.
    iii) The cost of energy consumed at Rs. 2.20 per kWh.

11. What is the function of an electric fuse? Name the material used for making fuse. In household circuit where is fuse connected?

12. Write one important advantage of using alternative current. How alternating current differ from direct current?

13. What is the difference between short circuiting and overloading?

14. a) Draw diagram showing three resistors R_1, R_2 and R_3 in series.
    b) Two resistors of resistance 4Ω and 12Ω
       i) In parallel
       ii) In series

    Calculate the values of effective resistance in each case.

HOTS QUESTIONS (SOLVED / UNSOLVED)

Q.1. Why is the tungsten metal more coiled in the bulb and not installed in straight parallel wire form?

Ans. The coiled wire of tungsten increases the surface area of the wire in very less space so as to emit more light and helps in glowing with more intensity.

Q.2. Why are fairy decorative lights always connected in parallel?

Ans. When the fairy lights are connected in series the resistance offered will be greater and brightness of the bulbs will be affected. But in parallel connection all the bulbs will glow with me intensity and if any more bulbs gets fused the other bulbs will continue to glow.

Q.3. What will happen when -

a) Voltmeter is connected in series?
b) Ammeter is connected in parallel?

Ans. a) Negligible current will pass through the circuit because the voltmeter has a very high resistance.

b) Ammeter will get damaged due to flow of large amount of current through it, because it has low resistance.

ELECTRICITY
ORAL QUESTIONS (CONVER TION TYPE)

1. a) Why is electricity more useful than other forms of energy?
   b) How is static electricity different from current electricity?
   c) What are conductors? Give examples.
   d) What are insulators? Give examples.

2. a) What constitutes an electric current?
   b) Name the SI unit of electric charge.
   c) Which is bigger – c coulomb of charge or a charge of an electron?
   d) How much is the charge on an electron? Can a charge less than this value exist?
   e) What is the number of electrons constituting one coulomb of charge?

3. a) Define electric current.
   b) Name the SI unit of current. Define one ampere.
   c) Is electric current a scalar of vector quantity?

4. a) What does an electric circuit mean?
   b) When does the current flow in an electric circuit?
   c) How can the current be kept continuous in a conductor?
   d) Which particles constitute current in a metallic conductor?

5. a) Define potential difference.
   b) Name the SI unit of potential difference.
   c) What is meant by ying that a potential difference between two points in 1volt?
   d) What is the relationship between work done, potential difference and charge moved?

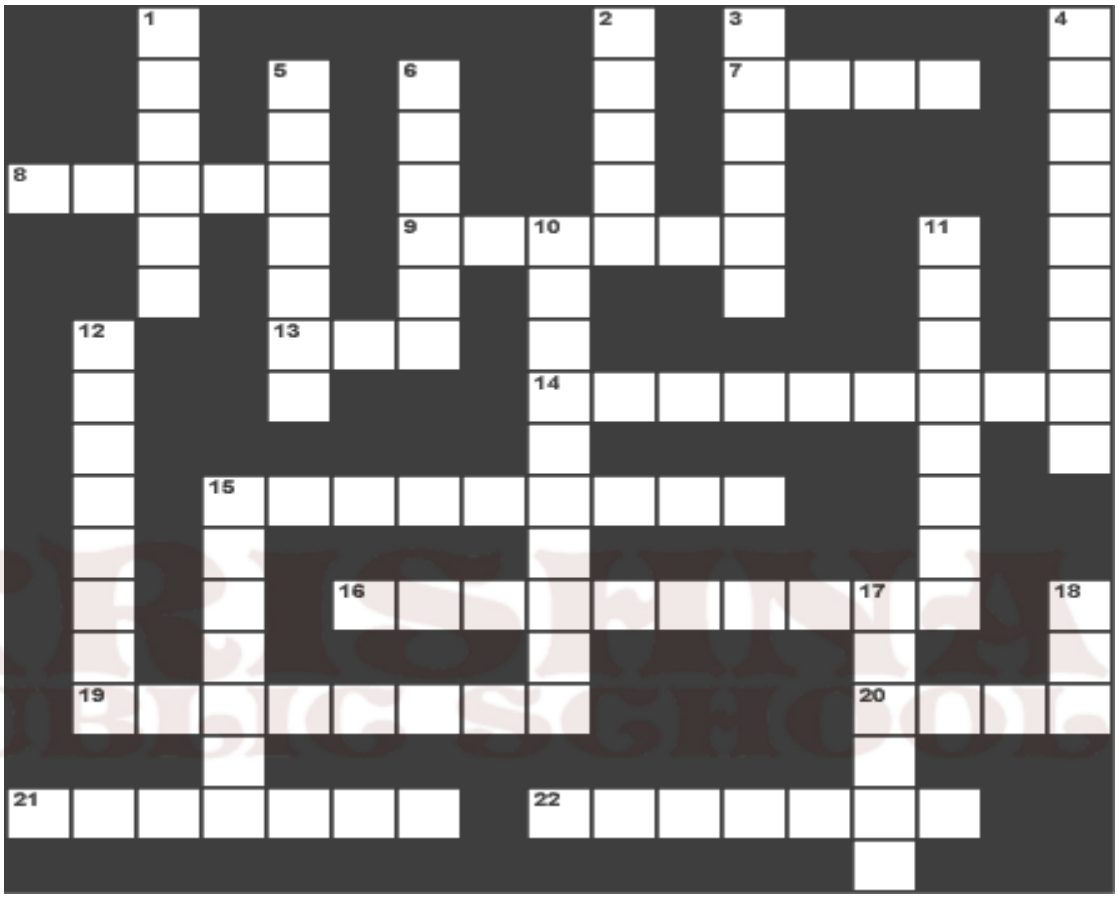
ORAL QUESTIONS

1. Which unit is equivalent of joule / coulomb?
2. How does the resistance of a wire depend on its length?
3. How does the resistance of a wire depend on its area of cross – section?
4. When are resistors id to be connected in series?
5. When are resistors id to be connected in parallel?
6. Why is tungsten suitable for making the filament of a bulb?
7. Why is tungsten not used as a fuse wire?
8. Alloys are preferred over metals for making the heating elements of heaters. Why?
9. How is the direction of electric current related to the direction of flow of electrons in a wire?
10. Should the heating element of an electric iron be made of iron, silver or nichrome wire?

QUIZ – WHO AM I

1. I am equal to the charge carried by 6.25×10^{18} electrons.
2. I am the rate of flow of charge through any section of a conductor.
3. I am me as coulomb/second.
4. I am closed path along which electric charges can flow.
5. I am equal to the work done per unit charge from point to another.
6. I am me as joule/coulomb.
7. I oppose the flow of charges through any conductor.
8. I am me as volt/ampere.
9. I relate potential difference with current for a given resistance.
10. I am used to measure potential difference between two points of a circuit.

CROSSWORD PUZZLE- ELECTRICITY



Across

7. Unit of electrical power, named after the Scottish inventor of the steam engine
8. a rotating machine that transforms electrical energy into mechanical energy
9. The kind of electricity you create by rubbing a balloon on your head
13. Atom or group of atoms that carries a positive or negative electric charge as a result of having lost or gained one or more electrons
14. Emission of radiant energy in the form of waves or particles
15. It transmits electricity, like copper
16. Opposition to the pas ge of an electric current
19. Elementary particle consisting of a charge of negative electricity

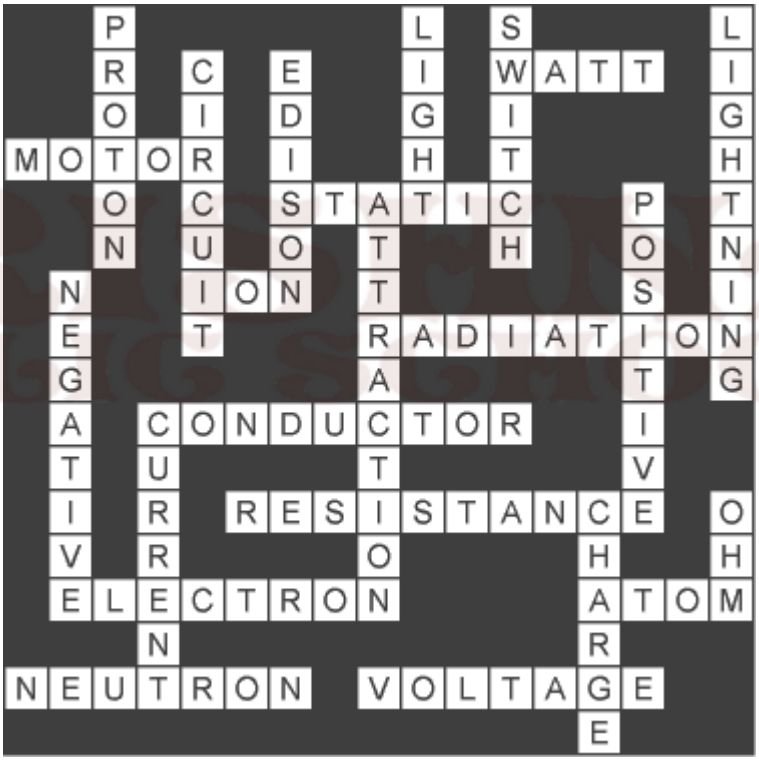
Down

1. Elementary particle that carries a positive charge
2. Electromagnetic radiation in the wavelength range including infrared, visible, ultraviolet, and X-rays
3. Device for making, breaking, or changing the connections in an electrical circuit
4. Flash produced by a discharge of atmospheric electricity
5. Complete path of an electric current including the source of electric energy
6. Inventor of the electric light bulb
10. Force acting on particles of

20. Smallest particle of an element that can exist either alone or in combination
21. Uncharged elementary particle
22. Electric potential or potential difference

matter, tending to draw them together
11. Electrical charge with more protons than electrons
12. Electrical charge with more electrons than protons
15. Electrical flow through a conductor
17. Definite quantity of electricity
18. Unit of electrical resistance

ANSWERS - ELECTRICITY CROSSWORD



MAGNETIC EFFECTS OF ELECTRIC CURRENT
KEY CONCEPTS & GIST OF THE LESSON

- Magnet: (i) is an object that attracts objects made of iron, cobalt & nickel.
  (ii) Comes to rest in North-South direction, when suspended freely.

- Magnets are used: (i) In radio & stereo speakers, (ii) In refrigerator doors, (iii) on audio & video cassettes players, (iv) On hard discs & floppies of computers & (v) in children's toys.

- Magnetic field: The area around a magnet where a magnetic force is experienced is called a magnetic field. It is a quantity that has both direction & magnitude.

- Magnetic field lines: Magnetic field is represented by field lines. They are lines drawn in a Magnetic field along which a North magnetic pole moves. Magnetic field lines are called as Magnetic lines of force.
  Refer to figure 13.3 & 13.4 page no. 225 of N.C.E.R.T Text book)

- Properties of Magnetic field lines:
  (i) They do not intersect each other.
  (ii) It is taken by convention that magnetic field lines emerge from North pole and merge at the South pole. Inside the magnet, their direction is from South pole to North pole. Therefore magnetic field lines are closed curves.
- Magnetic field lines due to a current through a straight conductor (wire)- consist of series of concentric circles whose direction is given by the Right hand thumb rule.
- Right hand thumb rule: If a current carrying straight conductor is held in your right hand such that the thumb points towards the direction of current, then the wrapped fingers show the direction of magnetic field lines.
  (Refer to figure 13.7, page no. 228 of N.C.E.R.T Text book)
- Magnetic field lines due to a current through a circular loop
  (Refer to figure 13.8, page no. 228 of N.C.E.R.T Text book)
- The strength of the magnetic field at he centre of the loop(coil)depends on:
  (i) The radius of the coil- The strength of the magnetic field is inversely proportional to the radius of the coil. If the radius increases, the magnetic strength at the centre decreases.
  (ii) The number of turns in the coil: As the number of turns in the coil increase, the magnetic strength at the centre increases, because the current in each circular turn is having the me direction, thus the field due to each turn adds up.
  (iii) The strength of the current flowing in the coil: as the strength of the current increases, the strength of thee magnetic fields also increases.

- Solenoid: (Refer to figure 13.10, page no. 229 of N.C.E.R.T Text book)
- (i) A coil of many turns of insulated copper wire wrapped in the shape of a cylinder is called a Solenoid.
  (ii) Magnetic field produced by a Solenoid is similar to a bar magnet.
  (iii) The strength of magnetic field is proportional to the number of turns & magnitude of current.

- Electromagnet: An electromagnet consists of a long coil of insulated copper wire wrapped on a soft iron core.
  (Refer to figure 13.11, page no. 229 of N.C.E.R.T Text book)

- Fleming's Left hand rule: Stretch the thumb, forefinger and middle finger of left hand such that they are mutually perpendicular. Forefinger points in the direction of magnetic field and centre finger in the direction of current, then the thumb gives the direction of force acting on the conductor.
  (Refer to figure13.13, page no. 231 13.13 of N.C.E.R.T Text book)

- Electric motor: A device that converts electric energy to mechanical energy.
  (Refer to figure 13.15, page no. 232 of N.C.E.R.T Text book)

- Principle of Electric motor: When a rectangular coil is placed in a magnetic field and a current is passed through it, force acts on the coil, which rotates it continuously. With the rotation of the coil, the shaft attached to it also rotates.

- Electromagnetic induction: Electricity production as a result of magnetism (induced current) is called Electromagnetic induction.

- Fleming's Right hand rule: gives the direction of induced current.
  Stretch the thumb, forefinger and middle finger of right hand such that they are mutually perpendicular. Forefinger points in the direction of magnetic field and centre finger in the direction of induced current, then the thumb gives the direction of motion of the conductor.

- Electric generator: A devise that converts mechanical energy to electric energy.
  (Refer to figure 13.19, page no. 236 of N.C.E.R.T Text book)
  Electric generator is of two types- (i) A.C generator (ii) D. C generator

- Principle of Electric generator: Electromagnetic induction

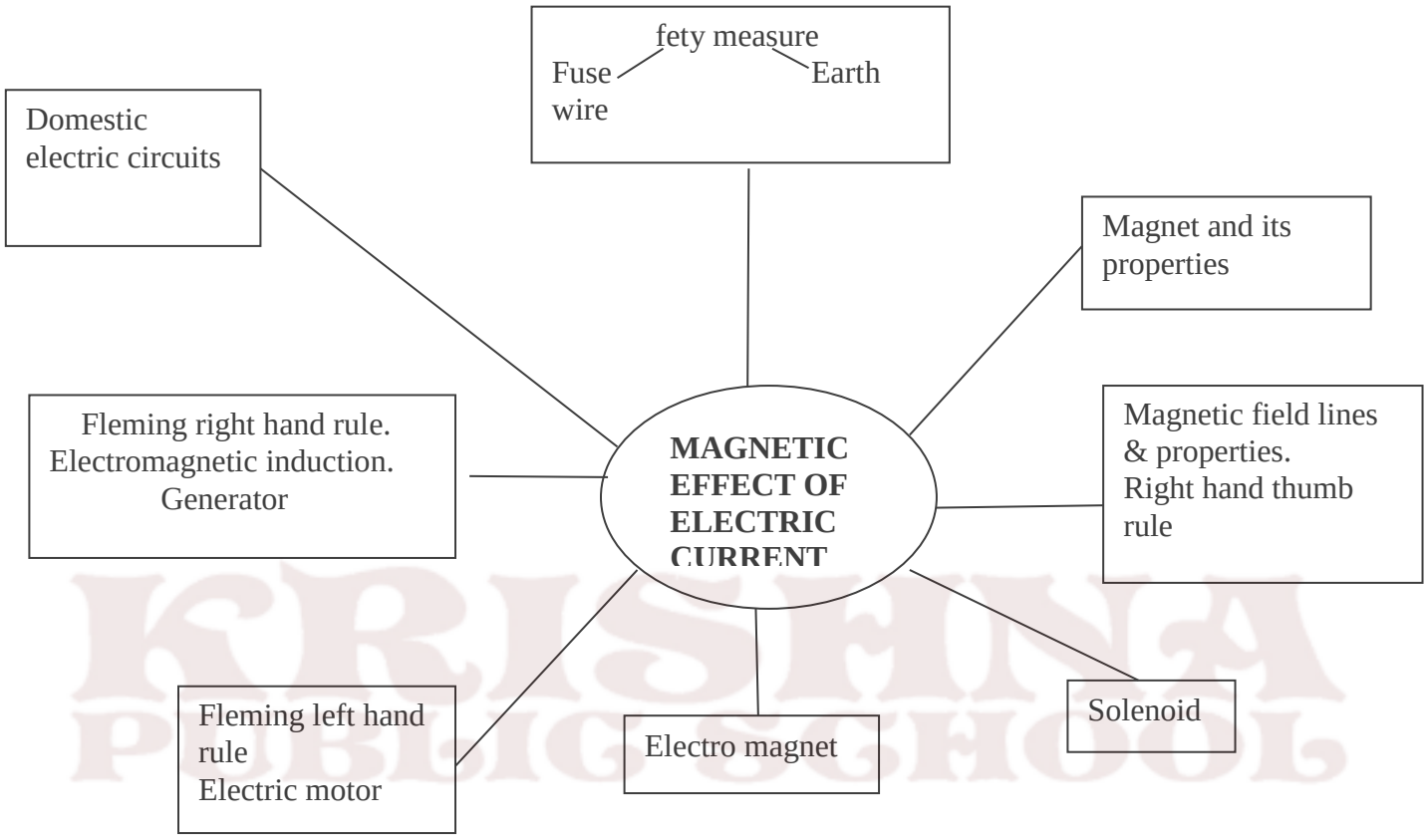
- Domestic electric circuits: (Refer to figure 13.20, page 238 of N.C.E.R.T Text book)
- We receive electric supply through mains supported through the poles or cables. In our houses we receive AC electric power of 220V with a frequency of 50Hz.
  The 3 wires are as follows- (i) Live wire- (Red insulated, Positive)
  (ii) Neutral wire- (Black insulated, Negative)
  (iii) Earth wire- (Green insulated) for fety measure to ensure that any leakage of current to a metallic body does not give any serious shock to a user.
- Short circuit: is caused by touching of live wires and neutral wire
- Fuse: is a protective device used for protecting the circuits from short circuiting and over loading
- **Important diagrams-**

1. Magnetic field lines around a bar magnet.
2. Right hand thumb rule
3. Magnetic field lines through and around a current carrying solenoid.
4. An electromagnet.
5. A simple electric motor
6. Electric generator

❖ **Important activities-**

1. Magnetic field lines around a bar magnet
2. Direction of electric current in a simple electric circuit.
3. Direction of Magnetic field lines depends on the direction of electric current.

MIND MAP



ASSESSMENT I
Q. PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1. State two uses of electromagnet.

2. An electron moving along X – axis in a magnetic field along Y – axis. In which direction will the electron deflected.

3. State Fleming's left hand rule.

4. What is the importance of earth wire?

5. Should a copper wire be used as a fuse wire? If not, why?

6. Give two points of difference between and electromagnet and permanent magnet.

7. Draw the lines of force indicating field direction of the magnetic field through and around
   i) Single loop of wire carrying electric current.
   ii) A solenoid carrying electric current.

8. What id magnetic field? How is the direction of magnetic field at a point determined?

9. Give four features of domestic electric wiring.

10. Draw a schematic diagram of domestic wiring system and write its main features.

11. Match the following:

A	B
i) Right hand thumb rule	a) Force on a conductor in a magnetic field
ii) Fleming's left hand rule	b) Direction of magnetic field of straight conductor
iii) Fleming's right hand rule	c) Direction of induced current in conductor
	d) Polarity of any end of a solenoid.

12. a) Draw a labelled diagram to show how electro – magnet is made.
    b) What is the purpose of soft iron core in making electromagnet?

13. Write two differences between AC and DC current and draw diagram also.

14. a) Write principle of electric generator.
    b) Explain construction and working of generator.
    c) Draw labelled diagram of electric generator.

HOTS QUESTIONS (SOLVED)

1. On what effect of an electric current does an electromagnet work?

A. Magnetic effect of electric current

2. What is the frequency of AC (Alternating Current) in India?

A. 50Hz

3. On what effect of an electric current does a fuse work?

A. Heating effect of electric current

HOTS QUESTIONS (UNSOLVED)

1. Name the sources of direct current.
2. Why don't two magnetic lines intersect each other?
3. What is the role of split ring in an electric motor?
4. What is an earth wire?

MAGNETIC EFFECT

ORAL QUESTIONS

1. a) What are magnets?
   b) What are natural magnets?
   c) What is the meaning of the word lodestone?
   d) What is the origin of the word magnetism?

2. a) State the law of magnetic poles.
   b) What is the surer test of magnetism?
   c) What happens if we break a magnet into two pieces?
   d) Is it possible to obtain isolated north and south poles?

3. a) What is magnetic line of force?
   b) Can two magnetic lines of force intersect? Give reason.
   c) Magnetic lines of force are endless. Comment.
   d) How do the field lines of the regions of strong field different from those of weak field?

4. a) What is a solenoid?
   b) Is the magnetic field of a solenoid similar to that of a bar magnet?
   c) State the two factors by which the strength of magnetic field inside a solenoid can be increased.
   d) How will you determine the direction of the magnetic field due to a current – carrying solenoid?

5. a) What is an electromagnet?
   b) What is the effect of placing an iron core in a solenoid?
   c) What type of core should be used inside a solenoid to make an electromagnet?
   d) Give two advantages of electromagnets.

ORAL QUESTIONS

1. What important observation did Oersted make in his experiments with current carrying conductors?

2. How can you locate a current – carrying wire concealed in a wall?

3. A freely suspended magnet always points along north – south direction. Why?

4. What type of core should be used inside a solenoid to make an electromagnet?

5. Name the SI unit of magnetic field.

6. What is the principle of an electric motor?

7. A generator converts energy from one form to another. What is this energy conversion?

8. Which wire (live, neutral or earth) goes through the switch?

9. Are different appliances connected in series or parallel in a house?

10. What is the colour convention for live, neutral and earth wires?

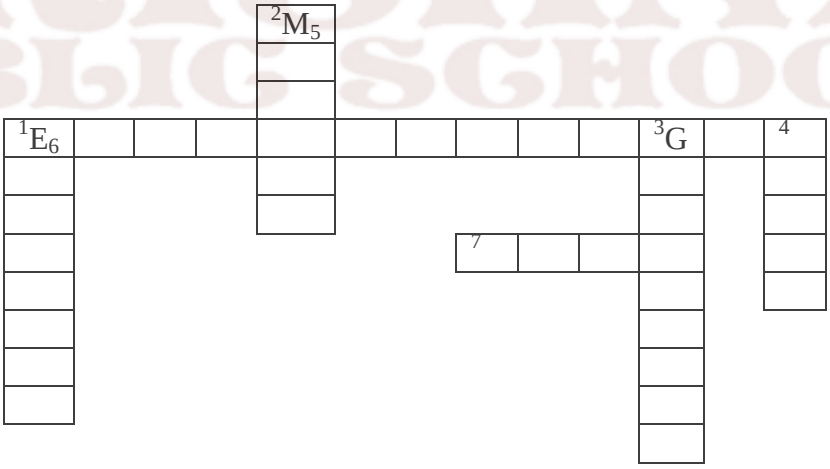
PUZZLE

⇒ **Across**

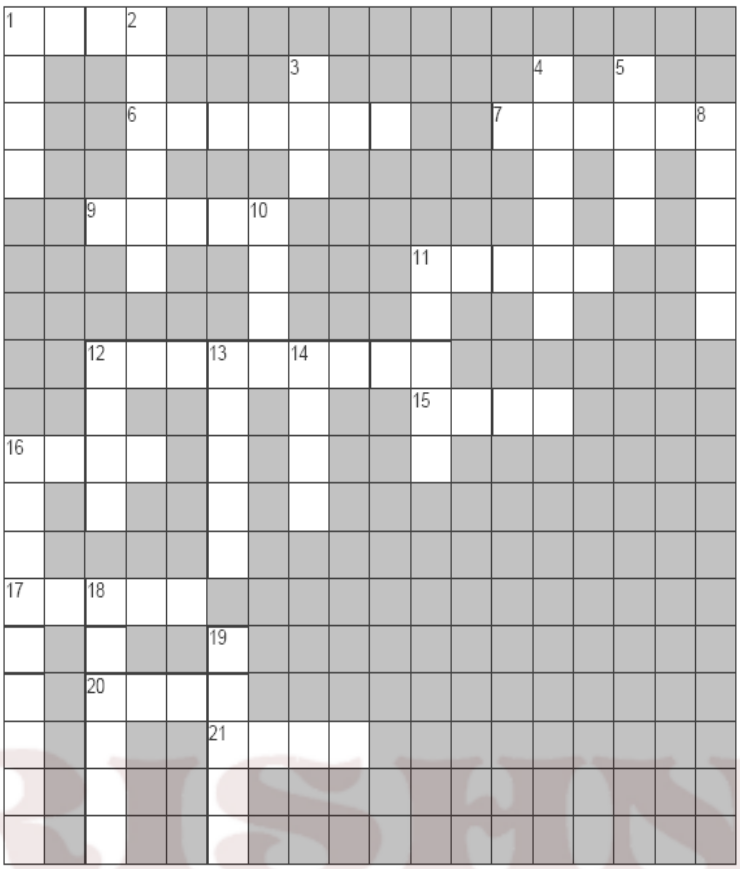
1. A method preventing electric shock due to touching of live wire with the metallic body of an appliance.
2. A device to convert electrical energy into mechanical energy.
3. A device to convert mechanical energy into electrical energy.
4. SI unit of magnetic field.

⇓ **Down**

5. A material having attractive and directive properties.
6. A temporary magnet.
7. A device to protect a circuit from overloading.



Magnetism



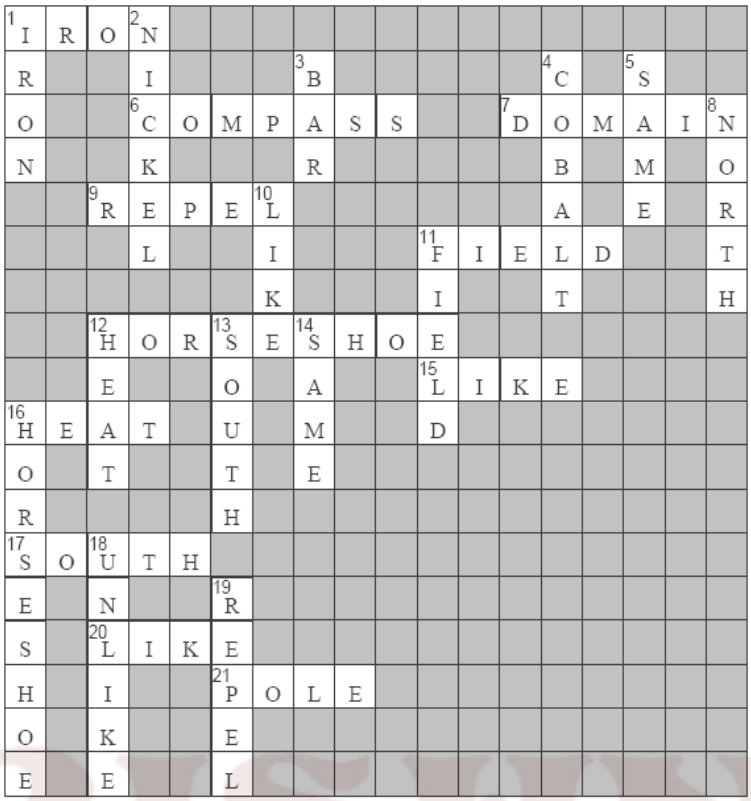
Across

1. Metal in the alloy steel.[4]
6. Movable magnet.[7]
7. Group of atoms within a magnet.[6]
9. Poles that are the same ___ each other.[5]
11. Magnetic ____ weakens with distance.[5]
12. Type of magnet.[9]
15. North and north poles are ____ poles.[4]
16. Magnets should be stored away from ____.[4]
17. The ____ pole of a compass points to the south.[5]
20. ____ poles repel.[4]
21. End of a magnet.[4]

Down

1. Magnetic material whose symbol is Fe.[4]
2. Magnetic material whose symbol is Ni.[6]
3. Type of magnet.[3]
4. Magnetic element whose symbol is Co.[6]
5. In a magnet, the domains point in the ____ direction.[4]
8. The south pole of a magnet attracts the ___ pole of a second magnet.[5]
10. ____ poles repel.[4]
11. Region around a magnet.[5]
12. To demagnetise a magnet, one can ____ it.[4]
13. Lines of magnetic force go from north pole to ____ pole.[5]
14. Repulsion occurs between poles that are the ____.[4]
16. A ____ magnet acts like several combined bar magnets.[9]
18. ____ poles attract.[6]
19. South and south poles will ____.[5]

ANSWERS-MAGNETISM



SOURCES OF ENERGY
KEY CONCEPTS & GIST OF THE LESSON

- Characteristics of a good fuel:
  - (iv) High calorific value
  - (v) Less smoke
  - (vi) Less residue after burning
  - (vii) Easy availability
  - (viii) Inexpensive
  - (ix) Easy to store and transport

- Fossil fuels: were formed millions of years ago, when plants and animal remains got buried under the earth and were subjected to high temperature and pressure conditions. E.g.: Coal, Petroleum, etc.
  These fossil fuels are non renewable sources of energy and cause environmental problems due to pollution.
- Thermal power plants:
  - (i) Use coal, petroleum and natural gas to produce thermal electricity.
  - (ii) Electricity transmission is very efficient.
  - (iii) The steam produced by burning the fossil fuels runs the turbine to produce electricity

- Hydro power plant:
  (Refer to figure 14.3, page no. 246 of N.C.E.R.T Text book)
  - (i) It is the most conventional renewable energy source obtained from water falling from a great height.
  - (ii) It is clean & non polluting source of energy.
  - (iii) Dams are constructed to collect water flowing in high altitude rivers. The stored water has a lot of potential energy.
  - (iv) When water is allowed to fall from a height, potential energy changes to kinetic energy, which rotates the turbines to produce electricity.
- Di dvantages of Hydro power plant:
  - (i) Highly expensive to construct.
  - (ii) Dams cannot be constructed on all river sites.
  - (iii) Large areas o human habitation and agricultural fields get submerged.
  - (iv) People face social and environmental problems.

- Non conventional sources:
  - (1) Bio mass:
    - It is the source of the conventionally used fuels that are used in our country. E.g.: Cow dung cakes, fire-wood, coal, charcoal
    - Bio gas: It is a mixture of gases produced during decomposition of bio mass in the absence of Oxygen. (Anaerobic Respiration). Methane is the major component of bio gas.
    - Bio gas plants: Animal dung, sewage, crop residues, vegetable wastes, poultry droppings, etc. are used to produce Bio gas in Bio gas plants.
    - (Refer to figure 14.4, page no. 247 of N.C.E.R.T Text book)
  - (2) Wind energy:
    - It can be converted into mechanical and electrical energy.

- Kinetic energy of the wind is used in running of wind mills, which are used to lift water, grind grains, etc.
- Wind mill-(Refer to figure 14.5, page no. 247 of N.C.E.R.T Text book)
- Advantages: (i) Eco friendly (ii) Renewable
- Di dvantages: (i) Wind speed not uniform always.
  (ii) Needs a large area to erect series of wind mills.
  (iii) Big amount of investment is needed.
  (iv) Out put is less as compared to investment

(3) Solar energy:

- Solar radiations can be converted electricity through solar cells (photovoltaic cells).
- Photovoltaic cells convert solar radiations directly into electricity through silicon solar cells.
- Solar cells arrange on a large flat sheets form a solar panel.
- Solar cookers are painted black from outside and a large glass plate to trap solar radiations by green house effect.
- (Refer to figure 14.6, page no. 249 of N.C.E.R.T Text book)
- Advantages of Solar cookers:
  (i) Eco friendly
  (ii) Renewable
  (iii) Used in rural areas.
  (iv) Retains all the nutrients in food due to slow cooking.
- Di dvantages of solar cooker:
  (i) Silicon cells are expensive.
  (ii) Solar radiations are not uniform over earth's surface.
  (iii) Cannot be used at night or on cloudy days.
  (iv) Cannot be used to make chapattis for frying as these require a temperature of 140^0C or more. (Maximum temperature of 100^0C only can be achieved in a solar cooker)
- Other solar devices- Solar water heater, Solar furnace

(4) Geo thermal energy:

(i) Energy harnessed from the heat of the sun is called Geo thermal energy.

(ii) Magma is formed when this heat melts the rocks. The molten rocks and hot gases are called magma

(iii) The magma gets collected at some depths below the earth's surfaces. These places are called 'Hot spots"

(iv) When underground water comes in contact these hot spots, it changes into steam, which can be used to generate electricity.

- Advantages of Geo thermal energy:
  (i) Renewable
  (ii) Inexpensive
- Di dvantages of Geo thermal energy:
  (i) Only few sites available for harnessing energy.
  (ii) Expensive

(5) Nuclear energy:

(i) Energy released when some changes take place in the nucleus of the atom of a substance, is called Nuclear energy.

(ii) It is used for heat generation, fuel for marine vessels.

- Advantages of Nuclear energy:
  (i) Alternative source of energy due to depletion of fossil fuels.
  (ii) From a small amount of fuel, a large amount of energy is released.
- Di dvantages of Nuclear energy:
  (i) Risk of nuclear waste leakage
  (ii) High cost of setting up of nuclear plant
  (iii) Pollution of environment.

(6) Energy from the sea-

(A) Tidal energy: Locations in India – Gulf of Kutch, Gujrat & W. Bengal

(i) Depends upon harnessing the rise and fall of sea level due to tidal action.

(ii) Dams are constructed across a narrow part of sea and turbine converts tidal energy into electrical energy.

Di dvantages: Uniform tidal action is not seen

(B) Wave energy:

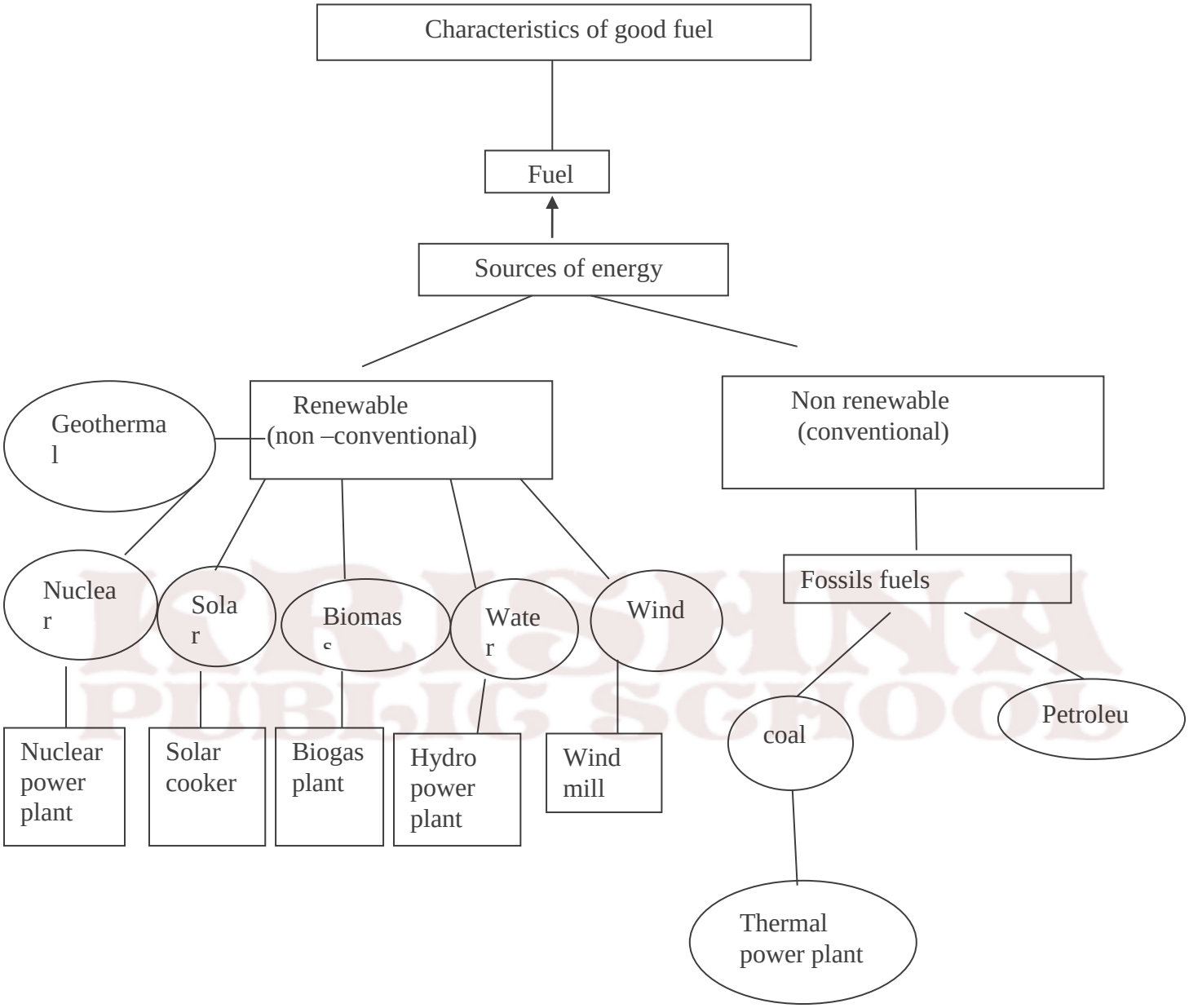
(i) Kinetic energy of the waves of sea are used to rotate turbines..

(ii) These turbines generate electrical energy

❖ **Important diagrams-**

1. Hydro power plant
2. Bio gas plant
3. A wind mill
4. A solar cooker

MIND MAP



ASSESSMENT I
Q.PAPER

MARKS-30 TIME- 70 MINUTES

Instructions:

- Questions : 1 to 5 – 1 Mark each
- Questions : 6 to 9 – 2 Marks each
- Questions : 10 to 13 – 3 Marks each
- Question 14 – 5 Marks

1. Name the component of sunlight, exposure to which may cause skin cancer.
2. Flowing water possess which type of energy.
3. Name one place in India where wind energy power station is installed.
4. What is a solar panel?
5. What type of energy transformation takes place during winding of spring of a clock?
6. Write two differences between renewable and non – renewable sources of energy.
7. What is the principle of solar cooker? Name two types of solar cooker.
8. Name any two types of harmful nuclear radiations emitted during nuclear fission.
9. What is thermal power plant? Where it is preferably situated?
10. What is the principle of solar cooker? Give two limitations and two advantages of solar cooker.
11. Name the fuel for hydro power plant. Mention two advantages and di dvantages of producing electricity at the hydro power plant.
12. Explain why:
    a) It is difficult to burn a piece of wood fresh from a tree.
    b) Pouring dry nd over the fire extinguishes it.
    c) It is difficult to use hydrogen as source of energy.
13. What are the different types of energies obtained from sea? Explain.
14. a) What is a principle of Biogas?
    b) Explain it working in brief.
    c) Draw a labelled diagram of biogas.

HOTS QUESTIONS (SOLVED)

1. Name the materials used for making solar cells.

A. Silicon, Germanium and Selenium

2. What fraction of solar energy reaches the earth's surface?

A. 47%

3. Name the process that produces a large amount of energy in the sun.

A. Nuclear fusion

4. Why is biogas called a clean fuel?

A. Because it- (i) leaves no ash (ii) does not cause pollution (iii) does not produce any poisonous gas.

HOTS QUESTIONS (UNSOLVED)

1. What is the use of black painted surface in solar heating devises.
2. Why are bio gas plants considered to be boon to the farmers? Give reason.
3. Hydroelectricity generated at a dam may be considered another form of solar energy. Why?
4. How is the slurry left over after the generation of biogas in biogas plant used?
5. Why is charcoal considered to be a better fuel than wood?
6. Why a solar cooker cannot be used for frying or making chapattis?
7. In parabolic reflector type coolers, even temperature up to 180^0C- 200^0C can be attained. How?
8. Modern chulahs are more efficient than traditional chulahs. Why?
9. How is hydro energy converted into electrical energy?
10. Explain, why only a part of the solar energy that strikes the upper regions of atmosphere reaches the surface of the earth?

ENERGY

ORAL QUESTIONS (CONVER TION TYPE)

1. a) What is a good source of energy?

   b) Name one good source of energy.

   c) It is a renewable source of energy?

   d) Is it conventional or non – conventional source of energy?

   e) What other name is give to it?

   f) What is a fossil fuel?

   g) Name any other two fossil fuels.

2. a) Which is the ultimate source of all forms of energy?

   b) Can you explain?

   c) Name some renewable source of energy arising due to sun.

   d) Name some non – renewable source of energy arising due to sun.

   e) Why is the energy contained in fossil fuels considered due to sun's energy?

f) Name any source of energy not influenced by sun's energy.

3. a) What is the principle of nuclear energy?

b) What are the kinds of nuclear reaction?

c) Which of these can be used for destructive purposes?

d) Which of these can be used to produce energy for common use?

e) What is nuclear fission?

f) Name two substances which are easily fissionable.

g) What are these substances called?

h) What is this phenomenon of breaking up of radioactive isotopes called?

i) Name the rays emitted.

ORAL QUESTIONS

1. Which component of solar radiations produces heat?
2. Name a form of energy that can be harnessed from the oceans.
3. Name the main component of biogas.
4. Name a fuel which is considered cleaner that CNG.
5. What is common between an atom bomb and a nuclear reactor?
6. What is the main transformation of energy during working of a windmill?
7. What are the conditions to achieve nuclear fusion?

QUIZ

1. I am a force that cannot be created but my form may be changed.
2. I am an important part of the system that transforms that transforms K.E. / P.E. into electrical energy.

3. I have been used to produce energy for a long time and my origin is in the remains of plants and animals.
4. I used to thrown as a waste material for centuries. But I am given an honourable name and a useful work to perform.
5. I have a huge body capable of eating water from any source with a decorative head called Hydroelectric power station.
6. I resemble a fossil fuel but find use as self sustained source of energy especially in rural areas.
7. I produce a chain of reactions each step capable of producing tremendous amount of energy.
8. I am associated with nuclear reactions but deliver heat in critical conditions.
9. I am the lightest fuel with a large potential as a source of energy.
10. I deliver hot springs with taking any energy from man – made sources or sun.

PUZZLES

1. ⇒ **Across**

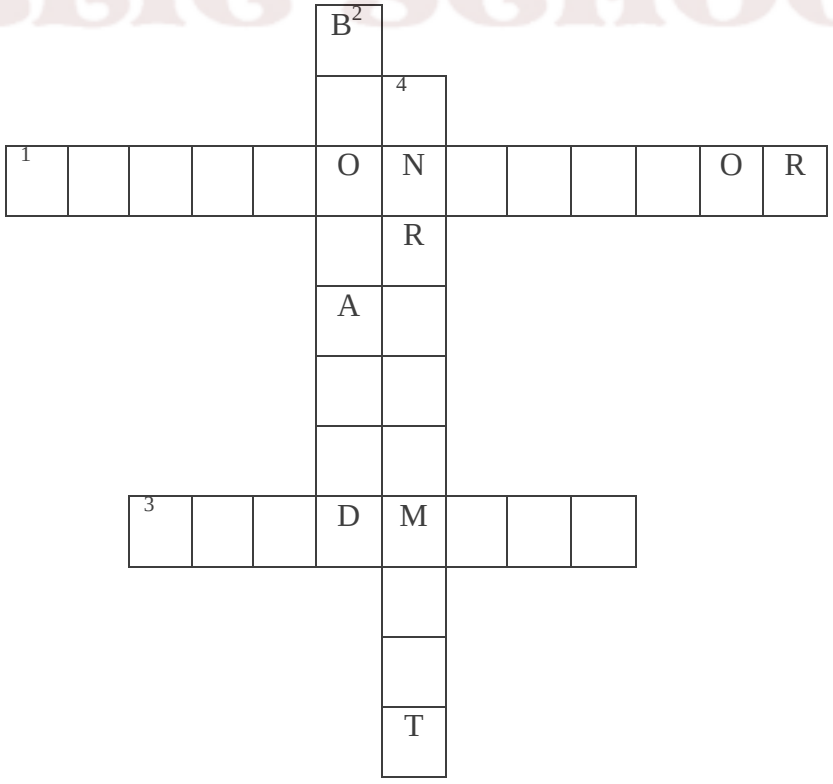
1. A type of metal that allows only partial current to pass (13)

3. A device to harness kinetic energy of wind (8)

⇓ **Down**

2. Vegetable and animal waste (7)

4. Process to increase percentage of fissionable material (10)

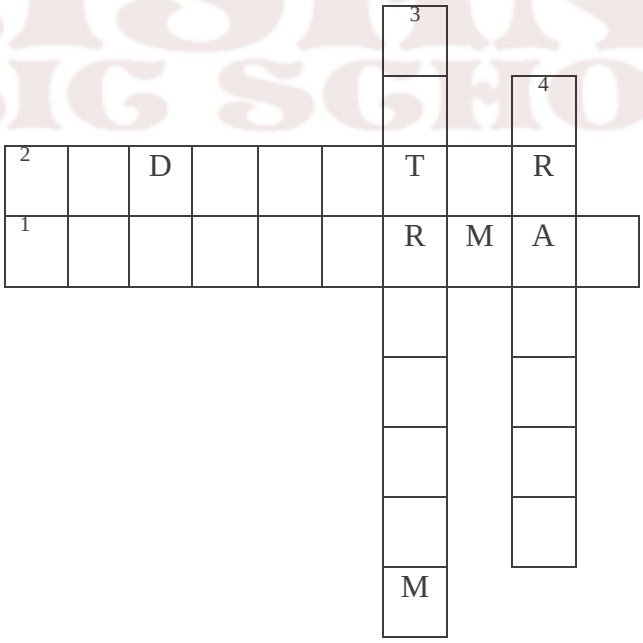


2. ⇒ **Across**

1. Trapped energy inside earth (10)
2. A substance which slows down the speed of neutrons in nuclear reactor (9)

⇓ **Down**

3. Liquid fossil fuel (9)
5. Isotope commonly used in nuclear reactor (7)

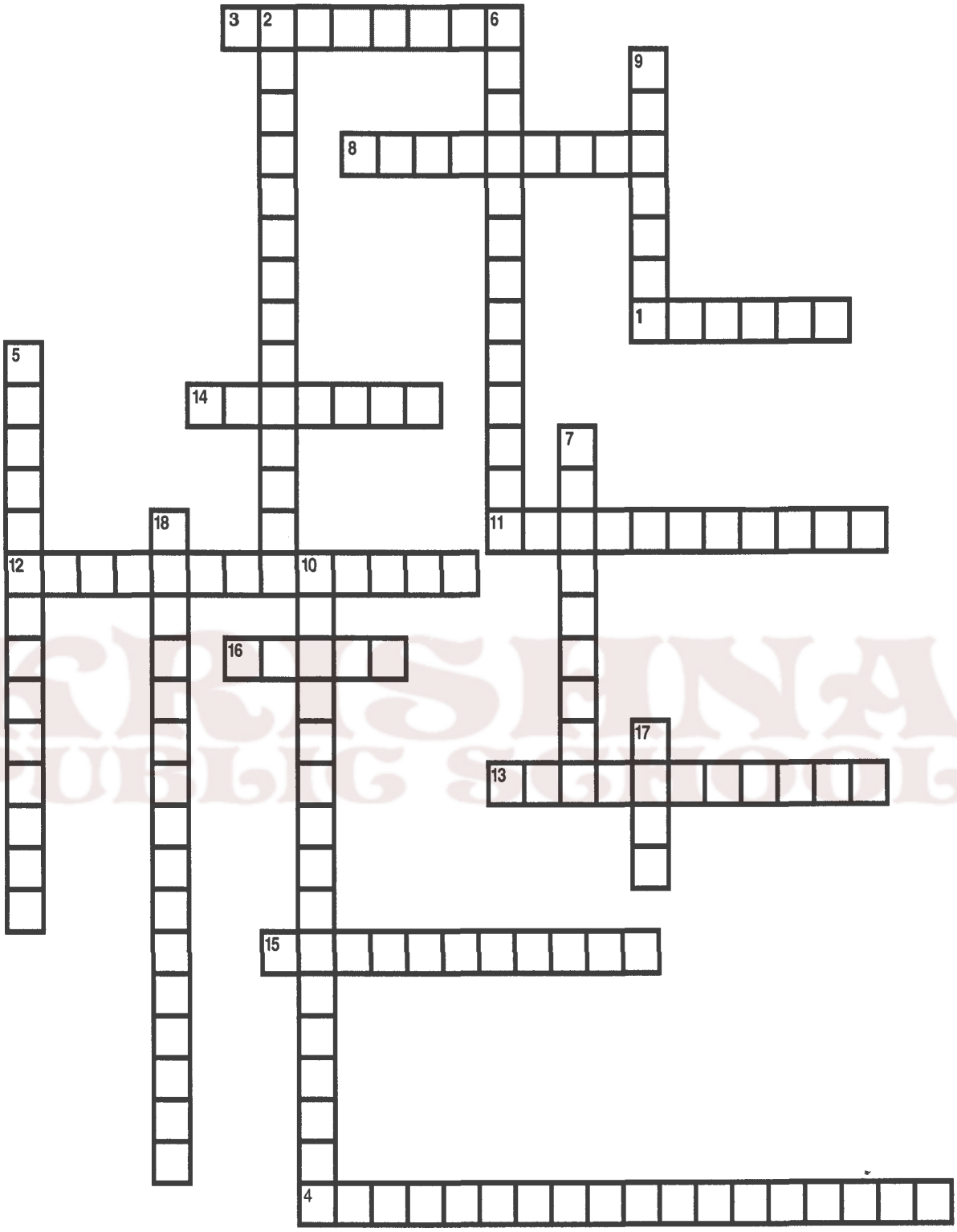


ENERGY CROSSWORD PUZZLE-CLUES

- Down
  - **2** A poisonous, odourless gas
  - **5** A plant's pollen that causes air pollution
  - **6** Pollution created by natural sources
  - **7** An opening in the Earth's crust which throws hot gases, magma and ashes
  - **9** Humans that make the land, water and air dirty and harmful to living things
  - **10** Land, air and water that gets dirty and is harmful to living things naturally
  - **17** This makes windmills turn
  - **18** Energy created from the earth

- **Across**
  - **1** Any kind of power
  - **3** Precipitation combined with sulphur dioxide
  - **4** Where nuclear energy is produced
  - **8** Something in air, water, land that makes it dirty
  - **10** Land, air and water that gets dirty and is harmful to living things
  - **11** The type of energy that comes from the sun
  - **12** Power or energy than can be released from the nucleus of an atom
  - **13** Coal, oil and gas
  - **14** Biological mass
  - **15** Lightning, batteries, light bulbs and plugs
  - **16** Clear liquid that is cold

ENERGY CROSSWORD PUZZLE



Energy Crossword Puzzle Answers

- **Down**
  - **2** carbon monoxide
  - **5** goldenrod weeds
  - **6** natural wastes
  - **7** volcanoes
  - **9** manmade
  - **10** natural pollution
  - **17** wind
  - **18** geothermal energy

- **Across**
  - **1** energy
  - **3** acid rain
  - **4** nuclear power plants
  - **8** pollution
  - **11** solar
  - **12** nuclear energy
  - **13** fossil fuels
  - **14** biomass

ASSESSMENT I

TIME: 3-$3^{1/2}$ HOURS M.M: 80

General Instructions:

1. The question paper comprises of two sections, A and B, you are to attempt both the sections.
2. All the questions are compulsory.
3. There is no overall choice. However internal choice has been provided in all the three questions of five marks category. Only one option in each question is to be attempted.
4. All questions of section A and all questions of Section B are to attempted separately.
5. Question numbers 1 to 4 in Section A are one mark question. These are to be answered in one word or one sentence.
6. Question numbers 5 to 13 are two marks questions, to be answered in about 30 words.
7. Question numbers 14 to 22 are three marks questions, to be answered in about 50 words.
8. Question numbers 23 to 25 are five marks questions, to be answered in about 70 words.
9. Question numbers 26 to 41 in section B are multiple choice questions based on practical skills. Each question is a one mark question. You are to choose one most appropriate response out of the four provided to you.

SECTION – A

1. Identify the compound which is oxidized in the following reaction:

$$H_2S + Br_2 \rightarrow 2HBr + S$$

2. Why are titanium and chromium classified as strategic element?
3. Which has a higher resistance: a 50W lamp or 25W lamp bulb and how many times?
4. A drop of litmus solution is added to each of the four solutions give below. State the colour of litmus solution observed in each.

   Soap solution, Sodium bicarbonate solution, Acetic acid, Tomato juice

5. Translate the following statements into chemical equations and then balance the equations:

a. Aluminium metal replaces iron from ferric oxide. Fe_2O_3, giving aluminium oxide and iron.

b. Barium chloride reacts with zinc sulphate to give zinc chloride and a precipitate of barium sulphate.

6. What is the chemical name of washing soda? Name the three chief raw materials used for making washing soda.

7. Write four characteristics used for selecting a suitable fuel.

8. How many 176Ω resistors (in parallel) are required to carry 5A on a 220V line? Distinguish between the terms electrical resistance and resistivity of a conductor.

9. What is solenoid? Draw field lines of the magnetic field through and around a current carrying solenoid. What does the magnetic field pattern inside the solenoid indicate?

10. a) What is power?

    b)In a house hold, 5 tube lights of 40W each are used for 5 hours and electric press of 500W for 4 hours everyday. Calculate the total electrical energy consumed by the tube lights and press in a month of 30 days.

11. Given the following reaction

$$2Al + Fe_2O_3 \rightarrow 2Fe + Al_2O_3 + Heat$$

    Answer the following with reason.

    a. Name the oxidising agent.

    b. Name the reducing agent.

    c. Name the substance oxidised.

12. A compound which is prepared from gypsum has the property of hardening when mixed with a proper quantity of water. Identify the compound. Write the chemical equation for its preparation. For what purpose is it used in hospital?

13.

    a. Show the formation of NaCl from sodium and chlorine atoms by the transfer of electrons.

b. Why has sodium chloride, a high melting point?

c. Name the anode and the cathode used in electrolytic refining of impure copper metal.

14. What are the functions of

a. Gibberellins

b. Cytokinins

c. Absorbic acid

15. Define ‘nerve impulse’ which structure in a neuron helps to conduct a nerve impulse.

16. State three advantages associated with using solar cells to produce electricity.

17.

a. State Ohm’s law.

b. Draw the circuit diagram of Ohm’s law.

c. What is the nature of graph in terms of relation between V and I.

18. a. An electric bulb is rated as 50W, 220V. Calculate the energy consumed by the bulb in 20 minutes. Express your answer in commercial units of electricity.

b.Distinguish between Overloading and Short Circuiting in a domestic circuit.

c.Why is it essential to earth electrical appliances having metallic body?

19. What are the environmental consequences of the increasing element for energy? What steps would you suggest to reduce energy consumption?

20. Name the hormone that-

i. is produced by thyroid gland

ii. Prepares the body for action

iii. Controls the amount of sugar in blood

iv. Brings about changes in boys at puberty

v. Brings about changes in girls at puberty

21. Draw neat and labelled diagram of digestive system.

Write the functions of the following glands.

i. livary gland

ii. Liver

iii. Pancreas

22.

a. Why should curd and sour substances not be kept in brass and copper vessels?

b. Why does an aqueous solution of acid conduct electricity?

c. Why plaster of Paris should be stored in a moisture proof container?

d. What is efflorescence?

e. Why is baking soda used as an antacid?

23.

a. State reasons for the following.

i. Metals are good conductor of heat.

ii. Addition of some silver to pure gold for making ornaments.

iii. Inability of non – metals for displacing hydrogen from dilute sulphuric acid.

b. Balance the following equations

iv. $CaO + H_2O \rightarrow Ca(OH)_2$

v. $NaOH + H_2SO_4 \rightarrow Na_2SO_4 + H_2O$

24. a. Explain why i) solar cooker is painted black from inside.

ii) the solar cooker box is covered with a glass sheet.

iii)the plain mirror reflector is used in solar cooker.

b.Draw a neat and well labelled diagram of solar cooker

SECTION – B

25 Absorption of light energy by mesophyll cells of leaf causes.

a) Oxidation of chlorophyll
b) Excitation of chlorophyll
c) Reduction of chlorophyll
d) Evolution of O_2

26 Which of the following does not secrete any hormone?

a) Testis
b) Spleen
c) Ovary
d) Pancreas

27 Which part of sunlight is used in making solar cell?

a) Infrared radiation
b) Ultraviolet radiation
c) Visible radiation
d) All of these

28 Which one of the following reaction can be a non – redox reaction?

a) Combination
b) Decomposition
c) Displacement
d) Double displacement.

29 Which of the following metal does not react with dilute sulphuric acid to liberate H_2 gas?

a) Calcium
b) Sodium
c) Iron
d) Silver

30 Sodium carbonate is not used as:

a) Ingredient in antacids
b) As a cleaning agent
c) For removing permanent hardness of water
d) For manufacturing of glass

31 Which one of the following compounds is not an ionic compound?

a) Sodium chloride
b) Calcium chloride
c) Carbon tetrachloride
d) Magnesium chloride

32 Which among the following reactions are endothermic in nature?

(i) Decomposition of lead nitrate
(ii) Burning of methane
(iii) Dilution of sulphuric acid
(iv) Dissolution of ammonium chloride in water.

a) i. and ii. b) ii. and iii. c) iii. and iv d) i. and iv

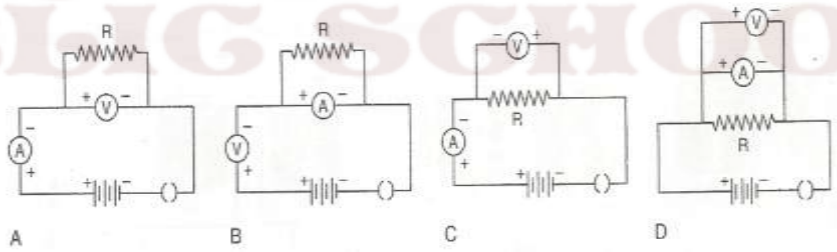
33 Seeds which are kept in the conical flask during the experiment that CO_2 is released during respiration must be.

a) Dry
b) Wet
c) Germinated
d) Boiled

34 The end products of aerobic respiration are

a) CO_2 energy and hydrogen
b) CO_2 and water
c) CO_2, H_2O and ATP
d) ADP and CO_2

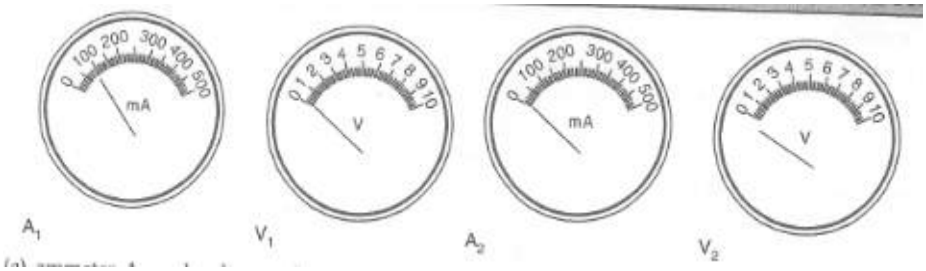
35 The correct set up of for studying the dependence of the current on the potential difference across a resistor is



a) A b) B c) C d) D

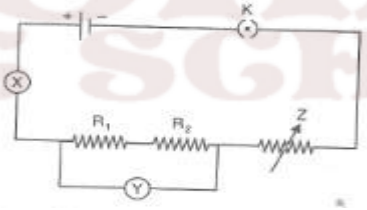
36 The normal positions of the pointers of the two ammeters A_1 and A_2 and two voltmeters V_1 and V_2 available in the laboratory are shown below:

For an experiment to study the dependence of the current on the potential difference across a resistor, the student should select.



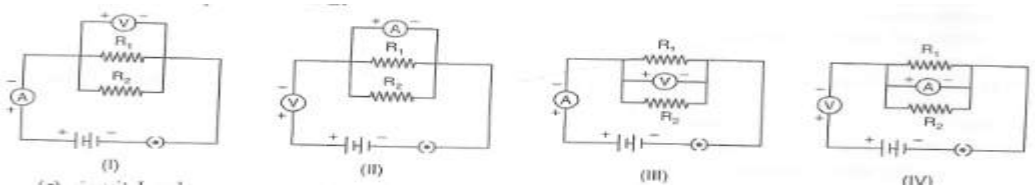
a) Ammeter A_1 and voltmeter V_1
b) Ammeter A_2 and voltmeter V_2
c) Ammeter A_1 and voltmeter V_2
d) Ammeter A_2 and voltmeter V_2

37 The given circuit diagram shows the experiment arrangement of different circuit components for determination of equivalent resistance of two resistors connected in series. The components X, Y and Z shown in the circuit, respectively represent



a) Rheostat, Resistor, Ammeter
b) Ammeter, Voltmeter, Rheostat
c) Voltmeter, Ammeter, Rheostat
d) Rheostat, Ammeter, Voltmeter

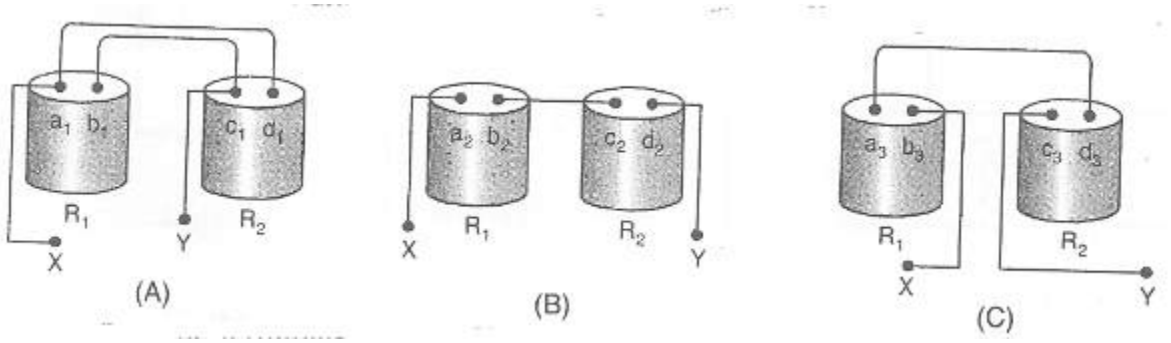
38 In the experiment on finding the equivalent resistance of two resistors, connected in parallel, the voltmeter has been correctly connected in



a) Circuit I only
b) Circuit II only
c) Both circuits I and III
d) Both circuits II and IV

39 The three students (A), (B) and (C) connected their two given resistors R_1 and R_2 in the manner

shown below.



They connect the terminals marked X and Y above to the terminals marked X and Y in the given circuit. They record the ammeter readings (I) for different positions of the rheostat and the corresponding voltmeter readings (V).

The average value of the ratio V/I in their observations would be minimum for:

a) Students (A) and (B) only
b) Students (B) and (C) only
c) Students (C) and (A) only
d) Student (A) only.

40. For testing the presence of starch an illuminated leaf is first

a) Boiled in alcohol
b) Dipped in iodide solution
c) Boiled in water
d) Placed in franin solution

41. Solid sodium bi carbonate was placed on a strip of pH paper. The colour of the strip

a) Turned blue
b) did not change
c) Turned green
c) Turned light pink

42. The temporary mount of the leaf epidermal peel which looked pinkish red under the microscope was

a) Stained in acetocarmine and mounted in glycerine
b) Stained in iodine and mounted in water
c) Stained in franin and mounted in glycerine
d) Stained in mythlene blue and mounted in water

TERM - II

(Second Term)

Contents:
Nos:

******

Topic 1:Carbon and its compounds

Important terms and conditions

Ver tility of carbon :Carbon is known metal and occurs in free as well combined state in nature.

Free state: Diamond ,graphite and coal.

Combined state :1.Solid state: All animals and plants products.

2.Liquid state: Petroleum and vegetable oil .

3.Gaseous state: In air has CO_3 .

Carbon has 4 valance electrons carbon can form an anion c-4 by gain of electons.It can also form of cations C+4 by loss of electron.IT can share its balanced electrons with other carbon atoms or atoms of non metal and forms covalent bonding.

Compounds of carbon: Simplest compounds of carbon are hydro carbon and simplest hydro carbon is methane.

Classification of hydro carbon:

turated hydro carbon: (C_nH_{2n+2})	Un turated hydro carbon:
Compounds having single bond	compounds having double and triple bonds.
ALKANES	ALKENES AND ALKYNES.
e.g	
ethane (C_2H_6)	
	alkenes(CnH_{2n}) alkynes. (CnH_{2n+2})
	Ehene C_2H_4 Ethyne C_2H_2

Sr no	Hydro carbons	Definitions	Examples
1	Straight chain	All carbons are in form of straight chain	Butane
2	Branched Chain	One or more carbon atoms are attached to main straight line	Isobutane.
3 a b	Ring or cycle hydro carbon turated Un turated	 Carbon atoms are in form of ring and bonded by single covalent bond. Carbon atoms are bonded by one or more doubled covalent bond.	Cyclohexane. Benzene.

Isomerism: The phenomenon of existence of compounds in two or more forms with me molecular formula but different structure.

Functional group: An atom or groups of atoms which makes a carbon compounds reactive and decide its properties.

Sr.no.	Hetro atoms	Functional groups	Formula of functional group	example
1.	Cl/Br	Halo-chloro/bromo	-Cl,-Br	Chloromethane(CH_3Cl)
2.	oxygen	1.Alochol	-OH	Ethanol C_2H_5OH
		2.Aldehyde	-CHO	Methanal HCHO
		3.Ketone	>C=O	Propanone CH_3COCH_3
		4.Carboxylic acid	-COOH	Ethanoic acid CH_3COOH

HOMOLOGOUS SERIES:A series of compounds in which the me functional group substitude for hydrogen in a carbon chain,such that successive compounds differ by CH_2 groups e.g CH_4 ,C_2H_6,C_3H_8 etc.

NOMENCLATURE OF CARBON COMPOUNDS:

Prefix word root+suffix+Functiuonal group.

CARBON COMPOUNDS:

ETHANOL –C_2H_5OH common name ethyl alcohol

ETHANOIC ACID- CH_3COOH.common name acetic acid.

ESTERIFICATION REACTION:The reaction between carboxylic acid and an alcohol in the presence of con. Suphuric acid to form a sweet smelling substance ester. .e.g

Conc H_2SO_4

$CH_3COOH+C_2H_5OH \longrightarrow CH_3COOC_2H_5+H_2O$

ponfication reaction : Alkaline hydrolysis of ester produces soaps.

$CH3COOC2H_5+NaOH \xrightarrow{\text{Heat}} CH_3COONa+C_2H_5OH$

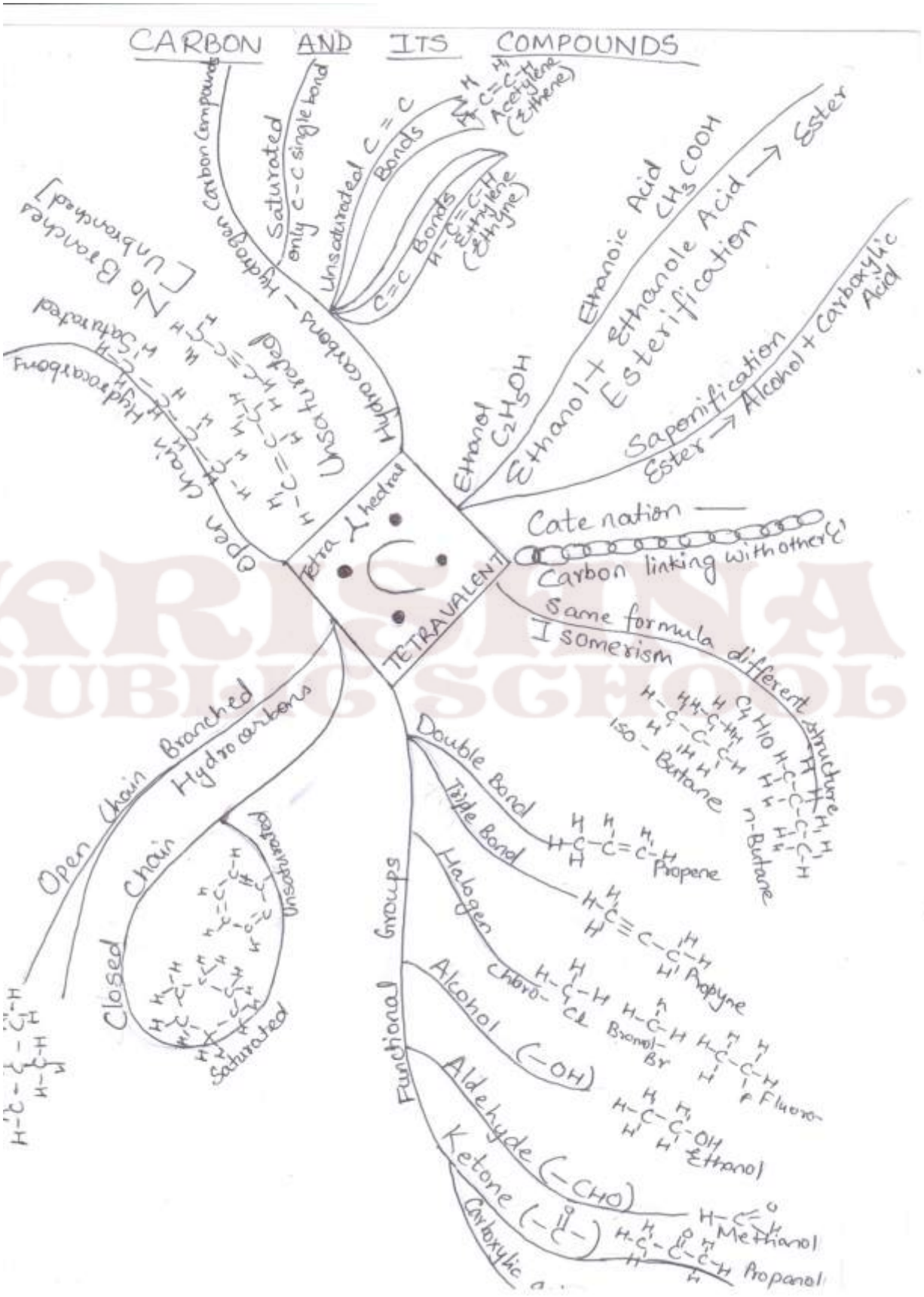
Reaction with carbonates and hydrogen carbonates: reaction of ethanoic acid with carbonates or bi carbonate evolves carbon di oxide gas.

$2CH_3COOH+Na_2CO3 \longrightarrow 2CH_3COONa+CO_2+H_2O$

SOAP AND DETERGENT: Soap is sodium and potassium lt of long chain of carboxylic acid .They foam lather with soft water only.

Detergent are ammonium or sulphonate lts of long chain carboxylic acid .they even remain effective in hard water and foam lather.

MIND MAP



Topic 1: Carbon and its compounds
-III
PAPER PEN TEST

TIME: 40 Min Max marks:40.

1. Name the compound form heating ethanol at 443 K with excess of conc.H_2SO_4. 1
2. What happened when a small piece of sodium is dropped into ethanol ? 1
3. Write the chemical equation for the decarboxylation of ethanoic acid? 1
4. Give an example of esterification reaction. 1
5. Name the product obtained when ethanol is oxidized by either chromic anhydride or alkaline potassium permanganate. 1
6. Write the chemical equation repressing the preparation reaction of ethanol from ethane. 1.

7. Name the 2 elements which are present both in CNG and Petroleum 2
8. Draw the electronic dot structure of ethane molecule (C_2H_6) 2
9. Write the IUPAC name of the next homologous of $CH_3OHCH_2CH_3$. 2
10. Define homologous series of organic compounds series of organic compounds ,Mention any two characteristics of homologous series. 2
11. Describe a chemical test to distinguish between ethanol and ethanoic acid. 2
12. Give the name of functional groups
(i)-CHO (ii) –C=0 2
13. Why does carbon form compounds mainly by covalent bonding ? 2
14. Give a chemical test to distinguish ethanol from ethanoic acid. 2
15 Allotropy is a property shown by which class: substances elements compounds or mixtures ? give one examples of allotropy. 2
16 . How may be the following be obtained from ethanol ? express giving chemical equations.
(i) Ethyl ethanoate (ii) Sodium ethoxide. 2

17. Describe with chemical equation how ethanoic acid may be obtained from.
(i) Ethanol (ii) Methanol 2
18. Explain the cleansing action of soap 3
19. Distinguish between esterification and ponification reactions of organic compounds 3.
20 Explain the structure of graphite in term of bonding and give one property based on this structure. 3
21 Name the organic acid present in vinegar .write a chemical equation which represents the commercial method for the preparation of this acid from methanol. 3

HIGH ORDER THINKING SKILLS (HOTS) QUESTIONS:

1. Why the colour of potassium permangante di ppers,if it is added to warm solution of ethanol.

2. An organic compound with molecular formula $C_2H_4O_2$ produces brisk effervescence on addition of sodium carbonate /bicarbonate.

a .Identify the organic compound.
b. Name the gas evolved.

C. How will you test the gas evolved.
d. Write the chemical equation for the above reaction.
e. List two important uses of the above compound.

3.a.What are the various possible structure formulae of a compound having molecular formula C_3H_6O .
b. Also give the IUPAC names of the above possible compounds.
c.What is the similarity in these compounds?

4.A mixture of oxygen and ethyne is burnt for welding ,can you tell why a mixture of ethyne and air is not used .

5.Two carbon compound A and B have molecular formula C_3H_8 and C_3H_6 respectively. Which one of the two is most likely to show addition .justify your answer .Explain with the help of a chemical equation ,how an addition reaction is used in vegetable ghee industry.

6.1ml glacial acetic acid and 1ml of ethanol are mixed together in a test tube. Few drops of concentrated sulphuric acid is added in the mixture are warmed in a water bath for 5 min.
a.Name the resultant compound formed.
b.Represent the above change by a chemical equation .
c.What term is given to such a reaction.
d.What are the special characteristics of the compound formed.

7.An organic compound 'X'with a molecular formula C_2H_6O undergoes oxidation in the presence of alkaline $KMnO_4$ and forms the compound 'Y'.
a. Identify 'X' and 'Y'
B.Write your observation when the compound 'X' is made to react with compound 'Y' which is used as a preservative for pickles.

Topic 1:Carbon and its compounds -IV

QUIZ:
1.Name the simplest hydrocarbon..
2.What is the general formula of alkynes.?
3.Name the carboxylic acid used as preservation
4.Name the product other than water formed on burning of ethanol in air.
5 Give the IUPAC name of the following compounds.
i. An aldehyde derived from ethane.

ii. A ketone derived from butane.

iii. A chloride derived from propane.

iv. An alcohol derived from pentane.

M.C.Qs.
1. Dilute acetic acid was added to the four test tubes containing the following chemical.
i.KOH ii.$NaHCO_3$ iii. K_2CO_3 iv. NaCI

Brisk effervescence was observed in test tubes

a) i & ii b) ii & iii c) i& iv d) ii & iii

2. Which of the following solution of acetic acid in water can be used as vinegar used in pickles?

a) 5-10% b. 10-15% c.20-130% d.100%

3.The suffix used for naming an aldehyde is

a..ol b.al c.One d..ene

4.When acetic acid reacts with ethyl alcohol ,we add cons,H_2SO_4,its acts as…….and the process is called……..

a)Oxidizing agent, ponification. b). Dehydrating agent, esterification c). reducing agent ,esterification.d).Acid & esterification.

5.2ml of ethanoic acid was taken in each of the three test tubes.A,B and C,and 2ml.4ml and 8ml water was added to them ,respectively .A clear solution is obtained in:

a. Test tube A only.

b.Test tubes A & B only.

c.Test tubes B and C only.

d. All the test tubes.

6.2 ml pf acetic acid was added in drops to 5ml of water it was noticed that:

a.The acid formed a separate layer on the top of water.

b.Water formed a separate layer on the top of the acid.

c.A clear and homogenous solution was formed.

d.A pink and clear solution was formed.

7.A few drops of ethanoic acid was added to solid sodium carbonate .The observation made was that

a. A hissing sound was evolved

b. Brown fumes evolved.

c. Brisk effervescence occurred.

d. A pungent smelling gas evolved.

8.Acetic acid , when dissolved in water, it dissociates into ions reversibly because it is a :

A. Weak acid B. strong acid. C. weak base. D. strong base.

9.Which of the following hydrocarbon can show isomerism?

a.C_2H_4 b. C_2H_6 c.C_3H_8 d.C_4H_{10}

10.Combustion of hydrocarbon is generally accompanied by evolution of

a. Heat b. Light c. both heat and light d. Electric current.

PUZZLE :

1.Compounds containing double and triple bonds.

2.A compound which is basic constituent of many cough syrups.

3.Very dilute solution of ethanoic acid.

4.A sweet smelling substance formed by the reaction of alcohol and carboxylic acids.

5 Gas released when sodium metal is dropped in ethanol.

6.The functional group present in methanol.
7.IUPAC name of alkene containing 3 carbon atoms.
8.The number of single covalent compounds present in pentane.
9.First member of homologous serious alkyne.
10. Simplest ketone.
11.Self linking property of carbon.
12.Product formed by dehydration of ethanol in conc. Sulphuric acid.
13.Alcohol whose intake in small quantities can be lethal.
14.Number of single covalent bounds in ammonia.
15.Type of reactions shown by alkanes.

Activity :

1.To Study the ponification reaction for the preparation of soap in the laboratory using any vegetable oils.

2.Prepare soaps of different colours and fragrances.

CARBON AND ITS COMPOUNDS
3..Testing the hardness of water.
4..Collect information about artificial ripening of fruits by ethylene.

PROJECTS :

To prepare models of methane ,ethane,ethyne and benzene molecules using thermocols ,ball and match sticks.

TOPICS FOR DEBATE:

1.Role of esters in everyday life.

2. Condemning the use of alcohol as a social practice.

3.Use of biodegradable synthetic for cleansing purpose.

TOPIC 2: PERIODIC CLASSIFICATION OF ELEMENTS

Gist of the lesson:

Classification of elements:the arrangement of element in such manner that element with similar properties are grouped together while elements with dissimilar properties are separated .
Early attempt to classify elements:
DOBEREINER'S TRIADS:
He arranged the elements with similar properties in a group of three known as triad in such a manner that the atomic mass of the middle element was approximately the average of the other two elements
LIMITATIONS:

Only three triads were identified from the element known at that time .hence this classification was not useful.

NEWLAND'S LAW OF OCTAVES :

He arranged the element in the order of increasing atomic masses starting with hydrogen(least atomic mass) and ended with thorium having atomic mass 56 . According to him ,the properties of every eighth element are similar to the first element . Iit was compared to music notation ,re ,ga ,ma, pa ,da ,ni , ,and thus the name Newlands law of octaves(notes of music).

LIMITATIONS:

1. It was applicable only for lighter element having atomic mass upto 40 amu ,i.e.upto calcium .
2. He believed that only 56 elements existed in nature but later on more element were discovered whose properties did not fit into Newland law of octaves.
3. Some elements having different properties were grouped together like cobalt and nickel have been placed with halogens .

Due to above limitations, Newland law of octave was rejected

MANDELEEV'S PERIODIC TABLE :

He arranged the elements in order of increasing atomic masses , similarity in physical and chemical properties of element . properties of hydrides and oxides of different element were studied and elements with similar properties were grouped together .

He classified the elements in table consisted of vertical columns called **groups** and horizontal rows called **periods .** there were 7 groups in table and group is subdivided into subgroups A and B except group 7 which has three sets of elements in 4th , 5th , 6th period.

LIMITATIONS OF MENDELEEV, PERIODIC TABLE :

1. Position of hydrogen was not assigned correctly .
2. No separate position has been given to isotopes of an element .
3. Some element having higher atomic mass are placed before the elements with lower atomic mass .

MODERN PERIODIC TABLE :

Mosely modified the Mandelleve's periodic table by taking atomic number as the fundamental property instead of atomic mass.

Modern periodic table consists of 18 vertical columns known as group , and 7 horizontal rows known as periods .

GROUPS:

Elements in group one are called alkali metal s.

Elements in group 2 are called alkaline earth metals .

Elements in group 17 are called halogens .

Group 18 element are called inert gasses or noble gases.

Significance of group in the periodic table is that an element in a group has me number of valance electron ,valency and thus identical chemical properties .

PERIODS

1ST PERIOD – 2 elments and is called very short period .
2nd PERIOD- 8 elements and are called short period .
3rd PERIOD – 8 elements and are called short period .
4th PERIOD – 18 elements and are called long period .
5th PERIOD – 18 elements and are called long period .
6th PERIOD – 32 elements and are called very long period .
7th PERIOD- incomplete period .

The number of shell present in the element indicates the period to which it belongs .

VALENCY :

It is defined as the combing capacity of an atom of an element to acquire noble gas configuration. it is equal to the number of electron lost , gained or shared during the formation of chemical compound .

ATOMIC SIZE / ATOMIC RADII:

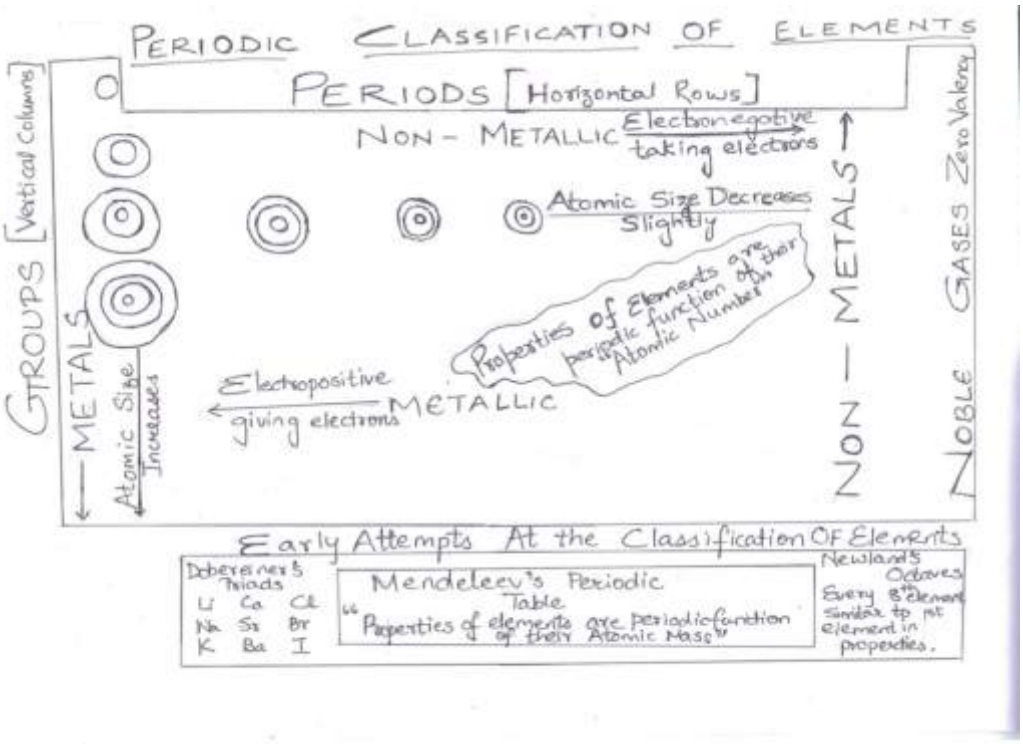
It is defined as the distance from the centre of the nucleus to the outer most cell of atom . it is generally expressed in pico meter (pm) .

On moving down the group the atomic radii increases.
Because on moving down the group a new energy shell is added which increases the distance between the outermost electron and the nucleus . All though the nucleus charge also increases , but it is compen ted by the additional shell being added thus , increasing the size of the atom .
Across the period the atomic radii decrease. Due to the increase nuclear charge , the pull on the electron increases and hence, they are pulled closer to the nucleus thus, decreasing the atomic size .
Oxides and its nature. Metal reacts with oxygen to form oxides by loss of electrons. These oxides on dissolution in water from bases.

REACTIVITY OF ELEMENTS.

Down the group reactivity of metal increases as the tendency to lose electron increases due to the increased atomic size .
Reactivity of non metals decreases down the group because of the increased atomic size and the tendency to gain electron decreases.
On moving across the period the reactivity first increases due to the decreased in the metallic character and increase in nonmetallic character.

MIND MAP



ASSESSMENT III

TIME: 1 HRS
M.M:30

Q.1what is the position of hydrogen in the modern periodic table? (1)

Q.2 where are the isotopes of the me elements having different atomic masses placed in the periodic table ? (1)

Q.3 An element M is the third group of the periodic table. Write the formula of its oxide? (1)

Q.4 What is the valency of magnesium with atomic no. 12 and chlorine with atomic no. 17? (1)`

Q.5what is the difference in number of shell in magnesium and sulphur? (1)

Q.6 on the basis of electronic configuration , how will you select (1)

i)the terminating member in a period .

ii) the chemically similar elements .

Q.7Give reason as to why the atomic radii of elements increase in a group while moving from top to bottom ? (2)

Q.8 element in a group of periodic table have similar chemical properties why ? (2)

Q.9 explain why atomic number is more important than atomic weight in determining chemical properties ? (2)

Q. 10 where in periodic table do we find :

i)elements classified as non metal .

ii) elements forming negative ions .

iii)elements with high melting points .

iv)elements forming positive ions . (2)

Q.11 in a group reactivity of metals increases while those of non metals decreases . Explain. (2)

Q.12 elements in a group of periodic table have similar chemical properties why (2)
Q.13 elements of group 18 are called zero group. Why? (2)
Q.14 write the electronic configuration of atoms of
A)potassium (K) B)argon (Ar) C)lithium (li) D)fluorine (F) E)chlorine (Cl) (5)

Q.15i)Why is potassium more reactive than lithium ?
ii)why is fluorine is more reactive than chlorine ?
iii)which is smaller in size Cl or Ar ?
iv)which is smaller in size Li or F ?
v)which is more electronegative F or Cl?
Q.16The atomic no. of an element is 17.
i)what is its valency?
ii) Whether it is a metal or non-metal?
iii) Whether it is bigger or smaller in size then an element of atomic no.18?
iv) What type of bonds it will form with elements of group 18?
v) How would its oxide behave with litmus solution? (5)

HOTS QUESTIONS

Q.1 an element has two electron in its M shell:
i) Identify the element. ?
ii) What type of ion will it form ?
iii) What will be the formula of its chloride ?
iv) Predict the solubility of its chloride ?
Q.2 which among the following elements whose atomic number are given below belong to the me period ? give the reason 17,10,20,12,19,15
Q.3 element X with atomic 12 and element Y with atomic number 17 reacts with hydrogen to form hydrides . Which of them is expected to have high melting points?
Q.4 why is position of hydrogen not justified in modern periodic table?

ASSESSMENT IV

QUIZ

Q.1 Name the element with atomic number 12.
Q.2 Name a metal in making cans and a member of group14.
Q.3Name the most electronegative element in the periodic table.
Q.4 Name the horizontal rows in the periodic table .
Q.5 on moving across the period , atomic size of the element increase or decrease.
Q.6 who gave the classification on the basis of musical note .
Q.7Name two elements belonging to group one which can be cut with the help of knife .
Q.8 what name is given to the elements belonging to group 2 of the periodic table and why?
Q.9 Name the lustrous non metal having 7 valence electron .

Q.10 Name the highly reactive metal that give violet colour to flame.
Q.11 Name the gas used in coloured advertising lights having 2 valence electron .

DEBATE AND DISCUSSION

A) Drawbacks of Mendeleev's and modern periodic table.
B) Achievements of Mendeleev's and modern periodic table.
C) Advantages of modern periodic table in understanding chemistry.

PROJECTS

1 Power point Presentation on the following topics:
1. Modern Periodic Table based on the similarity of properties of elements
2. Contribution by various Scientists towards the development of Periodic Table.
3. PERIODIC CLASSIFICATION
1.Making flash cards to study atomic numbers electronic configuration and other properties of elements.
2.Make an outline sketch of the Modern Periodic Table.

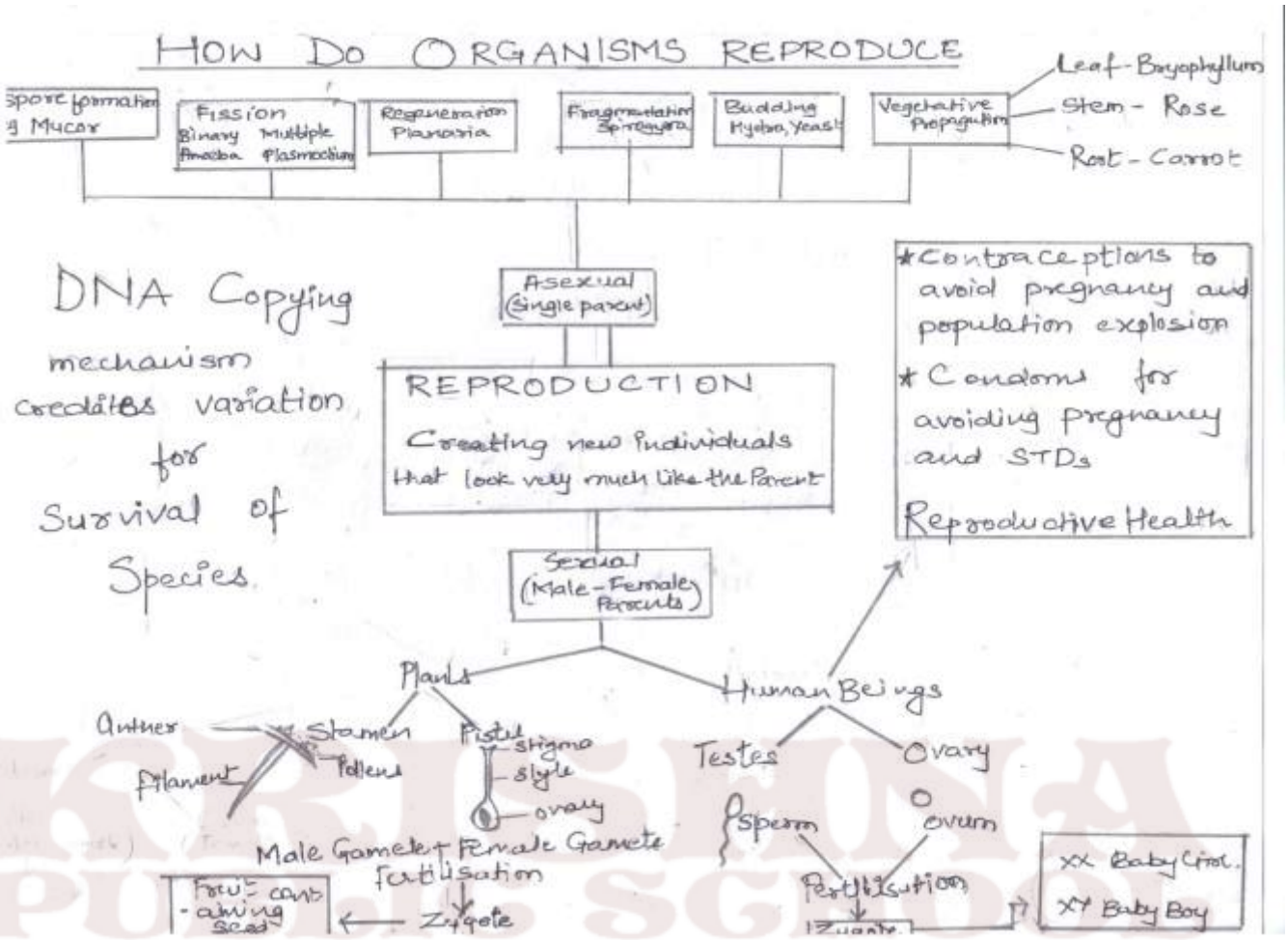
TOPIC 3: HOW DO ORGANISMS REPRODUCE?

GIST OF THE LESSON

1) Reproduction: process by which living organism produce new individual of their own kind.
2) Creation of DNA copy: when the cell divides into two, each new cell gets a copy of each DNA or chromosomes.
3) Importance of variation: variations are created by DNA copying mechanism during sexual reproduction.
4) Asexual modes of reproduction:
a) Fission—binary & multiple fission
b) Fragmentation
c) Regeneration
d) Budding
e) Vegetative propagation
f) Spore formation
5) Sexual reproduction-
a) In flowering plant
b) In human beings
6) Parts of flowers
7) Pollination: self and cross pollination
8) Fertilization: male and female germ cell fuses to form zygote.
9) Puberty: The age, when reproductive organs become functional,(in female 10-12 years, in male 13-14 years).
10) Male reproductive system in human beings.
11) Female reproductive system in human beings.
12) Reproductive health-
   a) To have awareness about STDs, (sexually transmitted disease).
   b) Some common STDs are gonorrhea, syphilis & HIV-AIDS.
13) Contractive methods: to avoid pregnancy-

a) barrier method b)chemical methods c) surgical methods

MIND MAP



ASSESSMENT-III

Very short answer type question:
Note: each question carries 1 mark.

1) What is reproduction?
2) Have you seen seeds of rose or potato? Name some plants whose seeds you may have seen.
3) Can an amoeba and hydra reproduce like human beings?
4) What changes are observed in the uterus if fertilization occurs?
5) Define fertilization?

Short answer type questions
Note: each question carries two marks:

1) In the human body, what is the role of (a) seminal vesicles (b) prostate gland?
2) State the difference between menarche and menopause?
3) What is variation? Mention the importance of DNA copying in reproduction.

HIGHER ORDER THINKING SKILLS (HOTS) QUESTIONS

1) Give two reasons for the appearance or variation among the progeny formed by sexual reproduction.
2) Colonies of yeast fail to multiply in water but multiply in sugar solution. Give one reason.
3) Malaria parasite divides into many daughter individual simultaneously through multiple fission. State an advantage the parasite gets because of this type of reproduction.
4) What is the importance of DNA copying in reproduction?
5) How does reproduction help in providing stability to population of species?
6) Why is vegetative propagation practised for growing some types of plants?
7) Why would be the reason for adopting contraceptive methods ?
8) Name those parts of flower , which serve the me function as the following do in the animals a) testies b) Eggs, c) Ovary ,d) Sperms.

*__Activity__- to grow rhizopus & prepare its temporary slide.
Aim: to show asexual reproduction in an organism.
App: slice of bread, water, box, slide, cover slip.
Procedure: children grow rhizopus on slice of bread and make a temporary slide.

*__Project: 1.a)__ To study manner of vegetative reproduction in some commercially useful plants.
b) To study the seeds during sprouting period.

2. How do organisms reproduce.
1.Seprating the various parts of any 5 flowers displaying and comparing them.
2.Growing some plants by vegetative propagation.

*__Seminars:__ reproductive health and sexually transmitted disease: children form groups and discuss.

*__Symposium:__ gender related problems: female infanticide.

*__Group discussion:__ if there was no sexual reproduction…..

*__Debate:__ is it neces ry to learn about reproductive health from class VII?

TOPIC 4: HEREDITY AND EVOLUTION

POINTS TO REMEMBER:

1.HEREDITY: Transmission of features or characters from one generation to another or from parents to offspring through their genes

2.VARIATION: It occurs due to sexual reproduction, inaccuracies during DNA replicating (mutation) and due to environmental factors.

3.GENETICS: Branch of biology dealing with the study of heredity and variations.

4.ALLELES :There is one pair of alleles which can express itself whether present in homozygous state or heterozygous state. Eg – T (tallness in pea plant), R(round seeds in pea plant)

5.GREGOR JOHANN MENDEL:- (1822-1884): He is known as the father of 'genetics'. He worked on Sweet pea plant(*pisum tivum*).

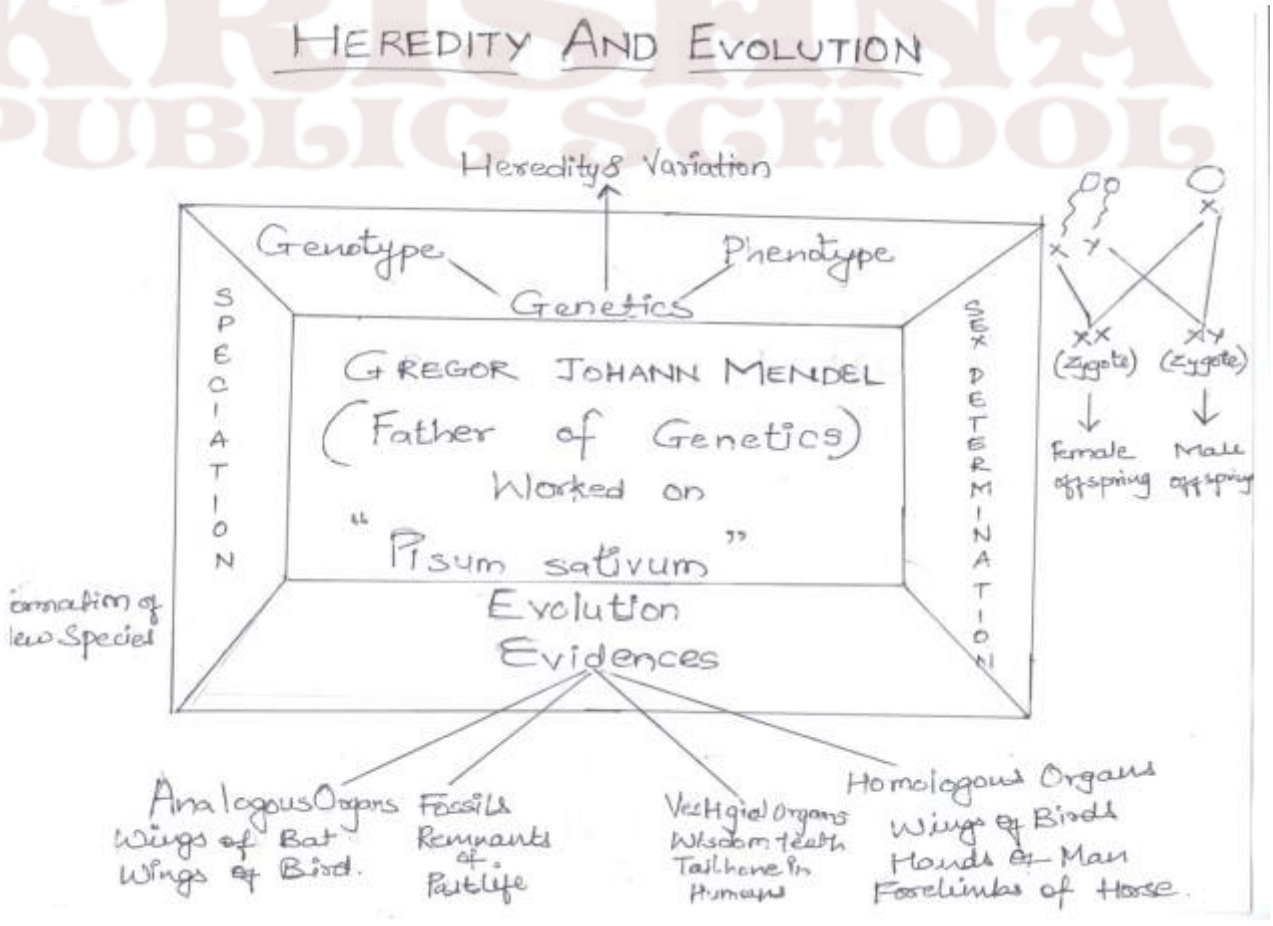
6.GENOTYPE: genetic composition of an individual, eg – pure tall-TT, hybrid tall-Tt

7.PHENOTYPE: Visible traits of an individual. Eg – Tallness or Dwarfness.

8.EVOLUTION: gradual changes in traits of organisms from pre existing organisms is called evolution.

9.SPECIATION: It may take place when variation is combined with geographical isolation. (Formation of new species)

MIND MAP



ASSESSMENT –III

TICK THE CORRECT OPTION:

1.The number of chromosomes in human ovum is
a.21 b.22 c.23 d.24
2. An example of homologous organs is
a.our arm and a dog's foreleg b./our seethe and an elephant's tusk
c.potato and runners of glans. D. all of these.
3. The hereditary units are:
a. Segments of RNA b. Genes. c. Chromosomes f. Chromatin
4. The science dealing with biotechnology is called.
a.Heredity and variation b. paleontology c. genetics

HOTS

1.If a trait exists in 10% of a population of an asexually reproducing species and a trait B in 60% of the me population which trait is likely to have arisen earlier?

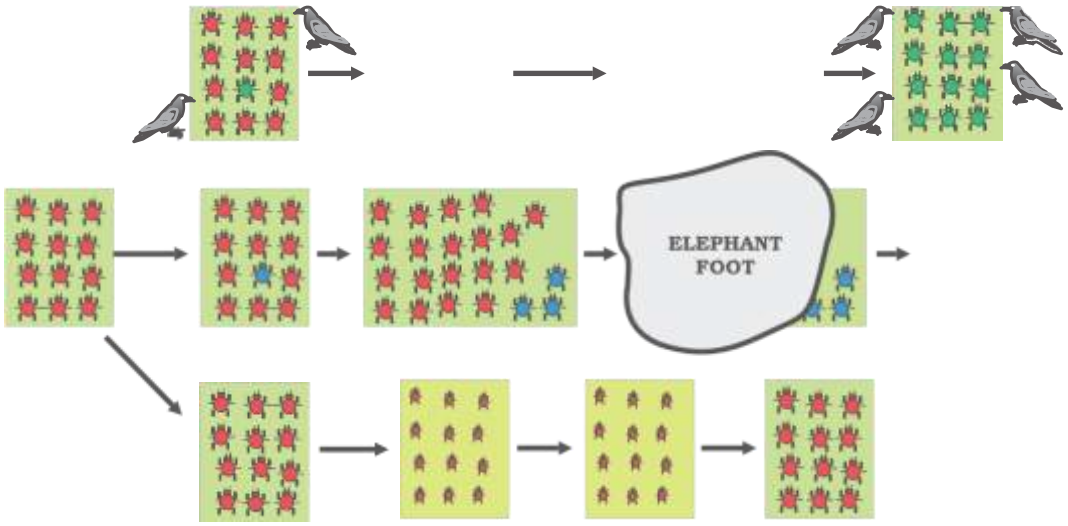
2.Which of the following is not the example of artificial selection ?

A)Colours of rose b.Flavours of mangoes 3.colours of beetle 4.Starch quality of wheat.

3. Explain how advantages variations like long neck help an organism like Giraffe to survive better?
4. Which of the following is the clearly acquiered trait in human beings?
a.Intelligence b.Height C.Swimming d. Skin colour.

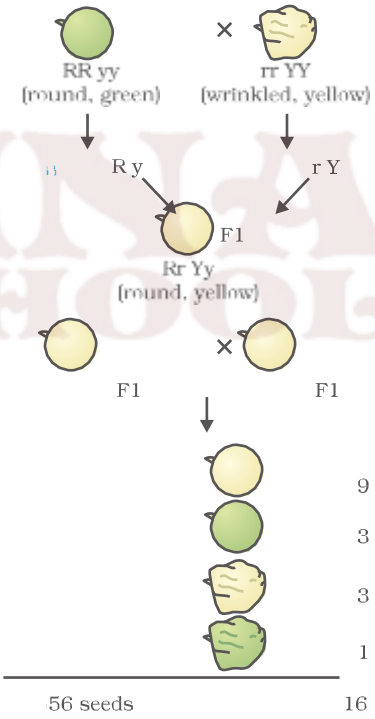
5. Why are human beings, who look different from each other size and colour belongs to the me species?

6. Acquiered characters are not inherited .Give reasons.
7. All the human races like Africans, Asians ,European and others might have from common ancestors provide few evidence in support of the view.
8. How is genetic drift different from natural selection? From the diagram given below which case shows natural selection?
Refer to diagram 9.7 ,page 147 of textbook.



9.Observe the diagram properly, mention the ration of round, yellow seeds and wrinkled,green seeds.

Refer to diagram 9.5,page 145 of text book.



10.From the figures given below ,make a pair of homologous and analogous organs.Also justify the answer.

Refer to page 132, diagram 9.8.

ASSESSMENT –IV

QUIZ

A. Decomposers are also called _____

B. Producers prepare their _____

C. Ozone layer is destroyed by _____

D. Ecology is the study of the interaction of_____ with each other and their surroundings.

SEMINAR

A. Mendel's work

B. Sex determination in organisms

C. Role play

D. Student in act as Aristotle ,Darwin,Lemark and Mendel and present the work done by these great people.

GROUP DISCUSSION

If Mendel had met!

Projects: 1. ve Tiger….. Children collect information about the Tigers from various national Parks and Wild life nctuaries. Perform the stage shows to develop the awareness about the forests and wild life.

3. To collect information on artificial selection carried out in some crops and animals . Visit to Vetenary college.

4. Visit to an agricultural research Institute to understand the various techniques involved in Hybridi tion.

5. 1.Conducting a survey on
   A. Evolution of wisdom teeth in parents.
   B. Free and attached earlobes.
   C. Rolling of tongue.
   D. Finger prints.

Debate: Use of Biotechnology in Human Welfare .

Activity; To study vestigial organs in Human beings . Students define vestigial organs and discuss the use of every part of the body.Then come to the conclusion.

CHAPTER :5 REFLECTION AND REFRACTION

Key concepts and terms:

1) Light: light is a form of energy. It brings the sen tion of sight. It is a form of electromagnetic radiation. It also provides us means of communication (fiber-optics).

2) Light wave: light wave travels with a speed of 3×10^8 ms^{-1} in free space. Its speed depends on the medium.

3) Ray and beam: the straight line indicating the path of the light (arrow- direction is called a ray. A bundle of rays originating from the me source of light in a particular direction is called a beam of light.

4) Reflection: when light falls on a surface and gets back the me medium, it is called reflection.

5) Image: the point of convergence or the point form where the light appears to diverge after reflection or refraction is called image.

6) Angle of incidence: the angle between the incident ray and the normal at the point of incidence is called angle of incidence.

7) Angle of reflection: the angle between the reflected ray and the normal at the point of reflection is called angle of reflection.

8) Laws of reflection: 1) the incidence ray the reflected ray and the normal at the point of incidence, all lie in the me plane.

2) The angle of reflection and the angle of incidence are equal.

9) Aperture: the width of the reflecting surface is called aperture.

10) Focus: the point on the principle axis where all parallel rays meet after reflection is called principle focus.

11) focal length: the length or separation between the pole and the focus is called focal length (PF = f)

12) In order to draw ray diagram, two rules are used:

1) The rays of light passing parallel to the principle axis will coverage at the focus after reflection.
2) The rays of light passing through the focus will emerge parallel to the principle axis after reflection.
3) The rays of light passing through the center of curvature will all retrace their both after reflection.(as it is normal at the point of incidence)
4) The rays of light falling at the pole get reflected at the me angle on the other side of principle axis.(Laws of reflection)

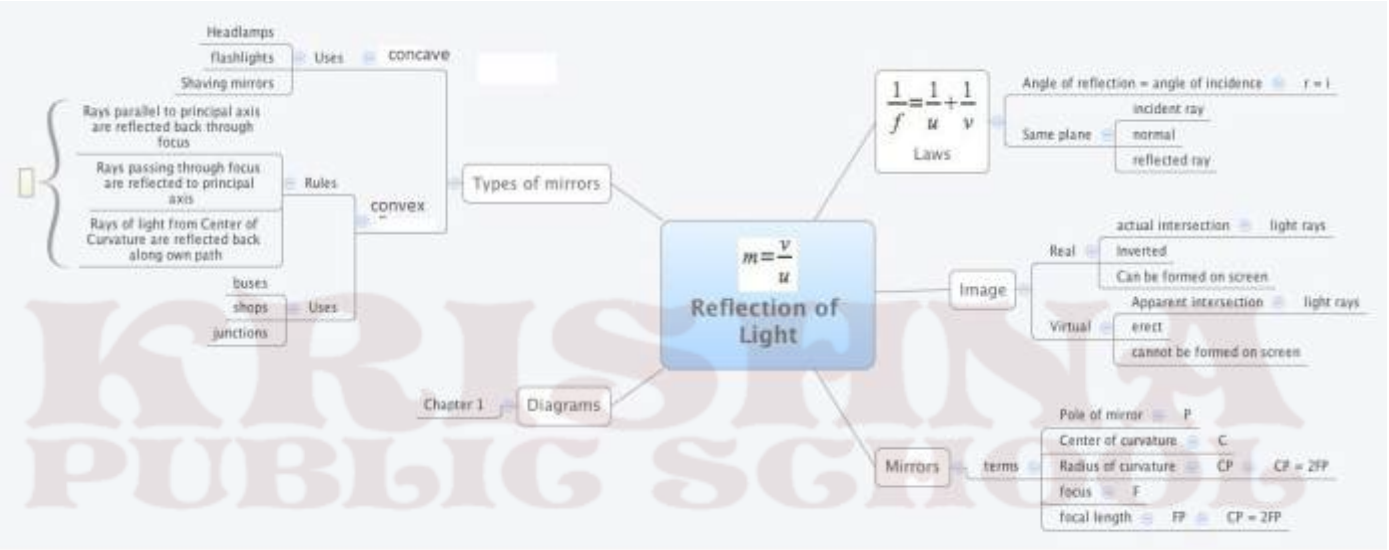
13) Relation between radius of curvature and focal length It is two times the focal length i.e. R=2f.

14) Mirror formula: 1/f= 1/v +1/u where f, v and u are the focal length, image distance and object distance.

15) Lens formula: if u, v and f are the object distance, image distance and focal length respectively then 1/f=1/v-1/u

16) Magnification of a lens: M= size of image (h_1)/ size of object (h_0) also m= (h_1)/ (h_0) = v/u.

MIND MAP



ASSESSMENT –III
(Pen Paper Test)

1) If the speed of light in a medium id 2 x 10^8 m/s, then its refractive index is:

   a) 1 b) 10 cm c) 1.5 d) 0.5

2) The power of sunglasses is

   a) 0 b) 10cm c) 25cm d) zero

3) The refractive index of diamond is 2.42. What is the meaning of this statement in relation to the speed of light?

4) Draw a ray diagram and show the image formed by a concave mirror when the object is kept at focus.

5) An object is placed at a distance of 10cm in front of convex mirror of focal length 15cm. find the nature and position of image.

6) 1) Two thin lenses of power +3.5D and -2.5 D are placed in contact. Find the power & focal length of lens combination?

1) Define 1) Snell's law of refraction of light. 2) Pole of a concave mirror.

7) An object of size 4cm is kept at a distance of 20cm from the optical center of a converging lens of a focal length 10cm. calculate the distance of image from the lens and the size of the image.

8) a) Define magnification. Write the sign convention used for expressing it.
b) Using lens formulae, find the position of image, its nature and magnification formed by a concave lens of focal length 20cm and the object is at 15cm.

ASSESSMENT –IV

1) QUIZ:

1) Name the place where image is formed in the eye?
2) Name the muscular diaphragm that controls the size of the pupil?
3) What is the cause of dispersion of light?
4) Which color has got more wave length?
5) How many colors evolve when white light disperses?
6) What is the reason for the different deviation?
7) Who discovered that white light consists of seven colors?
8) What makes bees respond the ultraviolet light?

Oral questions:

1) What is a ray?
2) A Lemmon placed in water appears larger in size due to _____
3) What does the negative sign of magnification of a mirror indicate?
4) What is the relation between focal length and radius of curvature of a spherical mirror?
5) What is the range of vision of normal human eye?
6) What do you mean by lateral displacement?

7) Magnification produced by convex mirror for object of size 5cm is ½ what is the size of image?

8) What is the real image?

9) A ray of light strikes at 45 degree on a mirror. what is a angle of incidence and reflection?

10) What is power of accommodation?

Home assignment:

1.What do you mean by Power of the lens?

2.What is the lens formula? Write the sign convention for various mirror and lens.

3.Name the lens/ mirror in the following situations;

i) Rear View mirror ii) magnifying Glass iii) Mirror with Dentist iv) Correction of Myopia .

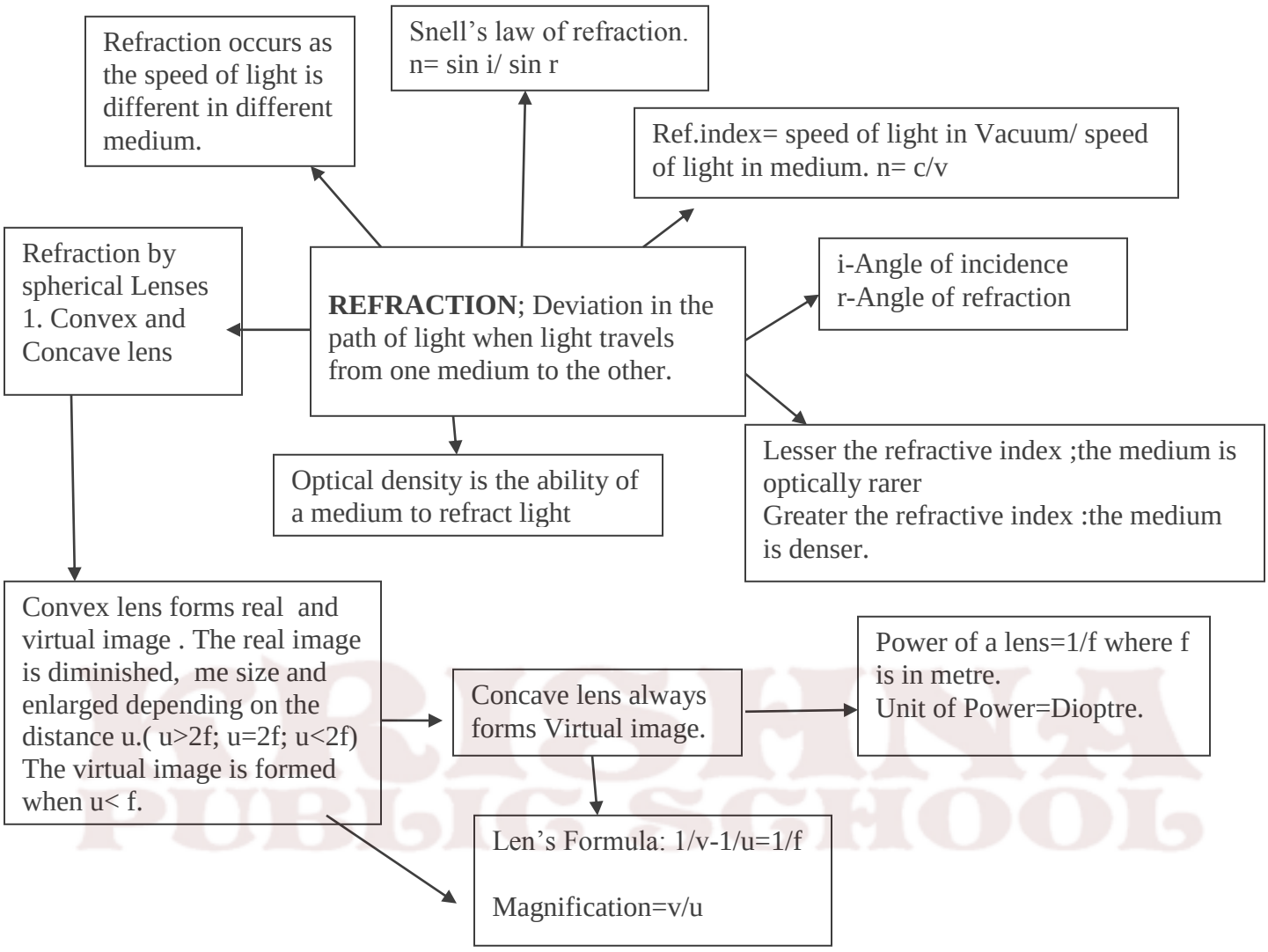
4. The power of the lens is -2D .What is the focal length and nature of the lens?

Project Work ;

1.To find the focal length of the given concave mirror using candle light.

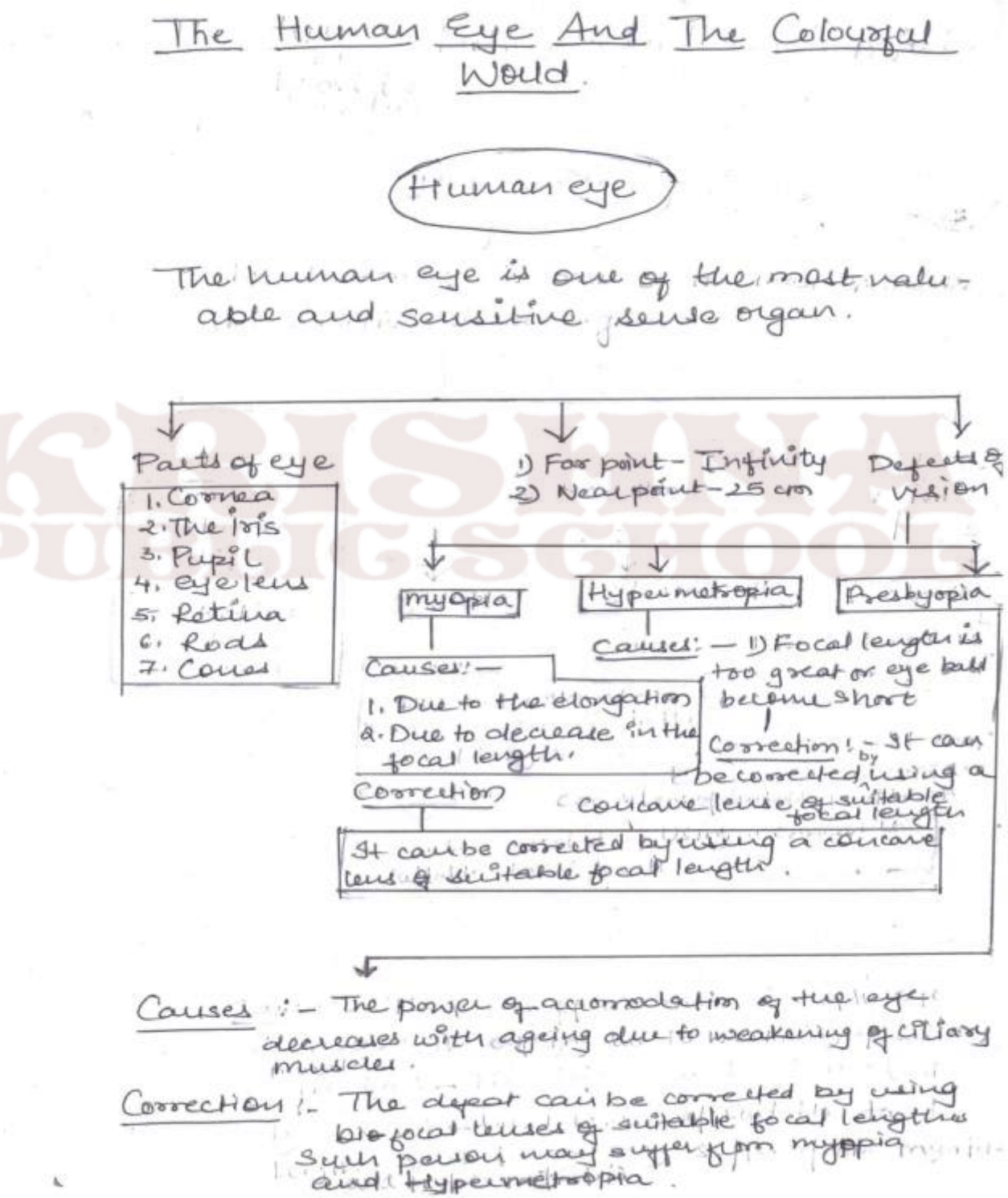
2.Study the phenomena of refraction of light in different medium(Glass slab, Plastic, etc)

MIND MAP



Topic 6 THE HUMAN EYE AND THE COLOURFUL WORLD

MIND MAP



ASSESSMENT –III

Give reason for the following:

1) Red light is used for danger signal

2) Cause of Color blindness.

3) Sky appears black in Moon.

4) Rainbow is seen on a rainy day in the presence of sunlight.

4) A person with a myopia eye cannot see objects beyond a distance of 1.5m. What would be the power of corrective lens? Which type of lens is used?
5) What do you understand by myopia? Write two causes of it?
6) What do you mean by far point and near point of eye?
7) What is presbyopia? State the cause of it and how is it corrected?
8) Explain: 1) why does sky look blue on a clear day
2) Twinkling of stars.
9) What is hypermetropia? State two causes of hypermetropia with help of ray diagrams show:
1) The eye defect hyperopia.

HOTS

1.Why does it takes sometimes to see in a dim room when you enter the room from bright sunlight outside?
ANS: In the bright iris causes the pupil to become smaller so that only a small portion of light enter the eye and rods of the retina are also adjusted in the me way. but when a person enter in to dim light each iris takes sometimes to increase the diameter of the pupil so that more amount of light can enter the eyes to see the objects clearly and rods of the retina also takes some time to adjust –themselves to get the picture of the object in the dim light.

2Can we see a rainbow on the moon?
ANS:No, since there is no atmosphere on the moon.

3.Does a beam of light give a spectum on passing through a hollow prism?
ANS:No,this is because dispersion of light cannot occur through a hollow prism containing air.

ASSESSMENT –IV

QUIZ: A

1. Name the place where image is formed in the eye?

2. Name the muscular diaphragm that controls the size of the pupil.

3. What is the cause of dispersion of light?

4. Give the cause of cataract of eye.

5. Which color has got more wavelength?

6. What makes bees respond to ultraviolet light?

Quiz:B

1) What is the focal length of a plane mirror?
2) Which of the two has a great power, a lens of shot focal lenth or a lens of large length?
3) What does m= +1 stand for?
4) What is the power of a lens if its focal lenth is 50cm?
5) What is the nature of image at retina?
6) Name the point inside the lens through which a ray of light goes deviated?
7) What is the S.I. unit of power of a lens?

Home Assignment

1. Name the photographic film equivalent to our eye .
2.Why does a glass slab not disperse white light?
3.Why do we not perceive the depth of a lake ?
4.Name two causes of Myopia, Hypermetropia and presbiopia.
5.Name the liquids that keep our eye soft.
6.What causes rainbow formation?
7.What is Mirage?

Project work:

1) To understand the dispersion of light with help of activity?

(Hint: materials, an irregularly shaped glass, white screen).

2) List, observe, reason and explain three cases of nature where dispersion happens.

(hint: 1) Sun rise and sun set 2.Formation of rainbow.3.Twinkling of stars)

3) Draw a labeled diagram of human eye and explain the function of retina, cornea, pupil, rods, and cones?

seminar: (students will be divided into groups 7 they will present papers on the topic)

****Topic-*** PROBLEMS OF VISION:

2) Means to overcome and Corrective measure

Topic 7: Management of natural resources

GIST

1) ***Natural resources:*** it is stock of the nature such as air, water, soil, minerals, coal, petroleum, forest and wildlife that are useful to mankind in many ways.

2) ***Pollution:*** it is defined as the undesirable change in physical, chemical or biological characteristics of our soil, air or water, which harmfully affect human lives or the lives of other species.

3) ***pH of water:*** pH stands for 'potential of hydrogen'. The acidic and basic character of aqueous solutions can be described in terms of hydrogen ion and hydroxyl ion concentration a pH below 7 indicates an acid solution and above 7 indicates an alkaline solution.

4) ***Three R's to ve the Environment:*** We can reduce pressure on the environment by applying the maxim to 'Reduce, Recycle and Reuse' in our lives.

5) ***Sustainable Development:*** It is the development which can be maintained for a long time without undue damage to the environment.

6) ***Need to manage our Resources:*** Our natural resources are limited. With the rapid increase in human population, due to improvement in health care, the demand for all resources is also increasing.

7) ***Biodiversity:*** It is the existence of a wide variety of species of plants, animals and microorganisms in a natural habitats with in a particular environment or of genetic variation with a species.

8) ***Wildlife:*** It means all those naturally occurring animals, plants and their species which are not cultivated, domesticated and tamed.

9) ***Water harvesting:*** It means capturing rainwater where it falls or capturing the run off in a local area and taking measures to keep the water clean by not allowing polluting activities to take place.

10) ***Fossil Fuels:*** These fuels are obtained from the remains of plants and animals, which got buried beneath the earth millions of years ago, changed into coal, petroleum and natural gas due to excessive heat and high pressure inside the earth.

11) ***Coal:*** It contains chiefly carbon and its compounds mainly nitrogen, oxygen, sulphur and hydrogen. It also contains inorganic matter.

12) ***Non-renewable Energy Sources:*** These are energy sources which cannot be replaced easily when they get exhausted and are also called conventional sources of energy. E.g.: Fossil fuels.

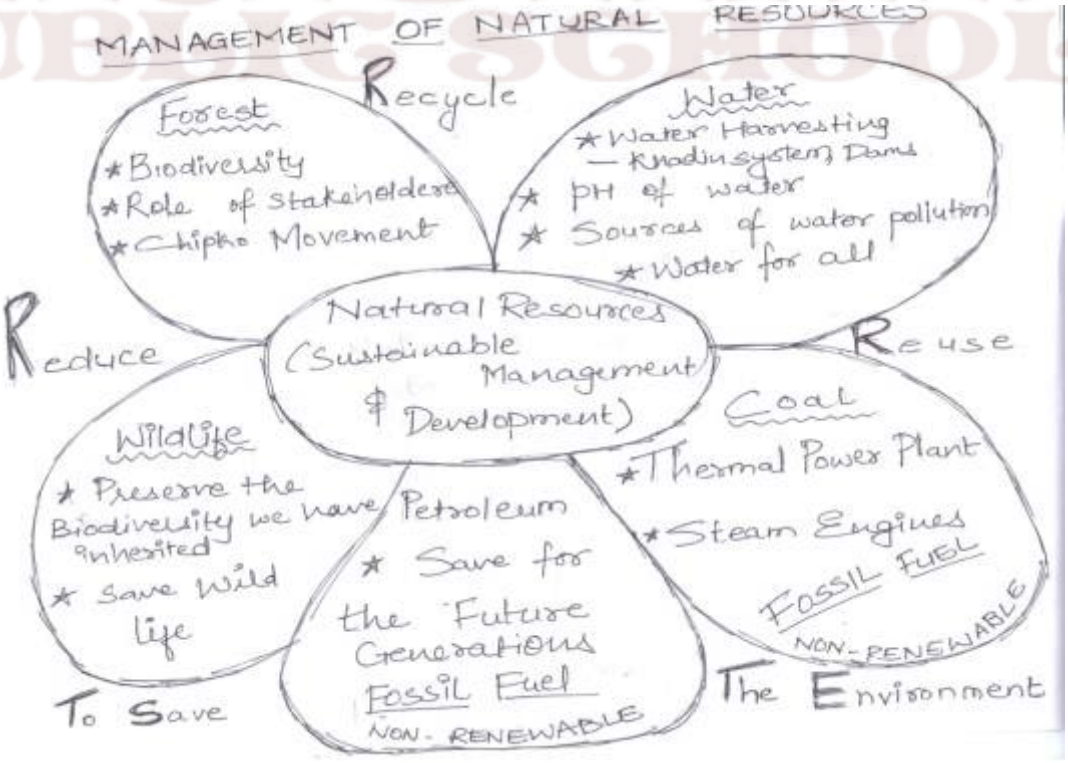
13) ***Uses of Fossil Fuels:***

Coal: Thermal power plants and steam engines

Petroleum: Petroleum products like petrol and diesel are used as means of transport.

14) ***Management of Fossil fuels:*** The natural gas is a good alternative to fossil fuels like coal and petroleum. The use of alternative source of non- conventional source of energy such as solar energy, wind energy, biomass energy etc. Should be promoted to ve the reserves of fossil fuels .biogas can also be used for various purposes.

MIND MAP



ASSESSMENT –III

(paper pen test)

Q 1.i) Which one of the following started chipko movement 1
a.A.K.Banerjee b. Amrita devi bisnoi c.Sundar Lal Bahuguna d. Medha patkart.

ii. From the list given pick the item that is not a natural resource?
a.soil b. water c. air d. electricity
iii. The pH range most conductive for life of fresh water plants and animals is 1
a. 6.5-7.5 b.2.0-3.5 c.3.5-5.0 d.9.0-10.5

Q.2 What are renewable resources? How are they different from non renewable resources 2
Q3 What would be the advantages of exploring resources and long term aim 2
Q4. Why should there be equitable distribution of resources 2
Q5 why are coal and petroleum known as fossil fuels?why do we need to conserve them? 3
Q 6. Name the three "R" to ve the environment ?explain how each of them is beneficial for mankind? 3
Q7. Who are the stakeholders in forest? Why do we think so?

HOTS

1. What do you mean by Bio-Reserves? What are their objectives?
2.Explain the main points of difference between Agro Forestry and Urban Forestry Programme.
3.Beutiful Landscapes are of great value to Human Beings. Explain.

ASSESSMENT –IV

QUIZ

1. Chipko Andolan originated in

   a. Kerala b. Rajasthan

   c. Uttarakhand d. Karnataka
2. Kulhs are irrigation Canals of
   a. Rajasthan b. Karnataka
   c. Himachal Pradesh d. As m
3. Which of the following is green house gas?
   a. Sulphurdioxide b. Carbon monoxide
   c. Carbondioxide d. Nitrogen dioxide
4. Which of the following bacteria is found in Garga water ?
   a. Coliform bacteria b. Streptococcus bacteria
   c. Staphylococcus bacteria d. Diplococcus bacteria
5. Stake holders of forest resources in India are
   a. Local people and industries b. NGO
   c. Forest enthusiasts d. All of these

6. Arabari forest of Bengal is dominated by

a. Teak b. l

c. Bamboo d. Mangrove

7.Which of the following are to be mangaged for sustainable developments?

a.Industries b.Forest C.Crops d.Resources

8.Red data book provides a list of :

a.Protect animals b. Rear animals for milk c.Entrap animal d.Both a & b

9. rdar rover dam is situated on river

a.Ganga b.Narmada c. Yamuna d. Godavari

10. Pynes System of irrigation is common in:

a.Bihar b.Madhya Pradesh c. Rajastan d. Himachal Pradesh

Debate:

Topic "Money spent on protection of wild life should actually be spent for the welfare of poor people"

Seminar :

Reading papers by the students on the following topics:

i.River water pollution –source and solution

ii. Sustainable development

Symposium

i.Globla warming and melting Himalaya –a controversy"

ii ve the tiger.

Home Assignment

1.Making a model to show Rainwater Harvesting.

2.Carry out a survey in your locality where Rainwater is being harvested.

3.Record the mode of transport used by your classmates.

4.Find out the amount of diesel/petrol used by families of your classmates.

5.Checking the PH of water from various sources.

Topic 8 OUR ENVIRONMENT

GIST

1. **ECOLOGY** – The study of the interaction of living organisms with each other and their surrounding is called ecology.

2. **ENVIRONMENT** –Everything that surrounds organisms and influences its life.

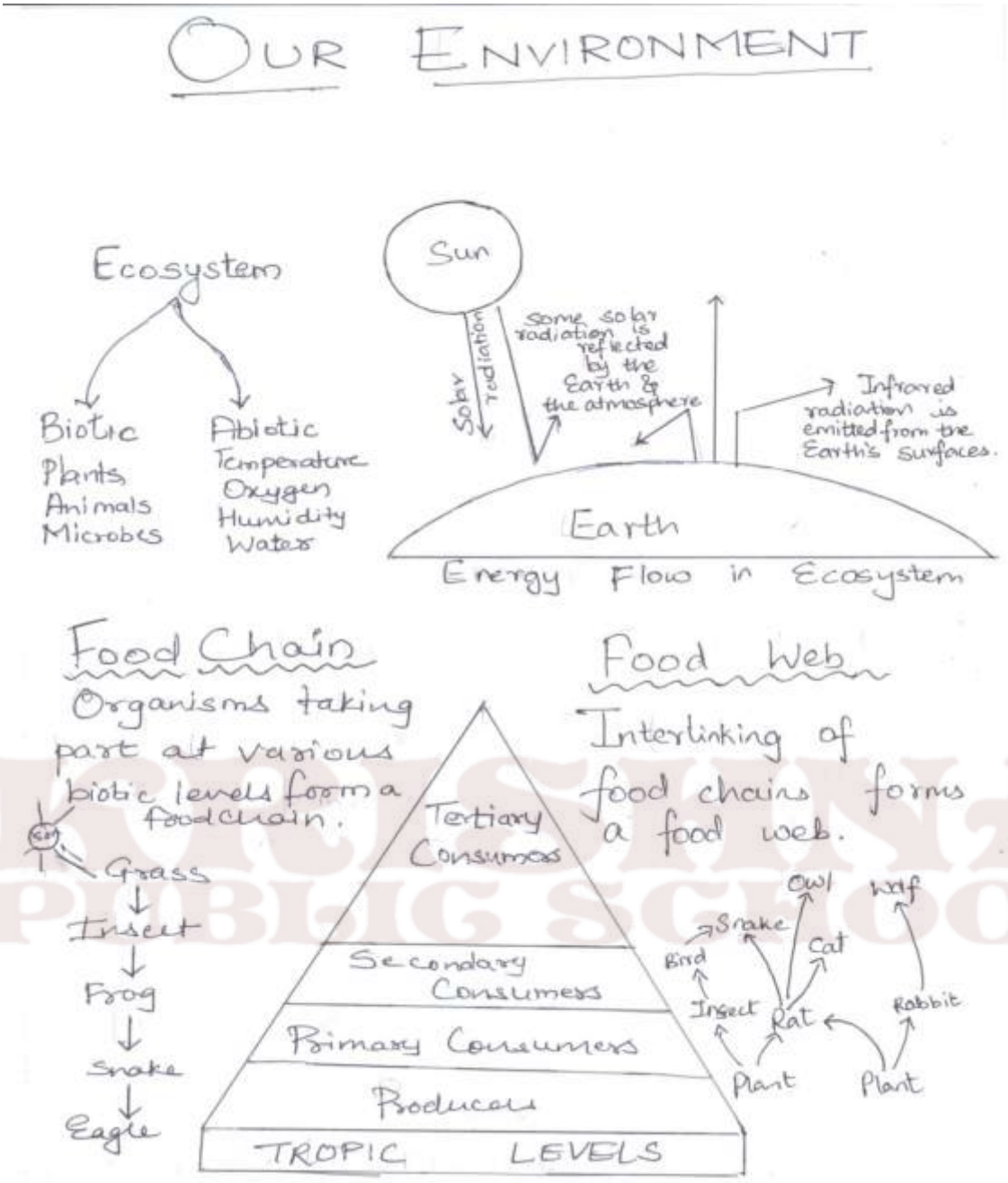
    a) Biotic components of environment – The living organisms e.g. Plants and animals.

    b) Abiotic components of environment –the nonliving components like air, light, etc.

3. **ECOSYSTEM** – All interacting organism in area =together with the nonliving constituents of environment. (Functional unit of an environment)

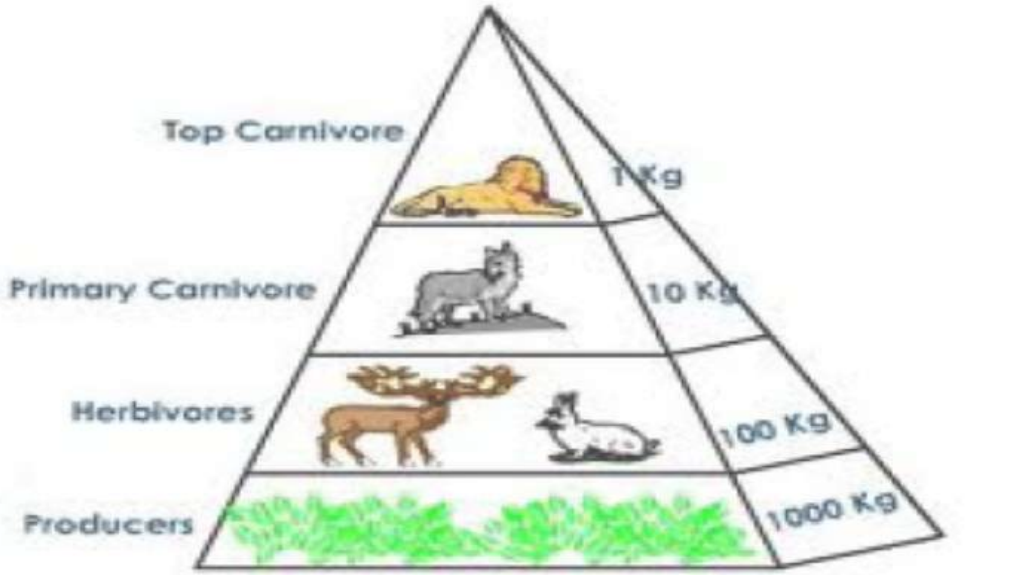
4. **PRODUCERS** – They make the energy from sunlight available to the rest of the ecosystem.
5. **CONSUMERS** – Animals cannot manufacture their own food. They are called consumers.
6. **BIODEGRABLE** – Substances that are broken down by the action of bacteria or prophytes. e. g. Paper.
7. **NONBIODEGRABLE-** Substances that are not broken down by the action of bacteria or prophytes. e.g. Plastic.
8. **FOOD CHAIN** – The process of one organism eating the other.

   GRASS → GRASSHOPPER → FROG → SNAKE
9. **FOODWEB** --- It is a network of food links between populations in a community.
10. **10% LAW OF ENERGY FLOW** – The energy available at any trophic level in a food chain is 10% of the previous one.
11. **BIOLOGICAL MAGNIFICATION** – Progressive accumulation of nonbiodegradable waste at various trophic levels of food chain.



HIGHER ORDER THINKIN SKIILS (HOTS) QUESTIONS

1. Write any two ways of energy flow through an ecosystem.
2. Differentiate between biodegradable and non biodegradable with respect to the effect of biological processes on them and the way they affect our environment.
3. Which level shows the maximum biological magnification? Why?



Upright Pyramid of biomass in a Terrestrial Ecosystem

4. Why is pond self-sustaining unit while an aquarium may not be? Justify the answer.

5. Arrange grasshopper, frog, grass, eagle and snake in the form of food chain.

6. If 1000 KJ energy is available at producer level, how much energy will be available at first carnival level?

7. Why do most food chains have 3-5 steps only?

8. Select the biodegradable items from the list given blow-

Polythene bags, old clothes, wilted flowers, pencil shavings, glass bangles, bronze statue, vegetable peels.

9. What will be impact on ecosystem if bacteria and fungi are removed from the Environment?

10. Express your feelings on the picture given down below. What will happen if all?

Carnivores are eliminated from the environment? What measures will you take to ve? Tiger?

ASSESSEMENT - III

Very short answer questions:

NOTE: Each question carries one mark.

TICK THE CORRECT OPTIONS:-

1. Ozone layer is destroyed by

a) SO_2 b) Smog c) CFC d) CO_2

2. Which of the following is biodegradable?

a) Cow dung b) Plastic c) DDT d) Radioactive wastes

3. Vegetables peels, waste paper, wood carvings and egg shells can be used to make

a) Bricks b) Compost c) Urea d) None of these

4. Which of the following is constituent of food chain?

a) Grass, wheat and mango b) Grass, goat and human

c) Goat, cow and elephant d) Grass, fish and goat

5. Acid rain is caused by precipitation of

a) Oxides of sulphur b) CFCs c) Ozone d) CO_2

SHORT ANSWER QUESTIONS:

EACH QUESTION CARRRIES TWO MARKS:

1) Classify the flowing as decomposers and producers Green plants, bacteria, fungi, algae, blue green algae.

2) Distinguish between producers and consumers.

3) Name two environment friendly practices.

ANSWER THE FOLLOWING QUESTIONS:
EACH QUESTION CARRIES THREE MARKS

1. How is ozone depletion caused? Name the compounds causing it.
2. What is meant by biodegradable waste? Which of the following are biodegradable? Agriculture residue, plastic, insecticides, sewage.
3. What is being done to avoid ozone depletion? (Three steps)
4. What is meant by a trophic level? Why do we have a greater number of organisms at lower levels?

Long answer (5 marks)

5. Describe any five modes of dispo l of wastes.

ASSESSMENT – IV

Quiz:

1. Ozone layer is destroyed by _____.
2. Ecology is the study of the interaction of _____ with each other and their surroundings.
3. Decomposers are also called _____.
4. Water, air, light and temperature are the examples of _____components.
5. Consumers _____ manufacture their own food and depend on plants and other animals for their feed.

- **Seminar:** Children discuss ways and means to reduce the problems given below:

a) Ozone depletion b) Garbage dispo l

- **Symposium:**

Environment problems: Groups mention the problems they are facing in day today life.

- **Group discussion**

Role of students in bringing awareness among community members on ill effects of polythene bags.

- **Activities:**

a) To study the ill effects of using some chemical like CFCS, nitrogenous fertilizers, DDT etc.

b) Field trips: Visit to a botanical garden.

1.Role play of food chain and food web by class students.
2.Skit /Action Song on Banning of plastics.
3.Write a pas ge on ‘Autobiography of plastics.

ASSESSMENT – II

Time: 3 Hrs **Max. Marks: 90**

General Instructions:

i) *The question paper comprises of two sections, A & B. You are to attempt both the sections.*

ii) *All the questions are compulsory.*

iii) *There is no overall choice. However, internal choice has been provided in all the five questions of five marks category. Only one option in each question is to be attempted.*

iv) *All the questions of Section A and all sections of section B are to be attempted separately.*

v) *Question numbers 1 to 3 in Section A are 1 mark questions. These are to be answered in one word or one sentence.*

vi) *Question numbers 4 to 7 are 2 mark questions, to be answered in about 30 words.*

vii) *Question numbers 8 to 19 are 3 mark questions, to be answered in about 50 words.*

viii) *Question numbers 20 to 24 are 5 mark questions, to be answered in about 70 words.*

ix) *Question numbers 25 to 42 is Section B are Multiple Choice Questions on Practical Skills. Each question is 1 mark question. You are to choose one most appropriate response of the options provided to you.*

Section-A

Q.1 List the three phenomenon of light responsible for formation of rainbow in the sky.

Q.2 Why is DNA copying an essential part of the process of reproduction?

Q.3 List any two common methods by which solid wastes of urban areas are disposed off.

Q.4 Why do we see stars twinkling whereas, where as planets do not twinkle?

Q.5 (i) What is meant by 'power of accommodation of the eye'?

(ii) How does the focal length of the eye lens change when we shift looking from a distant object to a nearby object?

Q.6 (i)Why are Coal and petroleum called fossil fuels?

(ii) Name the two elements which are present both in CNG and Petroleum?

Q.7 (i) What is the position of hydrogen in the model periodic table?

(ii) Where are isotopes of the me element having different atomic masses placed in the periodic table?

Q.8 Pure- breed pea plants A are crossed with pure breed pea plants B. It is found that the plants who look like A do not appear in F_1 generation but B re-emerge in F_2 generation. Which of the plants A and B: (i) tall,(ii) dwarf ? Give reason for your answer.

Q.9 A student sitting in the last row of the classroom is not able to read clearly the writing on the Blackboard:

(a) Name the type of defect of vision he is suffering from

(b) How can this defect be corrected ?

Q.10 (a) Name the compounds CH_3COOH and identify its functional group.

(b) Give a chemical test to identify this compound.

(c) Name the gas evolved when this compound acts on solid carbonate. How would you identify this gas.

Q.11(a) Explain the terms (i)Implantation (ii)Placenta

(b) What is the average duration of human pregnancy?

(c) What happens when the egg is not fertilized?

Q.12(a) A spherical mirror A forms an erect image of an object, a spherical mirror B forms erect as well as inverted image of an object. Name the types of the spherical mirror A and B.

(b) What is the relation between the focal length and radius of curvature of a spherical mirror? If the radius of a curvature of a spherical Mirror is 25 cm, what is the focal length?

Q.13 An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields An organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formula. What happens when 'A' and 'B' react in the presence of an acid Catalyst? Write the chemical equation for the reaction.

Q.14 which of the following are homologous and which are the analogous? Give reasons

1. Trunk of the elephant and hand of a chimpanzee
2. Wing of a bird and wing of a bat.
3. Scales of fishes and shell of molluscs.

Q.15 Iit is desired to obtain an erect image of an object, using an concave mirror of focal length 20cm.

(i) What should be the range of the distance of object from the mirror?

(ii) Will the image be bigger or smaller than the object?

(iii) Draw a ray diagram to show the image formation in this case.

Q.16 (a) Why does carbon form largest number of compounds?

(b) Why are some of these called turated and other un turated compounds?

(c) Which of these is more reactive?

Q.17Write three advantages of constructing dams across the rivers?

Q.18 (a) State two effects produced by scattering of light by the atmosphere?

(b)Why are 'danger' signal lights red in colour?

(c)What would the sky look like if the earth had no atmosphere?

Q.19The electronic configuration of these elements X, Y and Z are given below?

X	**2**
Y	**2,6**
Z	**2,8,2**

i)Which element belongs to second period ?

ii) Which element belongs to second group?

iii) Which element belongs to 18^{th} group ?

Q.20 (a) What are the main reasons why human beings are over-exploiting the forests?

(b)What are the effects of damages?

(c)Names the different measures taken up for the conservation of forests?

Q.21:a)Why do we classify elements ?

b) What were the two criteria used by Mendeleev in creating his periodic table?

c) In Mendeleev's periodic table, why was there no mention of noble gasses like helium, neon and argon?

d) Why did Mendeleev leave some gaps in his periodic table?

e) Would you place the two isotopes of chlorine, Cl-35 in different slot because of their different atomic masses or in the me slot because their chemical properties are the me ? Justify your answer.

Q.22 Names the type of mirror (s) that should be used to obtain:

(a)A magnified and virtual image

(b)A diminished and virtual image of an object .

(c) Draw labelled ray diagrams to show the formation of the required image in each of the above two cases .Which of these mirrors could also form a magnified and real image of the object ? State the position of object for which this could happen.

.

Q.23 a) Define homologous series of organic compounds. Mention any two characteristics of homologous series.

b) Name the compound formed on heating ethanol at 443k with excess of conc.H_2SO_4.

c) Describe a chemical test to distinguish between ethanol and ethanoic acid.

Q.24 (a) Give an example of bisexual flower. What is its female reproductive part known as?

(b) Draw a diagram of its longitudinal section showing the process of germination of pollen on stigma and label the following on it :

(c)Pollination may occur without fertilization but fertilization will not take place without pollination. Give reason .

SECTION –B

Q.25. an iron nail was suspended in copper sulphate solution and kept for a while. The solution

a) remained blue and a coating was formed on the nail

b) turned green and a coating was formed on the nail

c) remained blue and no coating was formed on the nail

d) turned green and no coating was formed on the nail

Q.26. A student put a big iron nail each in 4 test-tube containing solutions of zinc sulphate, aluminum sulphate, copper sulphate, and iron sulphate. A reddish brown coating was observed only on the surface of iron nail which was put in the solution

a) Zinc sulphate b) iron sulphate

c) Copper sulphate c) aluminum sulphate

Q.27. Four test tubes were taken and marked as A, B, C & D respectively. 2mL od solution of $Al_2(SO_4)_3$in water was filled din each of the test tubes. Clean piece of metal zinc was placed in A, clean iron nail in B, clean copper wire in C & a clean aluminium wire in D. It was observed that no change occurred in any of the test tubes. The correct inference drawn is:

(a) Zinc is more reactive than Aluminium

(b) Zinc is more reactive than Copper

(c) Copper is more reactive than Aluminium

(d) Zinc, Iron & copper is more reactive than Aluminium

Q.28. Which of the following reagents gives brisk effervescence with Ethanoic Acid?

(a) Calcium Hydroxide

(b) Sodium Chloride

(c) Sodium Bicarbonate

(d) Ammonium Chloride

Q.29. A student soaked 5g of raisins in beaker A containing 25ml of ice chilled water and another 5g of raisins in beaker B containing 25ml of tap water at room temperature. After one hour, the student observed that

(a) water absorbed by raisins in beaker A was more than that absorbed by raisins in beaker B

(b) water absorbed by raisins in beaker B was more than that absorbed by raisins in beaker A
(c) the amount of water absorbed by the raisins of both beakers A and B was equal.
(d) No water was absorbed by raisins in either of the beakers A and B

Q.30. When a stopper of a bottle containing a colourless liquid was removed, the bottle gave out a smell like that of vinegar. The liquid in the bottle could be

a) Hydrochloric acid solution b) sodium hydroxide solution
c) Acetic acid d) turated sodium bicarbonate

Q.31. In amoeba, asexual reproduction by multiple fission
a) never take place
b) sometimes takes place
c) take place when amoeba wishes
d) take place during unfavorable environment conditions

Q.32.For determining the percentage of water absorbed by raisins in a given time, apart from water, raisins and a watch, we shall also require
(a) a beaker, a graduated cylinder, a thermometer ,a filter paper.
(b) a watch glass, a graduated cylinder, a thermometer, a weighing balance.
(c) a beaker, a thermometer, a filter paper, a weighing balance.
(d) a graduated cylinder, a thermometer, a weighing balance.

Q.33. The inner surface of a stainless steel spoon behaves as_____.
(a) concave mirror.
(b) convex mirror.
(c) plane mirror
(d) neither concave nor convex

Q.34. A student obtains a blurred image of an object on a screen by using a concave mirror. In order to obtain a sharp image on the screen, he will have to shift the mirror
(a) towards the screen
(b) away from screen
(c) either towards or away from screen, depending upon the position of the object
(d) to a position very far away from the screen

Q.35. In an experiment to determine the focal length of a convex lens, a student obtained a sharp inverted image of a distant tree on the screen behind the lens. She then removed the screen and looked through the lens in the direction of the object. She will see
(a) an inverted image of the tree at the focus of the lens
(b) no image as the screen has been removed
(c) a blurred image on the wall of the lab
(d) an erect image of the tree on the lens

Q.36. A student is to find the focal length of a (i) concave mirror, (ii) convex lens by using a distant object. He will observe that the screen is on the me side as the object
(a) in both cases
(b) in neither of the two cases
(c) in case(i) but not in case(ii)
(d) in case (ii) but not in case(i)

Q.37. A student suggested the following Guidelines to his friend for doing the experiment on dressing the path of a ray of a light, passing through a rectangular slab, for three different angles of incidence:
A) Draw outline of the glass slab at three positions on the drawing sheet.
B) Draw normal on the top side of these outlines near their left end
C) Draw the incident rays on the three outlines in direction, making angles of 30^o, 45^o, 60^o with the normal drawn
D) Fix two pins vertically on each of these incident rays at two points nearly 1 cm apart.

E) Look for the images of the feet of these pins while fixing two pins, from other side, to get the refracted ray

When he showed these guidelines to his teacher, the teacher told him that two of them need to be corrected and modified. These two Guidelines are

(a) B & C
(b) C & D
(c) D & E
(d) B & D

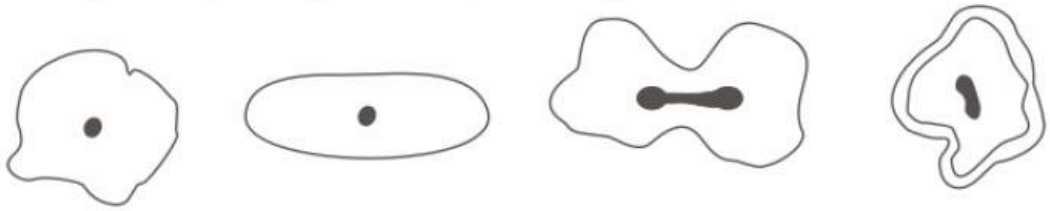
Q.38. If you find the focal length of a concave and convex mirror respectively which appears to be the me y 20cm. If you face the mirror to distant object, then the size of the image will be

(a) me in both the mirrors.
(b) smaller in concave mirror
(c) bigger in convex mirror
(d) bigger in concave mirror

Q. 39. Which one of the following is depicted in the sketch of a slide shown below?

(a) Binary fission in yeast
(b) Budding in yeast
(c) Binary fission in amoeba
(d) Budding in amoeba

Q.40. which one out of the following diagrams correctly depicts an amoebas Undergoing binary fission?



(I) (II) (III) (IV)

(a) I (b) II (c) III (d) IV

Q.41. Acetic acid is:

(a) Colourless, pungent smelling liquid
(b) Colourless, sweet smelling liquid
(c) Green coloured liquid having pungent smell
(d) none of the above

Q.42. If the object is at 2F of a convex lens, and then the image is at:

(a) 2F (b) F (c) infinity (d) Between F and 2F

Higher Order Thinking Skills (HOTS)

Present day understanding of learning is that 'learning is an exercise in meaning - making'. When indulging in the process of meaning making, mental ideas or concepts are built by the learner. Acquiring mere concepts is of no use and the ability to use them in real life situations is the requirement of the day. Therefore, the purpose of learning is to identify, understand and use these concepts to situations in real life.

Knowing a concept is at the bottom of hierarchy of learning outcomes and it can easily be achieved even by rote learning. Whereas, the ability to use these concepts in different situations is the next stage to knowing and therefore the questions which test these are referred to Higher Order Thinking Skills (HOTS) questions. The essential first step in acquiring the competence to answer HOTS questions is the development of a clear understanding of the concepts in its totality by the learner. Therefore, every learner is advised to learn the lessons thoroughly before venturing to answer the questions included in this material.

This material has been prepared chapter wise, with the focus primarily on the HOTS questions. And in each chapter you will find two sections, one in which both questions and answers will be there and the other in which only questions are there for which you have to find the answers (which we presume is within the reach of each and every learner).

CHAPTER No. 1

CHEMICAL REACTIONS AND EQUATIONS

HOTS: (High Order Thinking Skill) Questions with Answers:

1 A compound `X` is used for drinking, has pH =7.Its acidified solution undergoes decomposition in presence of electricity to produce gases `Y` and `Z` The volume of Y is double than Z. Y is highly combustible whereas Z is supporter of combustion .Identify X, Y & Z and write the chemical reactions involved.

2 An aqueous solution of metal nitrate P reacts with sodium bromide solution to form yellow ppt of compound Q which is used in photography. Q on exposure to sunlight undergoes decomposition reaction to form metal present in P along with reddish brown gas. Identify P&Q . Write the chemical reaction & type of chemical reaction.

3 Bhawana took a pale green substance A in a test tube. and heated it over the flame of a burner. A brown colored residue B was formed along with evolution of two gases with burning smell of sulphur.Idetify A & B. Write the chemical reaction involved.

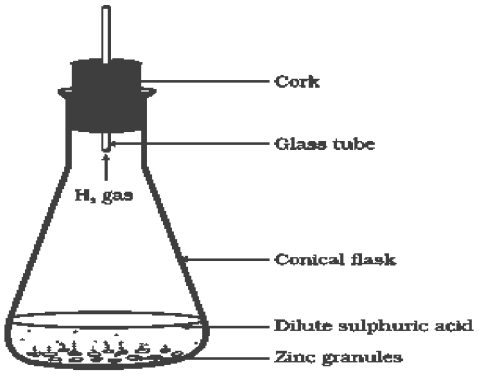
4 A student took 2-3 g of a substance X in a glass beaker & poured water over it slowly. He observed bubbles along with hissing noise. The beaker becomes quite hot. Identify X.What type of reaction is it?

5 A reddish brown vessel developed a green colored solid X when left open in air for a long time. When reacted with dil H_2SO_4 , it forms a blue colored solution along with brisk effervescence due to colourless & odourless gas Z. X decomposes to form black colored oxide Y of a reddish brown metal along with gas Z, Identify X, Y, & Z.

6 A substance X used for coating iron articles is added to a blue solution of a reddish brown metal Y,the color of the solution gets discharged Identify X and Y & also the type of reaction.

7. A student has mixed the solutions of lead (II) nitrate and potassium iodide.
   (i) What was the colour of the precipitate formed? Can you name the compound? precipitated ?
   (ii) Write the balanced chemical equation for this reaction.
   (iii) What type of reaction is it?

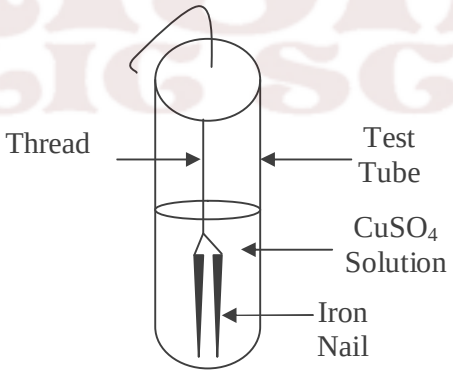
8. Observe the following activity & answer the questions



a. Do you observe anything happening around the zinc granules?
b. Is there any change in its temperature?
c. Why is glass tube not dipped in dil H_2SO_4?
d. How is H_2 gas collected by downward displacement or upward displacement of water?
e. Is H_2 gas soluble or insoluble in water?
f. Is H_2 gas heavier or lighter than air?

9. A reddish brown metal X when heated in presence of oxygen forms a black compound Y which is basic in nature when heated with hydrogen gas gives back X. Identify X & Y.Write the chemical reaction between Y & H_2 Identify the substance being oxidized & reduced.

10 Name the type of reaction seen in the diagram below. Write the reaction for the me.



11. A student burnt a metal A found in the form of ribbon. The ribbon burnt with a dazzling flame & a white powder B is formed which is basic in nature. Identify A & B.Write the balanced chemical equation.

12. A student dropped few pieces of marble in dilute HCl contained in a test tube. The gas evolved was passed through lime water. What change would be observed in lime water? Write chemical reactions for both the changes observed.

13. Astha has been collecting silver coins and copper coins. One day she observed a black coating on silver coins and a green coating on copper coins. Which chemical phenomenon is responsible for these coatings? Write the chemical name of black and green coatings

Answers

Ans: 1 $2H_2O\ (l) \longrightarrow H_2\ (g) + O_2\ (g)$
X Y Z

Ans.:2 P = $AgNO_3$, Q = AgBr $2AgBr\ (s) \longrightarrow 2Ag(s) + Br_2(g)$
Photochemical decomposition

Ans: 3 $2FeSO_4(s) \xrightarrow{Heat} Fe_2O_3(s) + SO_2(g) + SO_3(g)$
A (green) B (brown)

Ans: 4 a) X = Calcium oxide (Quick lime), Combination reaction.

Ans. 5 X = $CuCO_3$. Cu $(OH)_2$, Y= CuO, Z= CO_2

Ans. 6 X= Fe, Y = Cu, Displacement reaction.

Ans. 7 (i). Yellow, Lead iodide
(ii) $Pb(NO_3)_2 + KI \longrightarrow PbI_2 + 2KNO_3$
(iii) Double displacement reaction

Ans.8 a.Bubbles of hydrogen gas.
b. Yes temperature will increase.
c H_2SO_4 will rise in glass tube, preventing H_2 to evolve
d. downward displacement
e. Insoluble
f lighter than air
.

Ans. 9 Oxygen reacts with copper to form copper oxides which has black colour
$2Cu(s) + O_2\ (g) \longrightarrow 2Cuo(s)$
Air Black

$CuO + H_2 \xrightarrow{Heat} Cu + H_2O$

The copper (II) oxide is losing oxygen and is being reduced. The hydrogen is gaining oxygen and is being oxidized.

Ans.10 Displacement Reaction

$Fe(S) + CuSO_4 \longrightarrow FeSO_{4aq} + Cu$

Ans.11 X = Mg, Y = MgO, $Mg + O_2. \longrightarrow 2\ MgO$

Ans.12 $Ca(OH)_2(aq) + CO_2\ (g) \longrightarrow CaCO_3(s) + H_2O\ (l)$

$$\underset{\text{(Calcium hydroxide)}}{Ca(OH)_2(aq)} + CO_2(g) \rightarrow \underset{\text{(Calcium carbonate)}}{CaCO_3(s)} + H_2O(l)$$

Ans.13 Corrosion is responsible for this coating. Black coating is due to formation of Ag_2S and green coating is due to formation of $CuCO_3.Cu(OH)_2$

PRACTICE QUESTIONS

1. $Fe + CuSO_4 \longrightarrow FeSO_4 + Cu$

   Identify the type of reaction.
2. What does the symbol (g) used with water indicate?
3. How can we prevent fried food from turning 'Rancid'?
4. Why does lime water turn milky when CO_2 is passed into it?
5. Which gas is evolved when lead nitrate is heated?
6. During electrolysis of water, how can we identify the gas present in each test tube?
7. Give an example of a photolytic reaction which is not a decomposition reaction?
8. $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$

   In above reaction iron nail becomes brownish in colour and the blue colour of copper sulphate solution fades. Why?
9. Identify the element which is most reactive and the element which is least reactive?

   $A_2O_3 + 2B \rightarrow B2O_3 + 2A$

   $3CSO_4 + 2B \rightarrow B_2(SO_4)_3 + 3C$

   $3CO + 2A \rightarrow A_2O + 3C$
10. Write a chemical equation of a reaction in which a precipitate is formed.
11. Write your observation when Magnesium ribbon is burned in air? Name the powder formed.
12. Which characteristics of a chemical change do you observe when dilute sulphuric acid is added to zinc granules in a conical flask ?
13. Write word equation for the following chemical equation :

    a. $Mg + 2HCl \longrightarrow MgCl_2 + H_2$

    b. $2KNO_3 \xrightarrow{heat} 2KNO_2(s) + O_2(g)$

14. What happens when CO_2 (g) is bubbled through lime water. Write the chemical equation.

15. What happens when a silver spoon is kept immersed in aqueous copper sulphate solution?

16. Why does copper not liberate hydrogen on reacting with dilute sulphuric acid?

17. Write a chemical equation to show the process of respiration. Mention the type of reaction.

18. Which of the following reactions show evolution of gas.
    a. $2AgCl \rightarrow 2Ag + Cl_2$
    b. $Pb + CuCl_2 \rightarrow PbCl_2 + Cu$
    c. $CuO + H_2 \rightarrow Cu + H_2O$
    d. $ZnO + C \rightarrow Zn + CO$

19. Name 2 metals which get tarnished. Why does this happen ?.

20. Why is corrosion harmful?

21. Mention three situations in daily life where a chemical change occurs.

22. Balance the following chemical equations.
    a. $H_2SO_4 + NaOH \rightarrow Na_2SO_4 + H_2O$
    b. $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$
    c. $CH_4 + O_2 \rightarrow CO_2 + H_2O$

23. Write chemical equations for the following word equations :
    a. Hydrogen + Chlorine $\rightarrow$ Hydrogen Chloride
    b. Sodium + Water $\rightarrow$ Sodium Hydroxide + Hydrogen
    c. Zinc Oxide + Carbon $\rightarrow$ Zinc + Carbon Monoxide

24. What do you mean by endothermic and exothermic reactions? Give examples.

25. What happens when potassium iodide solution is added to lead nitrate solution? Give equation of reaction and mention the type of reaction involved?

26. How can we make a chemical equation more in ?

27. Write one chemical equation to show:
    a. Combination reaction
    b. Decomposition reaction
    c. Double Displacement Reaction

28. Write short notes on:
    a. Corrosion
    b. Rancidity

29. A substance X when mixed with water is used for white washing. The substance X is also formed when a substance Y decomposes.

a. Identify X and Y and write their formula.

30. Define oxidation and reduction. Give an example of a Redox reaction.

CHAPTER No.: 2

ACIDS, BASES AND LTS

HOTS: (High Order Thinking Skill) Questions with Answers:

1. Kazi and priyam want to prepare dil H_2SO_4 .Kazi added conc.H_2SO_4 to water slowly with constant stirring& cooling whereas Priyam added water to conc. H_2SO_4.Name the student who was correct and why?
2. A compound X is bitter in taste. It is a component of washing powder& reacts with dil.HCl to produce brisk effervescence due to colourless, odourless gas Y which turns lime water milky due to formation of Z. When excess of CO_2 is passed, milkiness di ppears doe to formation of P. Identify X, Y, and Z & P.
3. Compound P forms enamel of teeth. It is the hardest substance of the body. It does not dissolve in water but it is corroded when pH in the mouth is below 5.5. How does tooth paste prevent dental decay?
4. The oxide of a metal M was water soluble when a blue litmus strip was dipped in this solution, it did not go any change in colour. Predict the nature of oxide
5. A first aid manual suggests that vinegar should be used to treat wasp sting and baking soda for bee stings.
   (i) What does this information tell you about the chemical nature of the wasp stings
   (ii) If there were no baking soda in the house, what other household substance could you use to treat bee stings?
6. `A` is a soluble acidic oxide and `B` is a soluble base. Compared to pH of pure water. What will be the pH of (a) solution of A (b) solution of B?
7. A road tanker carrying an acid was involved in an accident and its contents spilled on the road. At the side of the road, iron drain covers began melting and fizzing as the acid ran over them. A specialist was called to see if the acid actually leaked into the nearby river.
   (a) Explain how the specialist could carry out a simple test to see if the river water contains some acid or not.
   (b) The word melting is incorrectly used in the report. Suggest a better name that should have been used.
   (c) Explain why drain covers began fizzing as the acid rain over them.
8. A compound `X` on electrolysis in aqueous solution produces a strong base. `Y` along with two gases `A` and `B`. `B` is used in manufacture of bleaching powder. Identify X, Y, A and B. Write chemical equations.
9. A yellow powder X gives a pungent smell if left open in air. It is prepared by the reaction of dry compound Y with chlorine gas. It is used for disinfecting drinking water. Identify X and Y. and write the reaction involved.
10. When CO_2 gas pass through turated solution of ammonical brine, two compound `X` and `Y` are formed. `Y` is used as antacid and decomposes to form another solid `Z`. Identify `X`,`Y`, `Z` and write chemical equations.

11.A compound `A on heating at 370 K gives `B` used as plaster for supporting fractured bones in the right position. `B` on mixing with water changes to `A`. Identify `A` and `B` and write the chemical reaction.

12. A few drops of phenolphthalein indicator were added to an unknown solution A. It acquired pink colour. Now another unknown solution B was added to it drop by drop and the solution becomes colorless. Predict the nature of A & B.

13. A student heated a few crystals of copper sulphate in a dry boiling tube.
(a) What will be the color of the copper sulphate after heating?
(b) Will you notice water droplets in the boiling tube?
(c) Where have these come from?

14. A substance `X` used in the kitchen for making tasty crispy pakoras.and is also an ingredient of antacid. Name the substance `X`.
(i) How does `X` help to make cakes and bread soft and spongy.
(ii) Is the pH value of solution of `X` is lesser than or greater than 7.0?

ANSWERS

Ans.1 Kazi was correct. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating.

Ans.2

$$\underset{\textbf{X}}{Na_2CO_3(s)} + 2HCl(aq) \rightarrow 2NaCl(aq) + H_2O(l) + \underset{\textbf{Y}}{CO_2(g)}$$

$$\underset{\textbf{(Lime water)}}{Ca(OH)_2(aq)} + CO_2(g) \rightarrow \underset{\textbf{(White precipitate)}}{CaCO_3(s)} + H_2O(l)$$

$$\underset{\textbf{Z}}{CaCO_3(s)} + H_2O(l) + CO_2(g) \rightarrow \underset{\textbf{(Soluble in water)}}{Ca(HCO_3)_2(aq)}$$

P

.

Ans.3 P = $Ca_3(PO_4)_2$. Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth after eating. Using toothpastes, which are generally basic, for cleaning the teeth can neutralize the excess acid and prevent tooth decay.

Ans.4 The Metal oxide (MO) is of basic in nature. It dissolves in water to form metal hydroxide as $MO + H_2O \longrightarrow M(OH)_2$

Blue litmus does not undergo any change in colour in the basic medium.

Ans 5: (i) Since vinegar (acetic acid) is used to heal or neutralize the effect of wasp stings this means that the chemical present in the stings must be some base.

(ii)NH_4OH

Ans 6: pH of A will be less than 7 and that of B will be more than 7.

Ans 7: (a) By dipping a strip of blue litmus paper in to the mple of river water. If the colour changes to red this means that some acid has gone in to the river.

(b) Corrosion.

(c) Iron reacts with acid to evolve hydrogen gas.

Ans 8:

$$\underset{\textbf{X}}{2NaCl(aq)} + 2H_2O(l) \rightarrow \underset{\textbf{Y}}{2NaOH(aq)} + \underset{\textbf{B}}{Cl_2(g)} + \underset{\textbf{A}}{H_2(g)}$$

Ans 9:

$$\underset{\textbf{Y}}{Ca(OH)_2} + Cl_2 \rightarrow \underset{\textbf{X}}{CaOCl_2} + H_2O$$

Ans 10:

$$NaCl + H_2O + CO_2 + NH_3 \rightarrow \underset{\substack{\text{(Ammonium}\\ \text{chloride)}\\ \text{`X`}}}{NH_4Cl} + \underset{\substack{\text{(Sodium}\\ \text{hydrogencarbonate)}\\ \text{`Y`}}}{NaHCO_3}$$

$$\underset{\substack{\text{(Sodium}\\ \text{hydrogencarbonate)}}}{2NaHCO_3} \xrightarrow{\text{Heat}} \underset{\substack{\text{(Sodium}\\ \text{carbonate)}\\ \text{`Z`}}}{Na_2CO_3} + H_2O + CO_2$$

Ans 11.

$$\underset{\substack{\text{(Plaster of Paris)}\\ \text{`B`}}}{CaSO_4.\frac{1}{2}H_2O} + 1\frac{1}{2}H_2O \rightarrow \underset{\substack{\text{(Gypsum)}\\ \text{`A`}}}{CaSO_4.2H_2O}$$

Ans. 12: Sol `A` is basic in nature as phenolphthalein has imparted pink colour to it. Sol `B` is an acid it has made solution A colourless by neutralizing by its basic effect.

Ans 13: (a) White

(b) Yes

(c) Copper sulphate crystals which seem to be dry contain water of crystallization.

Ans 14:

$$\underset{\substack{\text{(Sodium}\\ \text{hydrogencarbonate)}\\ \text{`X`}}}{2NaHCO_3} \xrightarrow{\text{Heat}} \underset{\substack{\text{(Sodium}\\ \text{carbonate)}}}{Na_2CO_3} + H_2O + CO_2$$

(i) When CO2 gas escapes as bubbles it leaves behind pores which make the cake or bread soft and spongy.

(ii) It is a lt of strong base so the pH of the solution will be more than 7.0

PRACTICE QUESTIONS

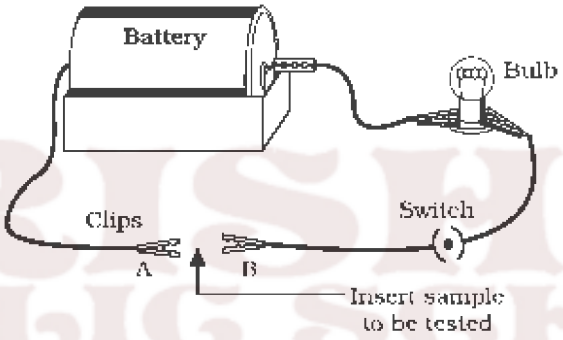
1. A substance changed its colour on heating in a closed vessel but regained it after sometime when allowed to cool and exposed to air. Name the substance. Explain the phenomenon involved.
2. What do you understand by the term Hyperacidity in a patient? What is the remedy for it?
3. A person caused burns while adding water into a concentrated acid. What was the reason behind it?
4. Why are me perishable food preserved in vinegar?
5. A doctor applied surgical bandages on fractured bones of a patient after making them wet. What changes are likely to occur?
6. Tooth enamel is one of the hardest substances in our body yet damage occurs when chocolates & sweets are eaten? Why? What will you do to prevent it?
7. An important chemical which is used in manufacture of glass, soap, paper and is also used as a cleansing agent for domestic purposes. Name it; write formula and also its chemical name.
8. Why curd or sour substance should not be kept in brass or copper container?
9. Name two synthetic indicators? What are its effects in a acidic and basic solutions?
10. Name the substance present in
    1) Bee sting 2) Stinging hair of nettle leaves.
    What should be the nature of substance for its remedy?

CHAPTER No. 3

METALS AND NON METALS

HOTS: (High Order Thinking Skill) Questions with Answers:

1. A metal acts as a good reducing agent. It reduces Fe_2O_3, and MnO_2. The reaction with Fe_2O_3 is used for welding broken railway tracks. Identify the metal and write all the chemical reactions
2. A yellow coloured powder `X` is soluble in carbon disulfide. It burns with a blue flame forming suffocating smelling gas which turns moist blue litmus red. Identify `X` and gives chemical reaction. Identify it is metal or nonmetal.
3. An element reacts with oxygen to form an oxide which dissolves in dilute hydrochloric acid. The oxide formed also turns a solution of red litmus blue. Is the element a metal or non-metal? Explain with the help of a suitable example.
4. A student set up an electric circuit as shown in Fig. He placed the metal to be tested in the circuit between terminals A and B as shown.



(i) Does the bulb glow? What does this indicate?

(ii) Why are electric wires coated with rubber like materials?

5. Royal water is prepared by mixing two acids `A` and `B`. It can dissolve gold and platinium. It is highly corrosive and fuming liquid. Identify `A` and `B`. What is the ratio in which `A` and `B` are mixed.

6.. Four metals A, B, C and D are, in turn, added to the following solutions one by one. The observations made are tabulatd below:

Metal	Iron (II) Sulphate	Copper (II) Sulphate	Zinc Sulphate	Silver Nitrate
A	No reaction	Displacement	—	—
B	Displacement	—	No reaction	—
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Answer the following questions based on above information.

(i) Which is the most active metal and why?

(ii) What would be observed if B is added to a solution of copper (II) sulphate and Why?

(iii) Arrange the metals A, B, C and D in order of increasing reactivity.

(iv) Container of which metal can be used to store both zinc sulphate solution and silver nitrate solution.

(v) Which of the above solutions can be easily stored in a container made up of any of these metals?

7. Nikita took Zn, Al, Cu, Fe, Mg, Na metals & put each metal in cold water and then hot water. She reacted the metal with steam

(i) Name the metal which reacts with cold water.
(ii) Which of the above metals react with steam?
(iii) Name the metal which reacts with hot water.
(iv) Arrange these metals in order of increasing reactivity.

8. A student was given Mg, Zn, Fe, and Cu metals. He put each of them in dil HCl contained in different test tubes. Identify which of them

(i) will not displace H_2 from dil HCl
(ii) forms a pale green substance
(iii) will give H_2 with 5% HNO_3
(iv) will be displaced from its lt solution by all other metals.

9. A metal `X` is found in the form of filings which burns vigorously when sprinkle on flame. When these filings are treated with sulphur a black colured compound `Y` is formed which is not attracted by magnet. `X` reacts with dil HCl to liberate hydrogen gas. `X` reacts with steam to form `Z` along with hydrogen gas. Identify `X`, `Y`, and `Z`. Write the reaction involved.

10. A, B and C are 3 elements which undergo chemical reactions according to following equations:

a) $A_2O_3 + 2B \longrightarrow B_2O_3 + 2A$
b) $3CSO_4 + 2B \longrightarrow B_2 (SO4)_3 + 3C$
c) $3CO + 2A \longrightarrow A_2SO_3 + 3C$

Answer of the following:

i) Which element is most reactive?
ii) Which element is least reactive?

11. An element X on reacting with O_2 forms X_2O.This Oxide dissolves in water and turns blue litmus paper red. Predict the nature of element whether it is a metal or a non metal.

12 An element E combines with O_2 to form an oxide E_2O, which is a good conductor of electricity. Answer the following:

i) How many electrons will be present in the outer most shell of E?

ii) Write the formula of the compound formed when it combines with Chlorine.

ANSWERS

Ans 1: Aluminium

$$3MnO_2(s) + 4Al(s) \rightarrow 3Mn(l) + 2Al_2O_3(s) + Heat$$

$$Fe_2O_3(s) + 2Al(s) \rightarrow 2Fe(l) + Al_2O_3(s) + Heat$$

Ans 2:

`X` is sulphur

$$S + O_2 \longrightarrow SO_2$$

It is non metal.

Ans 3: It is metal

$$4Na(s) + O_2 \longrightarrow 2Na_2O(s)$$

$$Na_2O(s) + H_2O(l) \rightarrow 2NaOH(aq)$$

$$Na_2O(s) + 2HCl(dil) \longrightarrow 2NaCl(aq) + H2O(l)$$

Ans 4: (i) Yes the bulb glows, this indicates that metal is a good conductor of electricity

(iii) Rubber like substance is a bad conductor of electricity

Ans 5: $3HCl + HNO_3$

Ans. 6 (i) B

(ii) Displacement reaction. Because B is more reactive than Cu.

(iii) B.>A.>C.>D

(iv) D

(v) $ZnSO_4$

Ans.7 (i) Na

(ii) Al, Zn, Fe

(iii) Mg

(iv) Na>Mg> Al > Zn > Fe > Cu

Ans8: (i) Cu

(ii) Fe

(iii) Cu

(iv) Cu

Ans 9: $Fe + S \longrightarrow Fe S$

`X` **`Y`**

$$Fe + HCl \longrightarrow FeCl_2 + H_2$$

$$3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$$

`Z`

Ans.10 i) Most reactive element is B as it has replaced both A and C from their compounds.

ii) Element C is least reactive as it has been replaced both by A and B.

Ans11 The oxide is acidic in nature as it has turned blue litmus to red. Hence X is a non metal.

Ans12 i) Valency of the element E is 1.This means that it has only one electron in the valence shell.

ii) $E^+ + Cl^- \longrightarrow ECl$

Valency of Cl is 1 and Valency of E is also 1.Therefore the formula will be ECl.

MORE QUESTIONS FOR PRACTICE

Q1. Name 2 metals which are neither ductile nor malleable.

Q2. What happens to the electrical conductivity of a metal when it is heated?

Q3. What is the nature of Al_2O_3?

Q4. An alloy of a metal contains Mercury. What will you call it?

Q5. What is the purpose of adding C to molten Iron?

Q6. Who am I?

a) Ver tility is my name. There are more than 5 million compounds of me.

b) Your teacher uses me, I am a metallic element found in chalk, limestone, marble etc.

c) Shocking? In one form I am a conductor whereas in another an insulator.

d) 'Bang'. I am the element formed when H_2 bomb explodes.

Q7. Which of the following is metal and non metal?

$^{7}_{3}X$, $^{3}_{1}Y$, $^{10}_{9}Z$

Q8. Name one metal and one non metal element which are obtained on a large scale from sea water.

Q9. Zn is more electropositive than Fe. So it should get corroded faster than Fe. But it does not happen. Instead it is used to galvanize Iron. Explain why does it happen so?

Q10. The reaction of a metal X with Fe_2O_3 is highly exothermic and is used to join railway tracks. Identify metal X.Write the chemical equation of its reaction with Fe_2O_3.

Q11. Why do metals generally not evolve H_2 gas when reacted with HNO_3? Name 2 metals which liberate H_2 gas with very dil. HNO_3.

Q12. Name one metal each which is extracted by:

a) reduction with heat alone
b) reduction with C
c) reduction with Al.
d) electrolytic reduction.

Q13.a) A metal M is found in nature as MCO_3.It is used in galvanizing Fe articles. Name the Metal M.
b) How can metal M be obtained from its Carbonate Ore?

Q14.Explain how the following metals are obtained from their compounds by the reduction process.

a) Metal X which is low in the reactivity series.
b) Metal Y in the middle of reactivity series.
c) Metal Z which is high in the reactivity series.

Give an eg of each.

Q15. Write the equations for the reactions of:

a) Iron with Steam
b) Calcium with Water.
c) Potassium with Water.

Q.16. Why Al metal cannot be obtained by the reduction of Al_2O_3 with Coke.

Q17 You cannot hold a piece of Na in your hand but you can eat Na ions in NaCl.Why?

Q18. Cinnabar is an ore of metal X.It exists in the lower order of the reactivity series. Write down the reaction involved in it for the extraction of X.

Q19. Identify the acid which oxidizes H_2 to H_2O.

CHAPTER No. 4

Carbon and its compounds

HOTS: (High Order Thinking Skill) Questions with Answers:

1.An organic compound X with a molecular formula C_2H_6O undergoes oxidation with in presence of alkaline $KMnO_4$ to form a compound Y. X on heating in presence of Conc. H_2SO_4 at 443K gives Z.which on reaction with H_2Oin presence of H_2SO_4 gives back `X.` `Z` reacts with Br_2 (aq) and decolorizes it. Identify X, Y, & Z.and write the reactions involved.

2. An organic compound 'A' is widely used as a preservative in pickles and has a molecular formula $C_2H_2O_2$. This compound reacts with ethanol to form a sweet smelling
compound 'B.

(i) Identify the compound 'A'

(ii) Write the chemical equation for its reaction with ethanol to form compound 'B'.

(iii) How can we get compound 'A' back from 'B'?

(iv) Name the process and write corresponding chemical equation.

(v) Which gas is produced when compound 'A' reacts with washing soda? Write the chemical equation.

3. Hydrocarbon `X` and `Y` having molecular formulae C_3H_8 and C_3H_6 respectively. Both are burnt in different spatula on the bunsen flame. Indicate the color of the flame produced by `X` and `Y`. Identify `X` and `Y`. Write the structural formulae.

4. A compound `X` has molecular formula C_4H_{10}. It undergoes substitution reaction readily than addition reaction. It burns with blue flame and is present in LPG. Identify `X` and give the balanced equation for its combustion and substitution reaction with Cl_2 in presence of sunlight.

5. `A` compound works well with hard water. It is used for making shampoos & products for cleaning clothes. A is not 100% biodegradable and causes water pollution. `B` does not work well with hard water. It is 100% biodegradable and does not create water pollution. Identify A & B.

6. An organic compound P with molecular formula C2H6Ois an active ingredient of all alcoholic drinks. It is also used in medicines such as tincture iodine, cough syrups. Identify `P`. Drop a small piece of sodium into the test tube containing `P`.A new compound `Q` is formed with the evaluation of colorless and odorless gas Name the gas evolved and compound `Q` write the chemical reaction.

7. A cyclic compound `X` has molecular formula C6H6. It is un turated and burns with sooty flame. Identify `X` and write its structural formula. Will it decolorize bromine water or not and why?

8. An organic compounds `A` is a constituent of antifreeze and has the molecular formula C_2H_6O. upon reaction with alkaline $KMnO_4$, the compound `A` is oxidized to

another `B` with formula $C_2H_6O_2$. Identify the compound A` and `B`. Write the chemical equation for the reaction which leads to the formulation of `B`

9. Two compounds `X` and `Y` have the me formula $C_2H_4O_2$. One of them reacts with sodium metal to liberate H_2 and CO_2 with $NaHCO_3$. Second one does not reacts with Na metal and $NaHCO_3$ but undergo hydrolysis with NaOH to form lt of carboxylic acid and compound `Z` which is called wood spirit. Identify `X`, `Y`, and `Z` and write chemical equation for the reaction involved.

10. A compound `X` with molecular formula C_2H_4 burns with a sooty flame. It decolourise bromine water. Identify `X`. Will it dissolve in water or not? Will it conduct electricity in aq. Solution? Will it have high melting point or low melting point ?

Answers

Ans I.

$$CH_3-CH_2OH \xrightarrow[\text{Or acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$$

X **Y**

$$CH_3-CH_2OH \xrightarrow[H_2SO_4]{\text{Hot conc.}} CH_2=CH_2 + H_2O$$

. **Z**

Ans 2.

$$CH_3-COOH + CH_3-CH_2OH \xrightarrow{\text{Acid}} CH_3-\underset{\underset{O}{\|}}{C}-O-CH_2-CH_3$$

(Ethanoic acid) (Ethanol) (Ester)

. **A** **B**

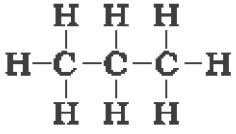
(iii)Esters react in the presence of an acid or a base to give back the alcohol and carboxylic acid.

(iv) $CH_3COOC_2H_5 \xrightarrow{NaOH} C_2H_5OH + CH_3COOH$

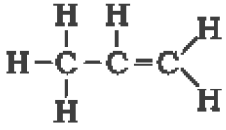
(v) CO2

$$2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + H_2O + CO_2$$

Ans 3: `Y` will burn with a sooty flame. So it is an un turated hydrocarbon.



Propane (X)



Propene (Y)

Ans 4:

C_4H_{10} + 13/2 O2 ⟶ $4CO_2$ +5 H_2O

`X` (Butane)

C_4H_{10} + Cl_2 ⟶ C_4H_9Cl +HCl

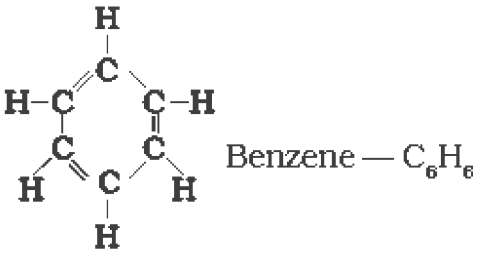
Ans 5 A is detergent & B is soap.

Ans 6:

$$2Na + 2CH_3CH_2OH \rightarrow \underset{\text{(Sodium ethoxide)}}{2CH_3CH_2O^-Na^+} + H_2$$

`P` **`Q`**

Ans 7:



It does not decolorize bromine water because it does not undergo addition reaction.

Ans 8:

$$\underset{\text{`A`}}{CH_3—CH_2OH} \xrightarrow[\text{Or acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} \underset{\text{`B`}}{CH_3COOH}$$

Ans 9:

$$CH_3COOH + NaHCO_3 \rightarrow CH_3COONa + H_2O + CO_2$$

`X`

CH_3COOH + Na ⟶ CH_3COONa +H_2

$HCOOCH_3$ + NaOH ⟶ HCOONa + CH_3OH

`Y` **`Z`**

Ans 10:

`X` is ethene. It will neither dissolve in water nor conduct electricity because it is a covalent compound. It has low melting point.

PRACTICE QUESTIONS

1. Write the formula for ‘ethanoic acid’and name the functional group present in it.
2. Allotropy is a property shown by which class:-
   Substances, elements, compounds, mixture.
3. What is the use of oxyacetylene flame?

4. Name the gas which is formed by decomposition of plants and animal matter in marshy areas?
5. Mention the name of the by product of soap industry/

6. Write the molecular formula and structures of benzene.

7. Match the following:-
   1. Ethane - Used in anti freeze solution.
   2. Ethanol - fruity smell.
   3. Ester - fossil fuel.
8. Write two uses of fullerenes.

9. Complete and balance following equation:-
a) $CH_2=CH_2 + H_2 \xrightarrow{\text{heat, Ni}}$
b) $CH_4+O_2 \longrightarrow$

10. Two alkanes A and B have 4 and 6 carbon atoms respectively in their molecule. In which physical state will they occur at room temp?

1) Give a test that can be used to differentiate chemically between butter and cooking oil.
2) How will you distinguish between ethanol and ethanoic acid by a suitable chemical test? Write chemical reactions involved.
3) Complete the following reactions :-
   1) $CH_3COOH + NaHCO_3 \longrightarrow$
   2) $HCOOH + CH_3OH \xrightarrow{\text{conc.}H_2SO_4}$
   3) $CH_3COOC_2H_5 + H_2O \longrightarrow$
4) Name the compound $CH_3COOC_2H_5$.Name the acid and alcohol from which it is made .write equation.

CHAPTER – 5

PERIODIC CLASSIFICATION OF ELEMENTS

HOTS: (High Order Thinking Skill) Questions with Answers

Q-1 X, Y and Z are the elements of a dobereiners triad. If the atomic mass of x is 7 and that of z is 39, what should be the atomic mass of y?

Q-2 A and B are the two elements having similar properties which obey Newlands law of octaves. How many elements are there in between A and B?

Q-3 The following is Newland's Octave Table. Observe it and answer the following questions:

sa(do)	re(re)	ga (mi)	ma (fa)	pa(so)	da (la)	ni(ti)
H	Li	Be	B	C	N	O
F	Na	Mg	Al	Si	P	S
Cl	K	Ca	Cr	Ti	Mn	Fe
Co and Ni	Cu	Zn	Y	In	As	Se
Br	Rb	Sr	Ce and La	Zr	-	-

i. Which of the element in 1st column has different properties from rest of the elements?

ii. Which of the elements resemble with each other in second column?

iii. Pick up odd element in second last column.

iv. Pick up elements which have similar properties in last column.

Q-4 In the Periodic Table given below, Lithium, carbon, oxygen and neon are placed in their correct positions and the positions of nine other elements are represented by letters. These letters are not the symbols for the elements?

1	2	13	14	15	16	17	18
Lithium			Carbon		Oxygen	L	Neon
X			E		G	Q	
Y						R	
Z						T	

By reference to the table, answer the following questions:

(a) Give the letter of the most reactive metal.

(b) Give the letter of the most reactive non-metal.

(c) Name the family of elements represented by L, Q, R, and T.

(d) Name one element in each case occurring in groups 2, 13 and 15

Q-5 Two elements X and Y have atomic numbers 12 and 16 respectively. Write the electronic configuration for these elements. To which period of the modern periodic table do these two elements belong? What type of bond will be formed between them and why?

Q-6 An element X (2,8,2) combines separately with NO_3 and $(SO_4)^{2-}$, $(PO_4)^{3-}$ radicals. Write the formulae of the three compounds so formed. To which group of the periodic table does the element 'X' belong? Will it form covalent or ionic compound? Why?

Q-7 The following table shows the position of six elements A, B, C, D, E and F in the periodic table.

Groups / Periods	1	2	3 to 12	13	14	15	16	17	18
2.	A					B			C
3.		D			E				F

Using the above table answer the following questions :
(a) Which element will form only covalent compunds?
(b) Which element is a metal with valency 2?
(c) Which element is a non-metal with valency of 3?
(d) Out of D and E, which one has a bigger atomic radius and why?
(e) Write a common name for the family of elements C and F.

Q-8 The diagram below shows part of the Periodic Table

1	2	3										4	5	6	7	0
Na															Cl	Ar

The position of three elements in the Periodic Table is shown:

i Write the atomic numbers of the elements.

ii Give the electronic distribution of the elements

iii Using these three elements as examples, describe the trend in chemical properties across the third period of the Periodic Table.

Q-9

Group	I	II	III	IV	V	VI	VII	VIII
Oxide Hydride	R_2O RH	RO RH_2	R_2O_3 RH_3	RO_2 RH_4	R_2O_5 RH_3	RO_3 RH_2	R_2O_7 RH	RO_4
Periods	A B	A B	A B	A B	A B	A B	A B	
1	H							
2	Li	Be	B	C	N	O	F	
3	Na	Mg	Al	Si	P	S	Cl	
4.First Series: Second Series:	K Cu	Ca Zn	Sc Ga	Ti Ge	V As	Cr Se	Mn Br	Fe Co Ni
5 First Series: Second Series	Rb Ag	Sr Cd	Y In	Zr Sn	Nb Sb	Mo Te 127.90	Tc I 126.90	Ru Rh Pd
6 First Series: Second Series	Cs Au	Ba Hg	La Tl	Hf Pb	Ta Bi	W		Os Ir Pt

(a) Write the formula of hydride and oxide of silicon

(b) Name the elements which is in

(i) II group and 4^{th} period

(ii) VI group and 3^{rd} period.

(c) Name the elements in group I which do not resemble with alkali metals

(d) In group VI why does Te with atomic mass 127.60 comes before I with atomic mass 126.90

Q 10. A metal M forms an oxide having the formula M2O3. It belongs to 3^{rd} period in the modern periodic table. Write the atomic number and valency of the metal.

Answers

Ans 1 $\frac{(7 + 39)}{2} = 46/2$ y = 23.

Ans 2 Six elements.

Ans 3: (a) Co & Ni
(b) Li, Na , K
(c) Mn
(d) O, S, Se

Ans 4 (a) Z , (b) L , (c) Halogen family, (d) Mg(group-2), Al (group-13), N (group-15)

Ans 5: X (Z=12): 2, 8, 2
Y (Z=16): 2, 8, 6
Both these elements are present in third period. An ionic bond is formed between X & Y as a result of transfer of two electrons from X to Y

Ans 6: X $(NO_3)_2$: XSO_4 $X_3(PO_4)_2$
X belong to second group . X forms ionic compound because by losing two electrons X achieve the electronic configuration of Noble gas element Neon.

Ans 7:
(a) E, (b) D, (c) B, (d) D, because the atomic size decreases along a period,
(e) Noble Gases.

Ans 8:
(a) Na = 11
Cl = 17
Ar = 18
(b) Na (2,8,1) Cl (2,8,7) Ar (2,8,8,)
(c) Metallic and reducing character decreases.

Ans.9 (a) SiO2, SiH_4
(b) (i) Ca,Zn
(ii) S
(c) H
(d) The sequence was inverted so that elements with similar properties could be grouped together

Ans 10. Atomic number = 13
Valency = 3

PRACTICE QUESTIONS

Q-1 State the modern periodic law

Q-2 which of the two elements

A=2,8,1 B= 2,8,8,1 is more electropositive

Q-3 How does the atomic size very in going from

A) Left to right in a period

B) Top to Bottom in a group

Q-4 An element has atomic number 13. In which group and period it should be placed?

Q-5 How many periods and groups are there in the long from of P.T?

Q-6 Why does the size of the atoms progressively become smaller when we move from sodium (Na) to chlorine (cl) in the third period of the period table ?

Q-7 Give symbols for

A. A metal of group 2.
B. A metal of group 13.
C. Two non metals of group 16.
D. Most reactive non- metal of group 17.

Q-8 Explain Why-

1. All the elements of a group have similar chemical properties.
2. All the elements in a period have different chemical properties.

Q-9 The atomic number of an element X is 17. Predict -

A. Its valency.
B. Nature of the elements.
C. Whether it is metal or non – metal.
D. Name of the element.
E. Relative size with respect to other members of its group.

Q-10 The three elements predicted by mendeleev from the gaps in his periodic table were known as eka- boron, eka- aluminum, eka- silicon. What names were given to these elements when they were discovered later on?

Q-11 The atomic numbers of Nitrogen, Oxygen and fluorine are 7, 8, and 9 respectively. Write the electronic configuration of each element and answer the following:

(a) Out of N, O and F which is most electronegative and which one is least electronegative?

(b) What is the number of valence electrons of F?

(c) What is the valency of each of N, O and F?

CHAPTER-6

LIFE PROCESSES

SOLVED QUESTIONS

(1) Due to availability of less water, how does the plant cope up with lack of water in desert conditions?
(2) After a vigorous exercise, you may experience cramps in your leg muscles. Why does this happen?
(3) What will happen if carbon monoxide combines with haemoglobin?
(4) Food moves down the gut by peristalsis. Which region of brain controls peristalsis?
(5) Name the pigment present in plants, which can absorb solar energy.
(6) Name the respiratory organs of (i) fish (ii) mosquito (iii) earthworm.
(7) Which of the four chambers of the human heart has the thickest muscular walls?
(8) What will be the outcome if a farmer floods his field everyday?
(9) Which part of visible spectrum is absorbed by chlorophyll pigments?
(10) How does respiration in plants differ from that in animals?
(11) Name the cartilaginous flap which closes the glottis to check the entry of food into it during swallowing.
(12) Which equipment is used to facilitate breathing during serious breathing problems?
(13) Chloroplast are called energy convertors. Explain.
(14) Why is the rate if breathing much faster in aquatic organisms than those of terrestrial organisms?
(15) Why are glomeruli considered as dialysis bags?
(16) Autotrophs synthesise food for the living world. Justify this statement in one sentence only interconnecting autotrophs and heterotrophs.
(17)Veins and arteries carry blood. Which of these carry blood?
   a) Away from the heart?
   b) Back to the heart?
(18) Which of the organs perform the following functions in humans?
   1. Absorption of food.
   2. Absorption of water
(19) Name the areas in a woody stem through which respiratory exchange of gases take place.
(20) Tooth enamel is one of the hardest substances in our body. How does it undergo damage due to eating chocolates and sweets?
(21) A certain tissue in a green plant somehow get blocked and the leaves wilted. What was the tissue that got blocked?
(22) Write one feature which is common to each of the following pairs of the term/organs.
   i) glycogen and starch ii) chlorophyll and haemoglobin
   iii) gills and lungs iv) arteries and veins.
(23) Why doesn't the lungs collapse even after forceful expiration?
(24) The two openings of the pharynx, one leading to trachea and the other leading to oesophagus, lie very close to each other. Yet food we swallow normally does not enter into our trachea. Why?

(25) How would it affect the digestion of proteins and carbohydrates if the duodenum of man if there is a blockade in the pancreatic duct?

(26) What do you mean by double circulation of blood?

(27) "If there were no algae there would be no fish in the sea". Comment.

(28)Write the functions of the following in the digestive process:

(i) Bile

(ii) Bicarbonate secreted by the duodenal wall.

(iii) Pancreatic amylase.

(29) Why is the process of diffusion insufficient to meet the oxygen requirement of human beings?

(30) Draw a diagram of human alimentary canal showing duodenum, small intestine, liver and pancreas.

(31) Draw a diagram of the human urinary system and label in it.

a. Kidney
b. Ureter
c. Urinary Bladder
d. Urethra

ANSWERS

Ans-1) They open their stomata at night and stomata remain closed during day time, to conserve moisture.

Ans-2) The sudden build up of lactic acid in our muscles during vigorous, exercise, causes muscular cramps in our leg muscles.

Ans-3) If the haemoglobin binds with carbon monoxide strongly, the oxygen will not be carried with blood leading to death of the organism.

Ans-4) Medulla of hind brain.

Ans-5) Chlorophyll.

Ans-6) Fish - gills
Mosquito – Trachea (air tubes)
Earthworm – moist skin

Ans-7) Right ventricle.

Ans-8) Respiration of plants will be affected because the oxygen present in the interspaces of the soil will be replaced by water.

Ans-9) Blue and Red light

Ans-10) In plants, all parts like the root, stem, leaves, etc., perform respiration individually., while in animals, either the general body surface or specific organs like the skin, gills, lungs, etc., are involved in respiration. The rate of respiration is much slower in plants than in animals. Unlike animals, there is little transport of gases from one part of the plant to another.

Ans-11) Epiglottis

Ans-12) Ventilator

Ans-13) Chloroplasts are called energy convertors because they trap the solar energy and convert it into chemical energy.

Ans-14) The aquatic organisms obtain oxygen dissolved in water. As compared to air, the availability of oxygen in water is fairly low. Hence, the aquatic organisms have to breathe faster as compared to the terrestrial organisms.

Ans-15) The main function performed by the glomeruli is selective filtration. They filter small molecules containing glucose, salts, urea, and liquid serum. Etc. The large molecules such as proteins remain in blood. Thus, glomeruli of the kidneys function as dialysis bags.
Ans-16) The food producers are autotrophs and all the heterotrophs consume the food produced by the autotrophs directly or indirectly.
Ans-17) a) Arteries carry blood away from the heart.
b) Veins carry blood back to the heart.
Ans-18)

1. Absorption of food takes place in small intestine.
2. Large intestine

Ans-19) In woody stem, the bark has lenticels for gaseous exchange.
Ans-20) The acid is formed in the mouth after a sugary food (chocolates and sweet) has been taken. This acid lowers the pH in the mouth. Tooth decay starts when the pH of acid formed in the mouth falls below 5.5. This is because then the acid becomes strong enough to attack the enamel of our teeth and corrode it.
Ans-21) The tissue that got blocked may be xylem. It is through the xylem that water and minerals absorbed by roots from the soil are transported to the leaves and other parts of the plant. So, if xylem is blocked, the leaves will not get the nourishment and will get wilted.
Ans-22)

i) Carbohydrate (food)
ii) Pigments.
iii) Respiratory organs.
iv) Blood vessels.

Ans-23) Even after forceful expiration to the maximum capacity, some amount of air remains in the lungs, known as residual volume. So, the lungs doesn't collapse even after forceful expiration.
Ans-24) The food does not enter into trachea because during swallowing, the aperture leading to trachea (glottis) gets covered by a cartilaginous flap called epiglottis and the food has no other passage except going into the oesophagus.
Ans-25) Duodenum is the region where the pancreatic juice secreted by the pancreas enters. The enzymes pancreatic amylase and trypsin helps in the digestion of carbohydrates and proteins. Thus, if there is a blockade, the digestion of carbohydrates and proteins gets affected.
Ans-26) Blood passes through the heart twice for each cycle of the body.
Ans-27) Algae produce O_2 as a result of photosynthesis. This oxygen is utilised by the fishes in the sea for carrying out respiration. If there were no algae, no oxygen would have been produced. Thus, fishes might have died.
Ans-28)

1. Bile: It is secreted by the gall bladder and it emulsifies the fats into the smaller droplets for their easy digestion.
2. It provides alkaline medium in the duodenum which is needed for the action of pancreatic enzymes of different food components for their digestion.
3. Pancreatic amylase enzyme digests starch and changes it into maltose.

Ans-29) The process of diffusion for carrying O_2 to all parts of the body is not sufficient for larger multicellular organisms like human beings. Hence, respiratory pigment haemoglobin takes up oxygen from the air and carry it to all the parts of our body through blood.
Ans-30) Textbook Page No. 99, Figure 6.6

Ans-31) Figure 6.13 Page 110 NCERT

QUESTION BANK FOR PRACTICE

1. Which fluid in the human body wets the internal organs?

2. Where does the blood absorb oxygen in the human body?
3. Name the two parts of the plant through which gaseous waste products are released into the air?
4. Why do the walls of the trachea not collapse when there is less air in it?

5. Normally a vein opens into a large vein or into the heart but does not end in capillaries. Which one or more veins in humans is/are exceptions to this rule?
6. Give reason for – The lung alveoli are covered with blood capillaries.
7. Why is blood called liquid connective tissue?
8. Structure of leaf is complementary to its functions. Explain.

9. Bile juice does not contain any digestive enzymes, yet it is essential for digestion, why so? Explain.
10. How do each of the following factors affect the productivity in the process of photosynthesis?
    1. Temperature. 2. Water. 3. Carbon dioxide.
11. Why is it necessary to separate oxygenated and deoxygenated blood in living organisms?
12. What substance/substances are transported in plants by
    (1) Xylem vessels and tracheids?
    (2) Sieve tubes (of phloem)?
13. Why is the inner wall of alimentary canal not digested although the digestive enzymes can digest all the materials that make cells?
14. Explain why the rate of photosynthesis in plants is low both at low and high temperatures?
15. Why is CO_2 mostly transported in the dissolved form in our blood than O_2?
16. Small intestine in the site for complete digestion of carbohydrates, proteins and fats. Write down the changes happen to the food in the small intestine before its absorption.
17. Plants absorb water from the soil. How does this water reach the tree tops? Explain in detail.
18. Where does aerobic break down of pyruvate take place in a living cell? What are the end products?
19. Hydrochloric acid creates an acidic medium which facilitate the action of protein digesting enzyme in the stomach. Name the enzyme and give any three other functions served by the acid.
20. Why is anaerobic respiration produce less energy compared to aerobic respiration?
21. What is root pressure?
22. In which direction does lymph flow?
23. Name the organ system which is responsible for excretion and osmoregulation?

24. What is the composition of lymph?
25. Differentiate between afferent and efferent arterioles?
26. Name the vestigial part of human alimentary canal.
27. Name the respiratory pigment of blood in mammals.
28. How does oxygen reach the cells in insects?
29. Respiration is a vital process for all organisms. Explain.
30. What will happen if a diaphragm of a person gets ruptured in an accident?
31. What is the source of oxygen in photosynthesis?
32. How would non-secretion of hydrochloric acid in our stomach affect food digestion?
33. Why does leaf appear green?
34. What is the role of light in photosynthesis?
35. Write about the major glands associated with the alimentary canal of man and mention their functions.
36. How does the butter in your food get digested and absorbed in the body and explain.
37. Why is the rate of photosynthesis more during a bright sunny day as compared to a cloudy day?
38. If all the green plants are removed from the earth life cannot be sustained. Comment.
39. Why is digestion essential for living beings?
40. Draw a diagram to show the internal structure of human heart. Label 6 parts in all including at least three valves.

CHAPTER-7

CONTROL AND COORDINATION

HOTS: (High Order Thinking Skill) Questions with Answers:

Q.1) On touching a hot plate, you suddenly withdraw your hand. Which category of neurons became active first and which one next?
Q.2) Give one example of plant part.
a. Which is positively hydrotropic as well as positively geotropic.
b. Which is positively phototropic but negatively geotropic.
Q.3) What name is given to the microscopic gap between two adjacent neurons?
Q.4) If we step on something sharp accidently we move our foot away at once .what is this type of response known as?
Q.5) A part of the hind brain makes possible activities like walking, skating, riding a bicycle and picking up a pencil.name this part of the hind brain.
Q.6) The neck of a person appears to be swollen.
a. Name the disease this person suffering from.
b. Name the mineral whose deficiency in the diet causes this disease.
Q.7) Name the plant hormone:
(a) which inhibits growth and causes wilting of leaves.
(b) which promotes cell division.
Q.8) Taking the example of heart beat, justify the antagonistic action of the sympathetic and the parasympathetic nerves.
Q.9) Why is abscisic acid known as stress hormone in plants?
Q.10) Name the part of neuron
(a) where information is acquired.
(b) through which information travels as an electrical impulse.
Q.11) How does the plant shoot bends, when the plant is placed in a room having only one open window?
Q.12) Who transmits nerve impulse across the synapse?
Q.13) Give a reason to explain why
(a) adrenaline helps in dealing emergency situations?
(b) secretions of growth hormone should be specific in the human body?
Q.14) Why do leaves drop off seasonally?
Q.15) Give reason why endocrine glands release their secretions into the blood?

ANSWERS

Ans.1) On touching a hot plate, first the sensory neurons are activated, which take the information to the brain or the spinal cord. Next, the motor neurons become active and bring the impulses from the brain to the muscles. In receiving these impulses, the muscles contract, and the hand is immediately removed from the hot plate.
Ans.2) a. roots
b. stem
Ans.3) Synapse
Ans.4) Reflex action
Ans.5) Cerebellum
Ans.6) a. Goitre
b. Iodine
Ans.7) a. Abscisic acid.

b. Cytokinins.

Ans.8) Sympathetic system increases contraction and rhythm and parasympathetic system decreases contraction and rhythm with respect to heart beat.

Ans.9) Abscisic acid in a plant hormone which inhibits growth. Its effects include wilting of leaves.

Ans.10) a. Dendrite

b. Axon

Ans.11) When the plant is placed in such a room that has only one open window, the shoot of the plant bends towards the direction of light. Plant hormone auxin is formed that diffuses towards the shady side of the shoot and stimulates the cells to live longer on the side of the shoot which is away from light. In this way the shoot bends towards the light.

Ans.12) Neurotransmitters.

Ans.13) a. Adrenaline increases the heart beat and breathing rate which results in the supply of more oxygen to muscles. It reduces the blood to the digestive system and skin, as a result the blood is further diverted to skeletal muscles. All these responses together prepare the body to deal with the emergency situations.

b. If growth hormones is secreted in excess during childhood then it leads to gigantism while the less secretion of this hormone during childhood causes dwarfism.

Ans.14) The leaves drop off seasonally as they stop producing auxins, which normally prevents the formation of abscission zone that cuts off nutrients and water supply to leaves.

Ans.15) Endocrine glands are ductless glands and their products have to act at a distant site.

Therefore, they release their secretions into the blood.

QUESTION BANK FOR PRACTICE

Q1. A particular hormone requires Iodine for its synthesis .Name the endocrine gland which secretes this hormone and state it's location in the human body.

Q2. Write a term for the chemical substance which brings about control and coordination in plants?

Q3. What is the apical dominance?

Q4. Name the organ associated with the nervous system which is also part of endocrine system and secretes hormone.

Q5. Why are hormones called informational molecules?

Q6. Why do leaves of "touch me not" plant droops when we touch it?

Q7. Name the structural and functional unit of nervous system.

Q8. What is the difference between the manner in which movement in the sensitive plant and movement in our legs takes place?

Q9. Why do people in the mountainous regions get goitre?

Q10. What is a synaptic cleft?

Q11. What are the scientific names for the following receptors in humans?

a) Receptors of smell
b) Receptors of taste

Q12. Which hormone is responsible for the development of moustache and beard in men?

Q13. How do we detect the smell of an agarbatti?

Q14. Why do stem and root show unilateral growth towards light and gravity of earth respectively?

Q15. Which part of the brain controls involuntary actions such as blood pressure, salivation and vomiting?
Q16. Justify that the pancreas and gonads perform dual function.
Q17. Why are some patients of diabetes treated by giving injections of insulin?
Q18. Pituitary gland is often called as master gland. Why?
Q19. How can thyroid activity be determined in man?
Q20. Do the plants have nervous plants like animals? If not, how control and coordination takes place in plants?
Q21. Nervous and hormonal systems together perform the function of control and coordination in human beings. Justify the statement.
Q22. Which hormone is released into blood when its sugar level rises? Name the organ which
produces the hormone and its effect on blood sugar level. Also name one digestive enzyme that this organ secretes and the function of this enzyme
Q23. Describe how auxins are related with the bending of shoots towards the source of light.
Q24. Define nerve impulse. Which structure in a neuron helps to conduct a nerve impulse:

a. Towards the cell body.
b. Away from the cell body.

CHAPTER-8

HOW DO ORGANISMS REPRODUCE?

HOTS: (High Order Thinking Skill) Questions with Answers:

Q.1) Why is variation beneficial to the species but not necessary for the individual?
Q.2) What is the advantage of reproduction through spores in the case of Rhizopus?
Q.3) The simple animals such as planaria can be cut into number of pieces and each piece grows into a complex organism. What is this process known as?
Q.4) Name the unicellular organism which caused the disease known as kala-azar.
Q.5) Which process taking place in the nucleus of a cell leads to variation in the offspring during reproduction?
Q.6) What causes joining up of stock and scion in grafting technique of vegetative propagation in plants? Define the terms stock and scion. Name one positive trait each of the plant contributing scion and stock should have.
Q.7) Which type of layering is done in Jasmine?
Q.8) Where does fertilization takes place in human female?
Q.9) Why is it said that "sexual reproduction promotes diversity of characters in the offsprings"?
Q.10) What happens if the fallopian tubes are partially blocked and the ovulated eggs are prevented from reaching the uterus?
Q.11) Name the causative organism of syphilis and gonorrhoea.
Q.12) Why are variation possible in progeny of sexually reproductive individuals?

ANSWERS

Ans-1) Variation is beneficial to the species as it enables a species for its survival. A favourable variation makes an organism to live better in a changed environment and an unfavourable variation will not. So it is not necessarily true that a variation is beneficial to the individual always.
Ans-2) The spores are covered by thick walls that protect them until they come into contact with aother moist surface and can begin to grow.
Ans-3) Regeneration
Ans-4) Leishmania
Ans-5) DNA copying
Ans-6) The stock and scion unite due to cambial cavity. **Stock** is the portion on which grafting is done and it provides the roots. **Scion** is the portion of the plant which is grafted on the other plant and it contributes the stem. The plant contributing scion should have large sized fruits and the plant contributing stock should have deep root system.
Ans-7) Air Layering (Gootee)
Ans-8) Oviduct (fallopian tube)
Ans-9) It is because sexual reproduction results from the fusion of two gametes coming from two different and sexually distinct individuals. This leads to variation, is necessary for evolution.
Ans-10) Fertilization may take place but the zygote may develop in the tube instead of uterus.
Ans-11) Treponema pallidum and Nisseria gonorrhoeae.

Ans-12) Variations are possible in progeny of sexually reproductive individuals because copy of DNA in newly formed cell is not identical to copy DNA of original cell.

QUESTION BANK FOR PRACTICE

Q1) Name those parts of the flower which serve the same function as the following do in the animals

(1) Testes (2) Ovary (3) Eggs (4) Sperms

Q2) 'Malarial parasite' divides into many daughter individuals simultaneously by multiple fission state an advantage the parasite gets because of this type of reproduction.

Q3) Is copy of DNA formed identical to original cell? If yes or no, how is it beneficial to a species?

Q4) An individual may have a good health even when the whole of reproductive system is removed. What is the function of the reproduction system then?

Q5) Grafting is a common method of obtaining a superior plant from two different plants. Explain.

Q6) The buds produced in the notches along the leaf margins of Bryophyllum plant fall on the soil and develop into new plants. Which type of reproduction is this?

Q7) What is the name of the yellow powdery substance present in the anther of a flower.

Q8) What substances are contained in oral pills used as contraceptives.

Q9) Which life process ensures that a plant or animal species will not disappear from the earth?

Q10) Fertilization is possible if ovulation has taken place during middle of the menstrual cycle. Give reasons.

Q11) Why is the female reproductive system more complex than the male reproduction system?

Q12) A potato is cut into a number of small pieces, these potato pieces are placed on wet cotton kept in a tray. After a few days, green shoots and roots appear only from some potato pieces and not from all potato pieces why?

Q13) What is the significance of human testis being located in the scrotum?

Q14) How the surgery methods are misused by people to prevent pregnancy?

Q15) Why is the number of sperms produced always more than the number of eggs produced?

Q16) DNA copies generated will be similar but may not be identical to the original. Explain.

Q17) After fertilization, name the part in each case which develops into

(a) the fruit (b) the seeds.

Q18) What is meant by implantation in human reproductive system.

Q19) Justify why the male reproductive system is called "urinogenital system".

Q20) Justify that parthenogensis is not the same as asexual reproduction.

Q21) State the advantages of tissue culture in growing plants.

Q22) What is meant by internal fertilization and external fertilization? Explain with examples.

Q23) Mention any two functions of human ovary.

Q24) What is the significance of syngamy and triple fusion?

Q25) (a) Draw the diagram showing the germination of pollen on the stigma. Label style, male germ cell, ovule and female germ cell.

(b) What happens to the following parts of a flower after fertilization:

(i) Ovule
(ii) Zygote
(iii) Ovary

Q26) Name the following structures:

a. Primary sex organs in man and women.
b. Reproductive parts of a flower.
c. A barrier method of birth control used by human.

(Q27) What is proliferative phase during menstrual cycle?

CHAPTER – 9

HEREDITY AND EVOLUTION

HOTS: (High Order Thinking Skill) Questions with Answers:

1. How one is change adopted to perform different functions? Give one example
2. What happened when Mendel crossed two traits of a character in a pea plants?
3. Who provided experimental evidence to support theory of origin of life from inanimate matter?
4. Why are asexually reproducing organisms capable of showing hereditary features?
5. If the sperm bearing Y-chromosome fertilizes the egg, the child born will not be entirely like his father. Why is it so?
6. A normal pea plant bearing colored flowers suddenly start producing white flowers. What could be the possible cause?
7. Mention any two recessive traits of garden pea.
8. Write the characteristics on the basis of which duck-biled platypus is considered as a link between reptiles and mammals.
9. Why are the small number of surviving tigers a cause of worry from the point of view of genetics?
10. What is called phylogenetic system of classification?
11. Is it true that when a new species is emerged, the old species is eliminated and why?
12. What will be the percentage of ab gametes produced by AaBb parent?
13. Mendel crossed a pure white recessive pea plant with a dominant pure red flowered plant. What will be the first generation of hybrids?
14. In evolutionary terms, which among-bacteria, spider, fish and chimpanzee have a “better” body design? Why or why not?
15. What is an offspring?
16. Why are traits acquired during life-time of an individual not inherited?
17. Name the chemicals which were essential for origin of life.
18. Why males are called heterogametic?
19. What is the percentage possibility a couple of having daughters?
20. Name 2 organisms in which sex determination is regulated by environmental factors.
21. What are inherited traits? Give one example.
22. When Mendel crossed a Tall plant with a dwarf plant, no medium height plants were obtained in F_1 generation. Why?
23. The gene type of green stemmed tomato plants is denoted as GG and that of purple stemmed tomato plants as GG when these two are crossed.
    i. What colour of stem would you expect in F1 progeny?
    ii. Give the percentage of purple stemmed plants if F_1 are self pollinated.
    iii. In what ratio would you find the gene types CG and Gg in the F_2 progeny?
24. The human hand, cat paw and horse foot when studied in detail show the same structure of bones and point towards a common origin.
    i. What do you conclude from this?
    ii. What is the term given to such structures?
25. What are the causes of variations in clones?

26. How do we know how old a fossil is?
27. Study the given data and answer the questions following the data:

Parental plants cross fertilised and seeds collected	F1 First Generation offsprings	F2 Offsprings of self pollination of F1
Male parents always bare red flowers. Female parent always had white flowers.	330 seeds sown and observed. All 330 gave red flowers.	Out of 44 seeds 33 seeds gave plants with red flowers and 11 seeds gave plants with white flowers.

i. What is the term for this type of cross?
ii. What does the data of the column marked F_1 indicate?
iii. Express the gene type of the (a) parents (b) F1 progeny and (c) F2 progeny

28. Only variation that confer and advantage to an individual organism will survive in a population. Do you agree with this statement? Why or why not?

ANSWERS

1. In evolution, one change occurred initially is used to perform other functions. For example, feathers were evolved for warmth, later they were adapted for flight.
2. Only dominant trait appeared in F_1
3. Miller and Urey
4. Asexual reproduction tends to preserve the similarities among all the individuals belonging to a give line of descent. Therefore, asexually reproducing organisms are capable of showing hereditary features.
5. It is so because the other sex chromosome, ie the X-chromosome will also have its effects and other autosomes of the egg will also show their characteristics.
6. The appearance of white flowers is due to mutation.
7. Dwarf (height of plant), wrinkled seed
8. The characteristic resembling reptiles is laying of eggs and the characteristics resembling mammals is presence of mammary glands.
9. As the population of tigers is decreasing, there is loss of genes from the gene pool and there can't be recombinations and variations, thus no evolution.
10. Classification based on evolutionary relationships of organisms.
11. No,it is not true that when a new species is emerged, the old species is eliminated. Because when there is a change in any species, the change is only in a part or a few members of the species population. If the newly generated species after genetic change is better in any way, it will get more opportunity to survive and if the genetic change is against the environment, it will die. Thus, unchanged members of other species may also remain and tend to live in changed environment.
12. 25 percent
13. All red
14. Chimpanzee have the better body design as compared to others given. They are better adapted for locomotion, communication and thinking.
15. In sexual reproduction organisms raised are as a result of crossing over and exchange of gene segments and are known as offspring.

16. Traits acquired during life-time of an individual not inherited because change in non-reproductive tissue or somatic cells cannot be passed on to the DNA of germ cells. Thus, the acquired trait will die with the death of the individual. It is therefore non-heritable and cannot be passed on to its progeny.
17. Proteins and nucleic acid
18. Because they have dissimilar sex chromosomes.
19. 50 percent
20. Turtle, lizard
21. The characteristics which are transmitted from parents to their offsprings are called inherited traits. E.g. free and attached earlobes.
22. Because dominant genes express themselves and suppress the effect of recessive genes. So no medium sized plants were obtained.
23.
    i. Colour of F1 progeny – Green
    ii. Percentage of purple stemmed plants in F2 generation ¼ or 25%.
    iii. Ratio of genotypes GG and Gg 1:2
24. They have a common ancestry (i)Homologous organs
25. i. inaccuracies during DNA copying
    ii. Effect of environment termed acquired variation.
    iii. Mutations are sudden stable changes which are discontinuous inheritable as produced due to changes in genetic make-up.
26. There are two methods:
    i. Relative method when we dig into the earth, the fossils we find closer to the surface are more recent than the fossils we find in deeper layers.
    ii. By detecting the ratios of different isotopes of the same element in the fossil material.
27.
    i. Monohybrid cross
    ii. Red colour of flower dominant over white flower
    iii. a. Parents – (RR) and (rr)
    b. F1 progeny – Rr
    c. F2 progeny – RR, Rr and rr
28. We agree with the statement.
    All the variation do not have an equal chance of surviving in the environment in which they find themselves. The chances of surviving depend on the nature of variation. Different individuals have different kind of advantages. A bacteria that can withstand heat will survive better in heat wave.

QUESTION BANK FOR PRACTICE

1. What name is given to a sequence of gradual changes over millions of year in which new species are produced.
2. Which are the two processes, sexual reproduction or asexual reproduction brings about marked variations in the offspring?
3. In which gametes are present X and Y chromosomes?
4. Name two processes which change the frequency of certain genes over generation in a population.
5. Explain with examples how characteristics of a population changes over the years for the following situations.

a. To gain survival advantage b. due to accidental survival c. Temporary change of characteristics

6. How will you substantiate the statement that heredity and its concepts were known to the ancient civilisations.
7. How many autosomes are present in a human sperm?
8. What are cross breed plants known as?
9. What does letter F represent in heredity?
10. How will you conclude that birds are closely related to reptiles?
11. Where did the earliest members of human beings live?
12. Which organ in man suggest that he is a descendent of herbivorous animals?
13. Why is appendix in human considered as vestigial?
14. Why offsprings differ from parents in certain characters?
15. What is meant by expression TT and Tt in Mendelian terms?
16. How is sex determined in human beings?
17. Why are flippers of whales and wings of birds are considered as homologous organs?
18. On the basis of the possibilities of combination of the sex chromosomes, what percentage probability does a couple have of having a son or a daughter. Show the same by making a cross.
29. Explain why evolution can't be said to progress from lower forms to higher forms.
20. How do Mendel's experiments show that traits may be dominant or recessive?
21. Explain with an example how variation took place due to inheritance?
22. Explain Urey and Miller's experiment showing evidence of the theory of origin of life.
23. How does the study of fossils provide evidence in favour of organic evolution.
24. Can the wing of a butterfly and the wing of a bat be considered homologous organs? Why or why not?
25. What do you understand by reproductive isolation? How is this mechanism responsible for speciation?
26. Though eyes are found in many organisms why can they not be grouped together?
27. Why can two sub-populations of a species not reproduce with each other? State two reasons. What will be the outcome of such a situation?

Chapter No. 10

LIGHT- REFLECTION AND REFRACTION

HOTS Questions and Answers

1. Where is the image formed in a convex mirror, when the object is anywhere in front of it ?
2. A person uses concave mirror for shaving, where should he position his face in front of it ?
3. A ray of light is incident on a concave mirror along its principal axis. What will be the angle of reflection?
4. What will happen to ray of light when it travels from rarer medium to a denser medium ?
5. What does negative sign in the value of magnification of a mirror indicate?
6. Name the point inside the lens through which a ray of light goes undeviated?
7. Which of the two has a great power? A lens of short focal length or a lens of large focal length?
8. Name the lens which always gives an erect and diminished image?
9. Which mirror is used as rear view mirror in vehicles and why ?
10. Define one dioptre?
11. The size of an object is 2cm.The magnification produced by a mirror is +1. What is the size of the image?
12. When a ray of light passes from a denser medium to a rarer medium which angle is greater: angle of incidence or angle of refraction?
13. An image formed in a spherical mirror has magnification -2.Is the image real or virtual?
14. The power of a lens is -2D. Is the lens convex or concave?
15. Focal length of a convex mirror is 10cm.Find the radius of curvature of the mirror?
16. An object is placed at a distance of 50cm from a convex mirror. State two characteristics of the image formed.
17. Write two uses of concave mirror.
18. An object 1cm high produces a real image 1.5 cm high, when placed at a distance of 15 cm from concave mirror. Calculate the position of the image.
19. Find the power of a concave lens of focal length 2m.
20. Which phenomenon occurs when light falls on(a) highly polished surface (b) a transparent medium ?
21. What will happen to a ray of light when it falls normally on a surface ?
22. What is absolute refractive index ?
23. If refractive index of glass is 1.65, What is the speed of light in glass. ?
24. The magnification " m " for a mirror is +1 what does this signify ?

ANSWERS OF THE ABOVE QUESTIONS

1. Between pole and focus, behind the convex mirror.
2. Between pole and principal focus.

3. Angle of reflection = 0
4. Bends towards the normal .
5. Image is real.
6. Optical centre.
7. Lens of short focal length.
8. Concave lens.
9. Convex mirror, wider field of view.
10. One dioptre is the power of a lens of focal length one meter.
11. +2cm, because m=I/O , +1=I/2 =+2
12. Angle of refractions.
13. Real.
14. Concave lens.
15. 20cm.
16. (1) Image is virtual and erect.
    (2) Image is diminished.
17. (1) Used as reflectors for automobile headlights.
    (2) Used as shaving mirror.
18. – v/u = h'/h , -v/-15 = -1.5/1
    v = 15x 1.5 = -22.5cm.
19. – p = 1/f
    =1/-2 = -0.5D.
20. (a) Reflection of light.
    (b) Refraction of light.
21. No bending of light ray occurs. It means light rays goes straight from one medium to another.
22. When first medium is taken as vaccum, the refractive index of second medium is called as
absolute refractive index.
23. Refractive Index of glass = $\frac{\text{Speed of Light in vaccum}}{\text{Speed of Light in glass}}$

à $1.65 = \frac{3 \times 10^8}{Vg}$ à $Vg = \frac{3 \times 10^8}{1.65}$

à 1.8×10^8 m/s

24. (a) Image is of same size as the object.
    (b) Image is virtual and erect .

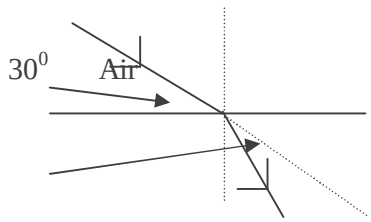
More Questions for Practice

1. What is angle of incidence?
2. A ray of light passing through centre of curvature of a concave mirror retraces its path on reflection, Why?
3. An object is placed at the focus of a concave mirror, Where is the image formed?
4. What is meant by refraction of light?
5. Define principal focus of a concave mirror?
6. State Snell's law of refraction?
7. Will the lateral displacement increase/decrease if glass block is made more thicker?

8. Why convex lens is called conversing lens?
9. Printed letters appears diminished, when viewed through a lens. What is the nature of lens.?
10. At What angle a ray of light should strike the surface of glass, So that it does not suffer any refraction?
11. Does the value of speed of light change with medium?
12. What is the cause of refraction of light?
13. Which lens is used as a magnifying glass?
14. What is an optically denser medium of light?
15. What is the difference between reflection and refraction?
16. If a ray of light traveling in air is incident on the water surface obliquely, Draw a ray diagram and show the change in its path in water?
17. Define refractive index in terms of a speed of light in two media. What is the unit of refractive index?
18. A ray of light strikes the mirror at 15^o, What is the angle of reflection?
19. What is refractive index of air? Why the refractive index of other medium is taken with respected to air?
20. Distinguish between real and virtual images?
21. For what position of an object, a virtual image is formed by a convex lens? Give ray diagram?
22. Find the position and nature of image formed in a concave mirror for the following position of an object. (a) At infinity (b) Beyond C.
23. An object is placed at a distance of 10cm from convex mirror of focal length 15cm; find the position and nature of image?
24. A thin lens has a focal length of -25cm. What is the power of the lens? Is it convex or concave?
25. Calculate the distance at which an object should be placed in front of convex lens of focal length 10cm to obtain an image double its size?
26. Why a mirror does has one principal focus while a lens has two principal foci?
27. Focal length of the lens in a photographic camera is 5cm.What is the power and nature of the lens?
28. Define linear magnification. Does it have any unit?
29. Why a concave mirror has a real principal focus, while convex mirror has a virtual principal focus?
30. Which of the following lenses would you prefer to use while reading the small letters found in dictionary.
    a. A convex lens of focal length 30 cm.
    b. A concave lens of focal length 30 cm.
    c. A concave lens of focal length 5 cm.
    d. A convex lens of focal length 5 cm.

31. Show that the refractive index of a medium 1 with respect to medium 2 is reciprocal to the refractive index of medium 2 with respect to 1 i.e. $\mathbf{n_{12} = 1 / n_{21}}$

32. From the diagram given below calculate
    a) angle of incidence
    b) angle of refraction .



c) the refractive index of the substance X. 30^0

X

33. A man standing in front of special mirror finds his image having a small face,big tummy and
legs of normal size .what are the shapes three parts of mirror?

34. A diverging lens of focal length 15cm forms an image of 10cm from the lens. Draw a scale
diagram for the formation of image.

Chapter No. : 11

Human Eye and Colourful World

HOTS Questions and Answers

1. What is the least distance of distinct vision of a normal human eye ?
2. Name the muscle responsible for bringing change in the focal length of the eye lens ?
3. Name one defect of vision which cannot be corrected by any type of spectacle lenses ?
4. State one effect produced by the scattering of light by the atmosphere ?
5. What is the nature of image formed on the retina of the eye ?
6. What type of lens is used for correcting hypermetropia ?
7. Who was the first person to obtain the spectrum of sunlight ?
8. What is the function of optic nerve in human eye ?
9. What is range of vision ?
10. Why do different colours deviate through different angles on passing through a prism?
11. As light rays pass from air into glass prism, are they refracted towards or away from the normal ?
12. Which color has largest wavelength ?
13. Which defect of vision can be rectified using a concave lens ?
14. What phenomenon causes twinkling of star on a clear night ?
15. What is meant by scattering of light ?
16. Why does the sky appear black instead of blue to an astronaut?
17. What is the basic cause of atmospheric refraction?
18. Why does clear sky look blue?
19. Can visible light be scattered by atoms/molecules in earth's atmosphere?
20. What is a spectrum?
21. Name the defect of vision in person
    a. Whose near point is more than 25cm away?.
    b. Whose far point is less than infinity.

ANSWERS OF THE ABOVE QUESTIONS :

Ans 1. 25cm.
Ans.2 Ciliary muscle.
Ans 3. Cataract.
Ans 4. Tyndall effect.
Ans.5 Real and inverted.
Ans.6 Convex lens.
Ans.7 Sir Isaac Newton.
Ans 8 Optic nerve carries the image formed on the retina to the brain in the form of electrical
signals.

Ans 9 Range of vision of a normal human eye is between it's near point and far point i.e,
from 25cm to infinity.
Ans 10 This is because different colours travel through glass with different speeds and glass has
different refractive index for different colours.
Ans 11. Towards the normal.
Ans. 12 Red color.
Ans. 13 Myopia.
Ans. 14 Atmospheric refraction.
Ans. 15 Change of direction of light on striking a scatterer.
Ans. 16 The upper atmosphere does not have particle or dust etc. as a result there is no scattering
of light and hence the sky appear dark in stead of blue to an astronaut.
Ans. 17 The basic cause of refraction is variation in optical density of different layers of earth's
atmosphere. The sun passes through earth's atmosphere.
Ans. 18 Because blue color having smallest wavelength is scattered most,
Amount of scattering is directly proportional to $1/\lambda^4$.
Ans. 19 Yes, as size of molecules/atoms is much less then wavelength of light
Ans. 20 The band of seven colours obtained by dispersion of white light is called spectrum.
Ans. 21

a. Hypermetropia
b. Myopia

More Questions for Practice

1. A person can see only objects beyond 1m. From his eyes. Name the defect of the eye.
2. Out of light of blue and red colours which one is scattered most?
3. What is the function of crystalline lens in the human eye?
4. Which phenomenon is responsible for increasing the apparent length of the day by 4 minute?
5. What is the far point of a person suffering from Myopia.
6. What name is given to front transparent part of human eye?
7. Where do we see :(1) Concave and (2) Convex lens in bifocal lenses.
8. What is the nature of image formed by our eye?
9. Name the liquid which is present between eye lens and cornea.
10. Where does most of the refraction of light in an eye occurs?
11. Which kind of lens is an eye lens?
12. What is the cause of dispersion of light?
13. Under very dim light, we are able to see the objects but can not distinguish between colours
why ?
14. What is the range of vision for normal human eye ?
15. How is the amount of light entering the eye controlled ?

16. What is the colour of danger signal? Why?
17. What is rainbow? How is rainbow formed?
18. State two causes of myopic vision.
19. How an uncorrected myopic eye sees far off objects.
20. What is presbyopia? Name the type of lens which can be used to correct presbyopia.
21. Explain why planet do not twinkle at night?
22. Explain about the colour of the sun at sunrise and sunset.
23. Define the term (1) Near point (2) Far point
24. Why is a normal eye not able to see clearly the object closer than 25 cm.
25. Draw a ray diagram to show the refraction of light through a glass prism on the diagram mark.
    (a) Incident ray (b) Emergent ray and (c) Angle of deviation
26. How is the dispersed white light recomposed ?

27 The near point of a hypermetropic eye is at 75 cm from the eye. What is the power of the lens required to enable him to read clearly a book held at 25 cm from the eye.

CHAPTER -12

ELECTRICITY

HOTS Questions and Answers

Q.1 What is represented by joule/coulomb?

Q.2 A charge of 2C moves between two plates, maintained at a p.d of 1V. What is the energy acquired by the charge?

Q.3 Why are copper wires used as connecting wires?

Q.4 A wire of resistivity ρ is stretched to double its length. What is its new resistivity?

Q.5 What is the resistance of connecting wire?

Q.6 What is the resistance of an ammeter?

Q.7 What is the resistance of a Voltmeter?

Q.8 Which has more resistance: 100W bulb or 60W bulb?

Q.9 How will you join three resistances, each of 2Ω so that the effective resistance is 3Ω?

Q.10 What happens to the current in a circuit if its resistance is doubled?

Q.11 What happens to the resistance of a circuit if the current through it is doubled?

Q.12 How does the resistance of a wire depend upon its radius?

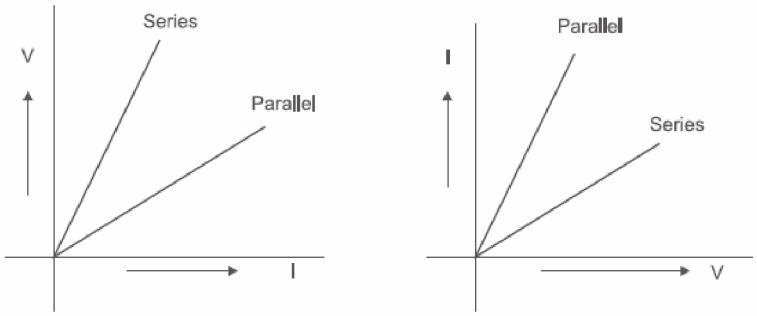
Q.13 Two wires are of the same length, same radius, but one of them is of copper and the other is of iron. Which will have more resistance?

Q.14 Two wires of same material and same length have radii r_1 and r_2. Compare their resistances.

Q.15 Given a resistors each of resistors R. How will you combine them to get the (i) maximum and (ii) minimum effective resistance? What is the ratio of the maximum to minimum resistance?

Q.16 A wire of length L and resistance R is stretched so that its length its doubled. How will its (a) Resistance change (b) Resistively change ?

Q.17 Two students perform the experiments on series and parallel combinations of two given resistors R1 and R2 and plot the following V-I graphs.



Which of the graphs is (are) correctly labelled in terms of the words 'series' and parallel' Justify your answer.

Q.18 A household uses the following electric appliances :

(i) Refrigerator of rating 400W for ten hours each day.

(ii) Two electric fans of rating 80W each for twelve hours each day.

(iii) Six electric tubes of rating 18W each for 6 hours each day.

Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00.

Q.19 Ammeter burns out when connected in parallel. Give reasons.

Answers of questions no 1-19

A.1 It represents potential difference.

A.2 $W=QV=2\times1=2J$

A.3 The electrical resistivity of copper is low.

A.4 It remains same because resistivity depends on nature of material.

A.5 The resistance of a connecting wire, which is made of good conductor, is negligible.

A.6 The resistance of an ammeter is very small and for an ideal ammeter, its value is zero.

A.7 The resistance of a voltmeter is very high and for an ideal voltmeter, its value is infinity.

A.8 As $R\alpha\ 1/P$.Thus, the resistance of 60W bulb is more.

A.9 A parallel combination of two resistances (which will be 1Ω) joined in series with the third resistance (2 Ω)

A.10 As $I\ \alpha\ 1/R$, the current is reduced to half of its previous value.

A.11 The resistance of the circuit does not depend on the current through it.

A.12 As $R\ \alpha\ 1/A$, $R\ \alpha\ 1/\pi r^2$ i.e. $R\ \alpha\ 1/r^2$.

A.13 As $R = \rho l/A$, but A and l are same it depends only on resistivity and it is more for iron so iron has more resistance.

A.14 If R_1 and R_2 are resistances, then $R_1/R_2 = r_2^2/r_1^2$ because ρ and l are same.

A.15 for maximum resistance $Rs= nr$ (Equivalent of series combination)

for minimum resistance $Rp= r/n$ (Equivalent of parallel combination)

$Rs/Rp= n^2$

A.16 (a) If the original length of the wire is l and its cross-sectional area is A, then $R = \rho l/A$.When length becomes 2l, cross-sectional area reduces to A/2 because volume does not change. The new resistance $=\rho\ (2l)/A/2=4\ \rho l/A = 4R$

(b) Resistively does not change.

A.17 Both are correct because $\Delta V/\Delta I=$ resistance(R) and $\Delta I/\Delta V=1/R$

Series means high resistance and parallel means low resistance.

A.18 Electrical energy consumed per day $= 400\times10+2\times80\times12+6\times18\times6$

$=4000+1920+648$

$= 6568$ Wh

$= 6.568$ kWh

Electrical energy consumed in 30 days$= 6.568\times30$

$= 197$ kWh (units)

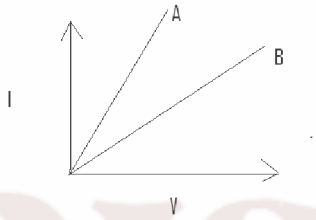
Electric Bill $= 197\times3$

$=$ Rs 591.

A.19 Ammeter consists of a wire of low resistance when connected in parallel, a large amount of current passes through it hence gets burnt i.e. short circuited.

More Questions for Practice

Q.1 Name a substance whose resistance almost remains unchanged by increase of temperature.
Q.2 Name two special characteristics of heater coil.
Q.3 A wire of resistance 4Ω is bent to form a circle. What is the resistance between two diametrically opposite ends ?
Q.4 How does the resistance of a conductor change if its temperature is increased?
Q.5 A current of 4A flows in a wire of resistance 60Ω.Calculate electrical energy consumed in 2 minutes.
Q.6 V-I graph for two resistors is given. Which of the two has minimum resistance?



Q.7 Alloys are used in electrical heating devices rather than pure metals. Give one reason.
Q.8 An electric geyser has the ratings 2000W, 220V marked on it. What should be the minimum rating, in whole number of a fuse wire that may be required for safe use with this geyser?

Q.9 The electrical resistivity of few materials is given below in ohm-meter. Which of these materials can be used for making element of a heating device?

A 6.84×10^{-8}
B 1.60×10^{-8}
C 1.00×10^{-4}
D 2.50×10^{12}
E 4.40×10^{-5}
F 2.30×10^{17}

Q.10 Where do we connect a fuse: with live wire or with neutral wire?
Q.11 What is the resistance of an air gap?
Q.12 Name two safety measures commonly used in electric circuits and appliances.

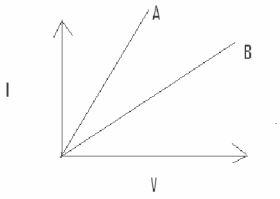
Q.13 Two metallic wires A and B are connected in parallel. Wire A has length l and radius r, wire B has a length $2l$ and radius 2r. Compute the ratio of the total resistance of parallel combination and the resistance of wire A.
Q.14 What is the meaning of the term 'frequency' of an alternating current? What is its value in India? Why is an alternating current considered to be advantageous over direct current for long-range transmission of electric energy?
Q.15 A TV set picture tube shoots out a beam of electrons. The current due to this beam is 10 mA. How many electrons will strike the TV screen every second?

Q. 16 An electric wire is stretched to increase its length by 25%.By what % will the resistance be increased and what will be increase in its resistivity?

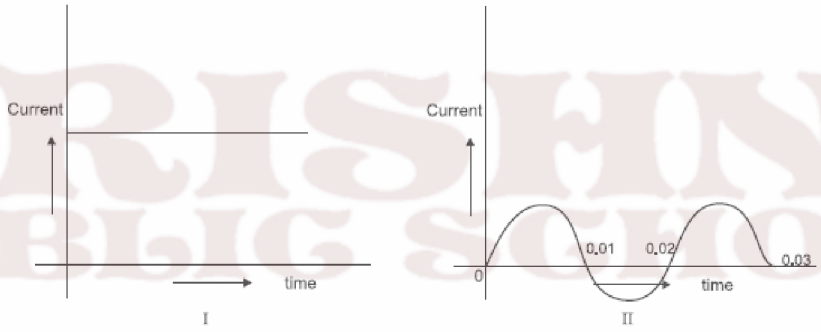
Q.17 An electric iron of resistance 20Ω takes a current of 5 A. Calculate the heat developed in 30 sec.

Q.18 A 60 W electric lamp gives off energy in the form of light at the rate of 7.5 J/s. What percentage of energy does the lamp transform into light?

Q.19 The voltage-current variation of two metallic wires A and B at constant temperature are shown in fig. Assuming that the wires have the same length and same diameter, explain which of the two wires will have larger resistivity.



Q.20 You are given following current-time graphs from two different sources:



(i) Name the type of current in two cases.
(ii) Identify any one source for each type of these currents.
(iii) What is the frequency of current in case II in India?

Q.21 The electric power consumed by a device may be calculated by using either of the two expressions $P = I^2R$ or $P = V^2/R$. The first expression indicates that it is directly proportional to R whereas the second expression indicates inverse proportionality. How can the seemingly different dependence of P on R in these expressions be explained.

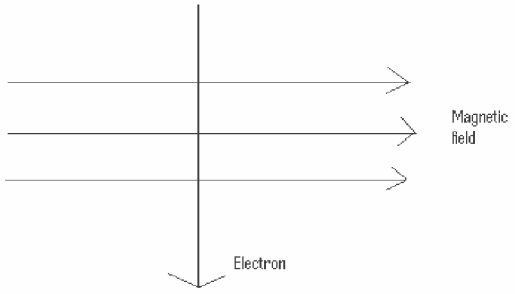
Q.22. Draw a schematic diagram of a circuit containing the following electrical components:(a) a resistance (b) a voltmeter (c) an electric bulb (d) a cell (e) an ammeter and (f) plug key

CHAPTER -13

MAGNETIC EFFECTS OF ELECTRIC CURRENT

HOTS Questions and Answers

Q.1 A straight wire carrying electric current is moving out of plane of paper and is perpendicular to it. What is the direction and type of induced magnetic field?
Q.2 How can it be shown that magnetic field exist around a wire carrying current?
Q.3 How can a solenoid be used to magnetise a steel bar.
Q.4 Why can't two magnetic field lines ever intersect?
Q.5 Can a 5 A fuse be used in wire carrying 15 A current? Why?
Q.6 Give the factors that affect strength of magnetic field at a point due to a straight conductor carrying current.
Q.7 Where do we connect a fuse: with live wire or with neutral wire?
Q.8 Give two uses of electromagnets.
Q.9 Name any two devices which use permanent magnets.
Q.10 Draw the magnetic field lines representing uniform magnetic field.
Q.11 A current-carrying straight conductor is placed in the east-west direction. What will be the direction of the force experienced by this conductor due to earth's magnetic field? How will this force get affected on? (a) reversing the direction of floe of current (b) doubling the magnitude of current.
Q.12 An electron enters a magnetic field at right angles to it as shown in fig. The direction of the force acting on the electron will be:
(a) to the right (b) to the left (c) out of the page (d) into the page

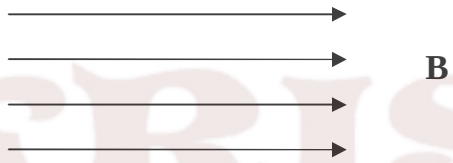


Q.13 Why is the earth pin thicker and longer than the live and the neutral pins?
Q.14 A coil of insulated copper wire is connected to a galvanometer. What would happen if a bar magnet is
(i) Pushed into the coil?
(ii) Withdrawn from inside the coil?
(iii) Held stationary inside the coil?

ANSWERS OF THE ABOVE QUESTIONS

A.1 Induced magnetic field will be in the form of concentric circles in the plane of paper.
A.2 By using magnetic compass which, shows deflection.
A.3 By inserting the steel bar inside the solenoid and switching on electric current.
A.4 If so then at the point of intersection there will be two different directions of magnetic field which is not possible.
A.5 No, because both of them would then be ineffective in controlling the amount of current flowing.
A.6 Magnitude of electric current, perpendicular distance between that point and conductor.
A.7 It is always connected with live wire.
A.8 (i) It is used in cranes for lifting heavy loads.
(ii) used in electric bells.
A.9 Loudspeakers, Galvanometer, voltmeter.

A.10



A.11 The direction of earth's magnetic field is from G-south to G-north. Let current is from west to east. Therefore force is vertically upwards.
(a) By reversing the direction of current, the direction of will be reversed i.e. vertically downwards.
(b) The magnitude of the force is doubled.
A.12 When a conductor carrying current is placed perpendicular to the direction of magnetic field, the acting on it is given by Fleming's left hand rule. Since the direction of current is the same as that of the motion of a positive charge, the direction of force acting on it when moving perpendicular to the direction of magnetic field is the same as that acting on a current-carrying conductor placed perpendicular to the direction of magnetic field. Obviously, the force acting on an electron is opposite to that. Therefore in this case it is into the page.
A.13 It is thicker so that it does not enter into the live or neutral sockets. It is made longer so that it gets connected to the earth terminal earlier than the live and neutral pins. This ensures the safety of the user.
A.14 (i) Due to change in magnetic flux linked with coil, the galvanometer shows deflection (say towards right).
(ii) Due to change in magnetic flux linked with coil, the galvanometer shows deflection (say towards left opposite to that in case one).
(iii) As it is stationary no change in magnetic flux linked with coil, so galvanometer shows no deflection.

More Questions for Practice

Q.1 The magnetic field inside a long straight solenoid carrying current:
(a) is zero
(b) decreases as we move towards its end
(c) is same at all points.
(d) Increases as we move towards its end

Q.2 Which of the following properties of proton can change while it moves freely in a magnetic field?
(a) mass
(b) speed
(c) velocity
(d) momentum.

Q.3 How do we think the displacement of rod AB will be affected if
(i) current in a rod AB is increased
(ii) a stronger horse-shoe magnet is used
(iii) length of rod AB is increased ?(Figure 13.12 Page number 230).

Q.4 A positively-charged particle (alpha particle) projected towards west is deflected towards north by magnetic field. The direction of magnetic field is :
(a) towards south
(b) towards east
(c) downward
(d) upward

Q.5 What is the role of the split-ring in an electric motor?

Q.6 What will be the frequency of an A.C if its direction changes after every .01 s?

Q.7 An A.C has a frequency of 50 Hz. How many times does it change its direction in one second?

Q.8 A student performs an experiment to study the magnetic effect of current around a current carrying straight conductor. He reports that
(i) The direction of deflection of the north pole of a compass needle kept at a given point near the conductor remains unaffected even when the terminals of the battery sending current in the wire are inter changed.
(ii) for a given battery, the degree of deflection of a N-pole decreases when the compass is kept at a point farther away from the conductor.
Which of the above observations of the student is incorrect and why?

Q.9 Draw the pattern of magnetic field lines of a current carrying solenoid. What does the pattern of field lines inside the solenoid indicate? Write one application of magnetic field of current carrying solenoid.

Q.10 Sketch magnetic field lines around a current carrying straight conductor.

Q.11 Why does a current carrying conductor kept in a magnetic field experience force?
On what factors does the direction of this force depend? Name and state the rule used for determination of direction of this force.

Q.5 Two circular coils A and B are placed close to each other. If the current in the coil A is changed, will some current be induced in the coil B? Give reason.

Q.6 Explain what is short-circuiting and overloading in an electric supply?

Q.7 What is the function of an earth wire? Why is it necessary to earth the metallic appliances?

Q.8 (a) What is an electromagnet? What does it consist of?

(b) Name one material in each case which is used to make a (i) permanent magnet (ii) Temporary magnet.

Q.9 Draw a sketch of the patten of field lines due to a (i) current flowing in a circular coin (ii) current carrying solenoid.

Q.10 A circuit has a fuse of 5A. What is the maximum number of 100W, 220V bulbs that can be safely used in the circuit.

Chapter No. : 14

SOURCES OF ENERGY

HOTS Questions and Answers

Q.1.The cost of production of electricity in a thermal power station located in Bihar/Jharkhand/Oris is less than in Gujarat/Maharashtra.Do you agree? Justify your answer.

Q.2 Which of the following sources of electricity involves more running expenses and why? Thermal power station, Hydro power station, solar cells or Geothermal source.

Q.3 Why is there so much emphasis on changing over from petrol/diesel driven automobiles to CNG-driven vehicles?

Q.4 Which of the following is not an example of the biomass energy source?

(a) Wood,(b) gobar gas,(c) atomic energy,(d)coal.

Q.5 How is the supply of electricity maintained in a windmill when there is no wind? In a solar panel when there is no sun?

Q.6 Can any source of energy be pollution-free? Why or why not?

Q.7 Why is biogas a better fuel than animal dung-cakes?

Q.8 Though a hot iron emits radiation, yet it is not visible in the dark, why?

Q.9 Define: OTE (ocean thermal energy).

Q.10 H_2 has been used as a rocket fuel. Would you consider it as a cleaner fuel than CNG? Why or why not?

ANSWERS OF THE ABOVE QUESTIONS

Ans.1 It is because coal is available in Bihar/Jharkhand/Oris locally, whereas it has to be transported for any thermal power plant in Gujarat/Maharashtra.

Ans.2 Thermal power stations involve more running cost due to continuous use of coal.

Ans. 3 CNG on burning produces only carbon dioxide and water

-It does not produce smoke.

-It does not leave unburnt hydrocarbons, lead particulates etc.

Ans.4 Atomic energy is not an example of biomass energy source.

Ans.5 In both the cases, the electricity generated is stored in a battery. This battery provides electricity when there is no wind in the case of a windmill and no sun in the case of a solar panel.

Ans. 6 No source of energy can be called pollution-free, because the use of any source of energy disturbs the environment in one way or the other. The actual source of energy may be pollution-free,but the assembly of the device might have caused some damage to the environment. So, in absolute sense, no source of energy can be called pollution-free.

Ans. 7 Biogas is a better fuel than animal dung-cakes because-

(a) Burning of animal dung-cakes produces lot of pollution whereas biogas is a smokeless fuel.

(b) The calorific value of Biogas is much higher than that of animal dung-cakes.
(c) Animal dung cakes leaves residue after burning whereas biogas leaves no residue.

Ans. 8 Hot iron emits infra-red rays and these are not visible to our eyes.

Ans. 9 The energy available due to the difference in the temperature of water at the surface of the ocean and at deeper levels is called OTE.

Ans. 10 H_2 when burnt in presence of O_2 produces H_2O as the only product with release of lot of heat energy. Water does not cause any damage to environment while CNG during burning produces CO_2 and water. CO_2 is not a pollutant yet it leads to rise in the temperature (global warming), this rise is called green house effect and this will affect polar ice, and life on the earth is at risk. Thus, H_2 is a cleaner fuel than CNG.

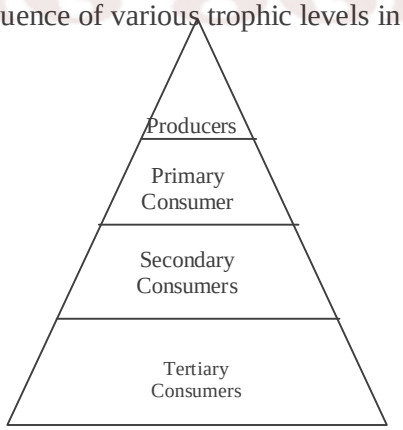
More Questions for Practice

Q1. Name the components of bio-gas.
Q2.What are hot spots?
Q3. What is the product obtained when wood is burnt without much supply of oxygen?
Q4. List problems associated with construction of dam?
Q5. What is the basis of nuclear energy? Explain briefly.
Q6. "It was believed nuclear energy is only destructive'' do you agree? Justify your answer.
Q7. List the criteria for selecting a good fuel.
Q8. What is bio-mass?
Q9. Name the process that converts solar energy into chemical energy in nature.
Q10. Biogas is considered to be a boon to the farmers. Give reason.

CHAPTER – 15
OUR ENVIRONMENT

HOTS Questions and Answers

Q.1 Why some substances are degraded and others not?
Q2. What limits the number of trophic levels in a food chain.
Q3. What will happen if decomposers are not there in the environment?
Q4. What is the harm of clay cups?
Q5. What will happen if all the carnivores are removed from the earth?
Q6. What will happen to grasslands if all the grazers are removed from there?
Q7. The number of malarial patients in a village increase tremendously, when a large number of frogs were exported from the village. What could be the cause for it? Explain the help of food chain?
Q8. State one reason to justify the position of man at the apex of most food chains?
Q9. Which food chains are advantageous in terms of energy?
Q10. Construct a food chain composing the following Snake, Hawk, Rats, Plants.
Q11. Name the process that is a direct outcome of excessive burning of fossil fuels?
Q12. If all the wastes we generate is bio-degradable what impact may this have on the environment?
Q13. Write the harmful effect of ozone depletion.
Q14. Why food chains consists of three or four steps only?
Q15. Which of the following will have the maximum concentration of harmful chemicals in its body?
Peacock, Frog, Grass, Snake, Grasshopper
Q16. Why energy of herbivores never come back to the autotrophs?
Q17. What are decomposers and what is the importance of them in the ecosystem?
Q18. Give the correct sequence of various trophic levels in a food chain.



Q19. What is biological magnification and give its causes?
Q20. Are plants actually producers of energy?

ANSWERS

Ans-1. Different components of food are changed to simpler substances by digestive enzymes and these enzymes are very much specific in nature and action. Similarly, substances are broken down by bacteria and saprophytes. They are also very specific

in action and break down of the particular substance. Therefore, some substances are biodegradable and other are non-biodegradable.

Ans-2. There is a loss of energy as we go from one trophic level to the next, this limits the number of trophic levels in a food chain.

Ans-3. If decomposers are not there in the environment, the breakdown of the complex organic substances into simple substances will not take place and natural replenishment of the soil will not take place. So, presence of decomposers is essential for the replenishment of soil and biogeochemical cycle of elements or substances.

Ana-4. Clay cups cause depletion of top fertile soil as they are formed from the same.

Ans-5. If all the carnivores are removed from the earth, the population of herbivores will increase. Large population of herbivores will overgraze. As a result, all plants will disappear from the earth surface and ultimately the earth may become a desert. The biosphere will get disturbed which will lead to end of life on earth.

Ans-6. If all the grazers are removed from grassland, grass will grow unchecked. It may help the growth of some organisms harmful to the animals and the animals which feed on the grazers will die of starvation. The biogeochemical cycle will stop and the whole biosphere will get disturbed.

Ans-7. Phytoplankton ⟶ Zooplankton ⟶ Mosquito larva ⟶ Frog

In the absence of frog, more mosquito larva survive, giving rise to large number of mosquitoes which cause increase incidence of malaria.

Ans-8. The position of man is at the apex of most food chains as he is an intelligent organism and can take any advantageous position by manipulation.

Ans-9. The two step chains in which man is close to producer are advantageous. For example, Producer ⟶ Man

Ans-10. Plants ⟶ Rats ⟶ Snake ⟶ Hawks

Ans-11. Global warming is a direct outcome of excessive burning of fossil fuels.

Ans-12. Cleaner environment without any pollution, more nutrients will be released into the nutrient pool, will help to maintain ecological balance.

Ans-13. 1. Cause the skin cancer
2. Damage to eyes
3. Immune system

Ans-14 Since so little energy is available for the next level of consumers and for this reason food generally consists of three or four steps. The loss of energy at the each step is so great that very little usable energy remains after four tropic levels.

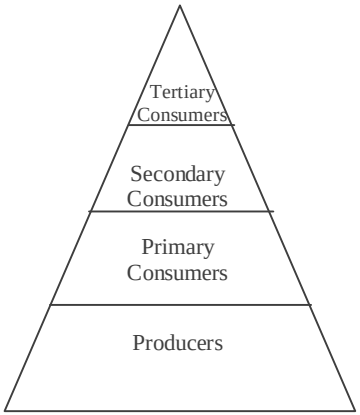
Ans-15. Grass ⟶ Grasshopper ⟶ Frog ⟶ Peacock

Peacock will have maximum conc.

Ans-16. Energy of herbivorous never comes back to autotrophs as flow of energy is always unidirectional. So once it passes the trophic level it is no longer available to the previous level.

Ans-17. The micro-organisms which break down the complex organic substances into simple inorganic substances e.g. bacteria, fungi. Decomposers decompose the complex substances into simple ones so that plants can use it again

Ans-18.



Ans-19.The increased concentration of chemicals at any trophic level is called biological magnification. It occurs due to the excessive use of pesticides which enter our food chain.

Ans- 20. No, plants are not actually producers of energy, they can trap the energy of sun and can convert solar energy into chemical energy in the form of carbohydrates and other food materials so they are called transducers.

QUESTION BANK FOR PRACTICE

Q1. During heavy rains in a village, the rain water carried excessive nitrogen compounds to a pond. How will it affect the growth of fish in the pond in the long run?

Q2. Which of the following materials are non-biodegradable? Aluminum wire, tea leaves, synthetic fibres, wool

Q3. In comparing the two ecosystems A & B it is observed that A has only first and second order consumers while B has third, fourth and fifth order consumers. Which of the two could be more stable?

Q4. What name has been given to those organisms which breakdown the complex organic compounds present in dead animals and plants?

Q5. Which of the following constitutes a food chain?

a) Grass, wheat and mango b) Grass, goat and human

c) Goat, cow and elephant d) Grass, fish and goat

Q6. Vegetarian food habit can sustain a larger number of people. Justify the statement in terms of food chain.

Q7. Which of the following belong to the same trophic level?

Tree, Frog, Snake, Grass, Lizard

Q8. Give any two ways in which non-biodegradable substances would affect the environment.

Q9. How does study of food chain in an area or habitat help us.

Q10. What percentage of energy, available at the producer level is transferred at successive trophic levels in a food chain?

Q11. A non-biodegradable toxic chemical has entered into a food chain. Which type of food habit will you suggest to a man? Vegetarian or Non-vegetarian.

Q12. Name two waste materials, which can be recycled?

Q13. Explain why, the practice of serving tea in Kulhads (disposable cups made of clay) on trains has been discontinued?

Q14. Explain why there are greater chances of accumulation of harmful chemicals in the body of human being.

Q15. The use of pesticide DDT is discouraged since this chemical is found in human body. How does this chemical enter our body?

Q16. What will happen if we kill all the organisms in one trophic level?

Q17. Consider the following food chains:

1. Plants → Mice → Snake → Hawks
2. Plants → Mice → Hawks

If energy available at the producer level in both the food chains is 100 J in which case will hawks get more energy as food and by how much? Justify your answer.

Q18. How much energy will be available to hawks in the food chain comprising hawk, snake, paddy and mice, if 10,000 J of energy is available to paddy from the sun?

Q19. Calculate the amount of energy available to lion in the following food chain if plants have 20000 J of energy available from the sun.

Plant ⟶ Deer ⟶ Lion.

Q20. In the food chain Grass ⟶ Deer ⟶ Lion, operating in a forest, what will happen,

1) If all the lions are removed?
2) If all the deer are removed?
3) If all the grass is removed?

Q21. What are the various methods of waste disposal practiced in your school? Describe any 2 methods briefly.

Q22. All the flesh of a carnivore is from grass. Justify the statement.

Q23. Explain the following terms

1) Acid Rain 2) Ozone depletion 3) Green house effect.

CHAPTER-16

MANAGEMENT OF NATURAL RESOURCES

HOTS Questions and Answers

1. What does the high level of total coliform count in river Ganga indicates?
2. What are "biodiversity hot spots"? What is the measure of the biodiversity?
3. Which programme was started to replenish forests?
4. Why scarcity of water is there in our country inspite of nature's monsoon bounty?
5. What is the effect of continuous depletion of ground water along coastal region?
6. Why is dependence of man on nature greater than that of any other organism?
7. In addition to low rainfall, what are the other reasons for non-availability of water in arid and semi-arid zones of our country?
8. Why is mining a big source of pollution?
9. Write two points to be kept in mind while storing water in tanks.
10. Write any two alternatives to dams.
11. Why do you think there should be equitable distribution of resources?
12. Which canal has brought greenery to considerable areas of Rajasthan?
13. What were the two main problems as a result of Tawa Irrigation Project?
14. Write the advantages of giving the control of water management to the residents of the area?
15. State benefits of water harvesting.
16. How did Chipko Andolan ultimately benefit the local population? Give any three benefits?
17. Quote three instances where human intervention saved the forests from destruction.
18. Why are environmentalists insisting upon sustainable natural resource management? Give any four reasons.

ANSWERS

1. It indicates that water is contaminated by disease causing micro-organisms.
2. Forests are "biodiversity hot spots". One measure of the biodiversity of an area is the number of species found here.
3. Silviculture
4. It has taken place due to the following reasons:
   (a) Failure to sustain water availability underground which has resulted largely from the loss of vegetation cover.
   (b) Diversion for high water demanding crops.
   (c) Pollution from industrial effluents and urban wastes.
5. The effect of continuous depletion of ground water along coastal region will lead to movement of saline sea water into freshwater wells then spoiling their quality.
6. Man's dependence on the environment is greater than that of other organisms because man:
   (a) Develops curiosity for more comforts and security.
   (b) Consumes large amount of material and energy.

(c) Develops a new kind of socio-economic environment which consists of things developed by man through his tools and techniques.

7. (a) Flowing of rain water and lack of management to harvest it.
   (b) Ground water is pumped out for high water demanding crops.
   (c) Water becomes unsafe and unusable due to mixing of urban wastes and effluents from the industries.
8. Mining causes pollution because large amount of slag is discarded for every tonne of metal extracted.
9. Storage tank should not be located close to the source of contamination and should be accessible for cleaning.
10. Adopting water harvesting techniques and reducing the scale of floods through better catchment management.
11. We think that there should be equitable distribution of resources because not only a handful of rich and powerful people, but all the people may get benefit from the development of these resources.
12. Indira Gandhi Canal.
13. Water logging and increasing salinity
14. Water harvesting techniques are highly locality specific and the benefits are localised. Thus, giving people the control over their local water resources ensures that mismanagement and overexploitation of these resources is reduced.
15. a. Provides self-sufficiency to water supply
    b. Conserves valuable ground water
    c. Reduces cost for pumping ground water
    d. Reduces local flooding and drainage problems

16. a. The locals benefitted from forest produces
    b. The wild life and nature were conserved
    c. The quality of air and soil was preserved

17. a. Contribution of Bishnoi movement
    b. Building national parks
    c. Encouraging wildlife sanctuaries

28. a. Non-renewable resources are limited, we should use them judiciously
    b. We should encourage the use of renewable resources
    c. We should preserve the environment for future generation
    d. The benefits of the controlled exploitation should go to local people

QUESTION BANK FOR PRACTICE

1. Construction of a dam on a river often results in the reduction of fish catch. Why is it so?
2. Name one National Park and a bird sanctuary developed in our country to protect wild life, rare animals and birds.
3. Write another term for petroleum
4. What are Kulhs?
5. How would the setting of a factory on the bank of a river affect the population down stream?

6. Why the management of the forest and wildlife resources considered as a challenging task?
7. Industrilisation is one main cause of deterioration of environment. Discuss
8. What are the main factors responsible for causing ecological crisis in nature?
9. State one limitation of rain water harvesting.
10. Write two points for sustainable forest management.
11. How can you say that water is a basic natural resource?
12. Economic growth and ecological consideration should grow hand in hand. Explain why?
13. How can you make balance between environment and development?
14. What is Narmada Bachao Andolan?
15. Why is the re- use of material is better than recycling in saving the environment?
16. In what way industry is affecting the forest?
17. Explain various steps of rooftop rain water harvesting.
18. How can we make wise use of rains?
19. What are the various remedial measures to conserve wild life?
20. What steps do you take at your home in order to be environmental friendly?
21. Judicious use of oil and petroleum is very important. How can this be achieved?
22. Rainfall, soil conservation and depleting forest resources are interlinked with one another. Explain how they are related to one another.
23. Government is sole responsible for the protection of environment and individuals are not to be bothered about it. Give your comments on the statement.
24. What are the advantages of ground water over surface water?

CHAPTER - 1

CHEMICAL REACTIONS AND EQUATIONS

1. State which of the following chemical reactions will take place or not, giving suitable reason for each.

$Zn(s) + CuSO_4(aq)$ ----> $ZnSO_4(aq) + Cu(s)$
$Fe(s) + ZnSO_4(aq)$ ----> $FeSO_4(aq) + Zn(s)$
$Zn(s) + FeSO_4(aq)$ ----> $ZnSO_4(aq) + Fe(s)$

$Zn_{(s)} + CuSO_{4_{(aq)}} \rightarrow ZnSO_{4_{(aq)}} + Cu_{(s)}$

In this reaction, zinc displaces copper from copper sulphate solution so that copper is set free. This displacement reaction takes place because zinc is more reactive than copper.

$Fe_{(s)} + ZnSO_{4_{(aq)}} \rightarrow FeSO_{4_{(aq)}} + Zn_{(s)}$

This reaction does not take place because Fe is less reactive than Zn.

$Zn_{(s)} + FeSO_{4_{(aq)}} \rightarrow ZnSO_{4_{(aq)}} + Fe_{(s)}$

In this reaction, Zn displaces Fe from $FeSO_4$ solution so that Fe is set free. This displacement reaction takes place because zinc is more reactive than Fe.

2. A housewife wanted her house to be whitewashed. She bought 10kg of quick lime from the market and dissolved it in 30 litres of water. On adding lime to water she noticed that the water started boiling even when it was not being heated. Give reason for her observation. Write the corresponding chemical equation and name the product formed.

Reaction between quick lime (CaO) and water is highly exothermic, so the water started boiling even when it was not being heated.

$CaO + H_2O \rightarrow Ca(OH)_2 + Heat$

Calcium hydroxide (slaked lime)

3. Four metals A, B, C and D are, in turn, added to the following solutions one by one. The observations made are tabulated below:

Metal	Iron II Sulphate	Copper II Supphate	Zinc Supphate	Silver Nitrate
A	No reaction	Displacement	----	----
B	Displacement	----	No reaction	-----
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

Answer the following questions based on above information.

(i) Which is the most active metal and why?

(ii) What would be observed if B is added to a solution of copper (II) sulphate and why?

(iii) Arrange the metals A, B, C and D in order of increasing reactivity.

(iv) Container of which metal can be used to store both zinc sulphate solution and silver nitrate solution.

(v) Which of the above solutions can be easily stored in a container made up of any of these metals?

CHAPTER - 2

ACIDS, BASES AND SALTS

1. During summer season, a milkman usually adds a very small amount of baking soda to fresh milk. Give one reason.

A milk man adds a small amount of baking soda to fresh milk to delay the curding of milk. In alkaline medium the bacterial action involving the conversion of milk to curd gets slow down.

2. Baking soda is used in small amount in making bread and cake. It helps to make these soft and spongy. An aqueous solution of baking soda turns red litmus blue. It is also used in soda acid fire extinguisher.

Use this information to answer the following questions:

(i) How does Baking Soda help to make cakes and bread soft and spongy?

(ii) How does it help in extinguishing fire?

(iii) Is the pH value of baking soda solution lesser than or greater than 7?

(i) When baking powder is mixed with water (present in dough used for baking cake or bread), then sodium hydrogen carbonate reacts with tartaric acid to evolve CO_2 gas. This CO_2 gas thus produced gets trapped in the wet dough and bubbles out slowly while baking. This makes the cake (or bread) to 'rise' and it becomes soft and spongy.

(Baking powder is a mixture of baking soda (sodium hydrogen carbonate) and a mild, edible acid such as tartaric acid.)

(ii) Soda acid type fire extinguishers contain a solution of sodium hydrogen carbonate and H_2SO_4 in separate containers inside them. When the knob of the fire extinguisher is pressed, then H_2SO_4 mixes with sodium hydrogen carbonate solution to produce a lot of CO_2 gas. The pressure of this CO_2 gas forces a stream of liquid and falls on the burning substance. The CO_2 gas forms a blanket around the burning substance and cuts off the supply of air to the burning substance. Since the supply of air is cut off, the process of burning stops and fire gets extinguished.

3. Answer the following:

(a) Why is Plaster of Paris written as $CaSO_4 \cdot \frac{1}{2} H_2O$? How is it possible to have half a water molecule attached to $CaSO_4$?

(b) Why is Sodium Hydrogen Carbonate an essential ingredient in antacids.?

(c) When electricity is passed through an aqueous solution of sodium chloride, three products are obtained. Why is the process called chlor-alkali?

(a) It is not possible to have half a molecule of water. The formula $CaSO_4 . \frac{1}{2}H_2O$ actually means that two molecules of $CaSO_4$ share one molecule of water so that the effective water of crystallisation for one $CaSO_4$ unit comes to half a molecule of water. The formula of plaster of pairs can be written as $(CaSO_4)_2 .H_2O$.

(b) Sodium hydrogen carbonate is used as an antacid in medicine to remove acidity of the stomach. Being sodium hydrogen carbonate a mild alkali it neutralises the excess acid present in the stomach and relieves indigestion.

(c) When electricity is passed through a concentrated solution of sodium chloride, it decomposes to form sodium hydroxide, chlorine and hydrogen.

$$2NaCl_{(aq)} + 2H_2O_{(l)} \xrightarrow{\text{Electrolysis}} 2\,NaOH_{(aq)} + Cl_{2(g)} + H_{2(g)}$$

The process of electrolysis of sodium chloride solution is called chlor-alkali process because of the products formed are chlorine (chlor) and sodium hydroxide (alkali).

4. Dry Hydrogen Chloride gas does not turn blue litmus red whereas Hydrochloric acid does. Give one reason.

Dry HCl gas does not contain any hydrogen ions in it, so it does not show acidic behaviour. Hence dry HCl does not change the colour of dry litmus paper. However when HCl gas dissolves in water, it forms hydrogen ions and hence changes the colour of blue litmus to red.

5. What happens when a few drops of water are added to anhydrous copper sulphate? Explain with the help of an equation?

When water drops are added to anhydrous copper sulphate, it gets hydrated and turns blue due to the formation of hydrated copper sulphate.

The crystalline shape is regained

$$CuSO_4 + 5H_2O \rightarrow CuSO_4.5H_2O$$

Anhydrous copper sulphate — water — Hydrated copper sulphate

Thus anhydrous copper sulphate turns blue on adding water. This property of anhydrous copper sulphate is used to detect the presence of moisture (water) in chemical substances.

6. Consider the following salts:

Na_2CO_3, NaCl, NH_4Cl, CH_3COONa, K_2SO_4, $(NH_4)_2SO_4$.

Which of these salts will give:

(a) acidic solutions (b) neutral solutions and

(c) basic or alkaline solution.

(a) NH_4Cl, $(NH_4)_2SO_4$

(b) NaCl, K_2SO_4

(c) Na_2CO_3, CH_3COONa.

CHAPTER - 3

METALS AND NON-METALS

1. Alloys are used in electrical heating devices rather than pure metals. Give one reason.

Resistivity of an alloy is higher than that of pure metals which form the alloy.

2. A student has been collecting silver coins and copper coins. One day she observed a black coating on silver coins and a green coating on copper coins. Which chemical phenomenon is responsible for these coatings? Write the chemical name of black and green coatings.

The black coating on silver coin and green coating on copper coin are due to corrosion.

- Silver coin becomes black on exposure to air, because it reacts with sulphur in the air to form a coating of silver sulphide.
- Copper coin reacts with moist carbon dioxide in the air to produce a green coating. This green substance is copper carbonate.

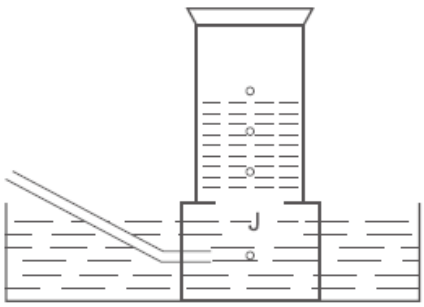
3. A metal M forms an oxide having the formula M_2O_3. It belongs to the 3rd period of the modern periodic table. Write the atomic number and valency of the metal.

Atomic number of the metal = 13 (A*l*)

Valency of the metal = 3

(The electronic configuration of Aluminium is 2, 8,3. It can lose its 3 valence electrons to achieve the nearest inert gas electronic configuration 2, 8. So its valency is 3.)

4. A metal is treated with dilute sulphuric acid. The gas evolved is collected by the method shown in the following figure.



Answer the following.

(i) Name the gas.

(ii) Name the method of collection of the gas.

(iii) Is the gas soluble or insoluble in water?

(iv) Is the gas lighter or heavier than air?

(i) Hydrogen gas.

(ii) Downward displacement of water.

(iii) Insoluble in water. (iv) Hydrogen is lighter than air.

5. In a solution of silver nitrate, a copper plate was dipped. After some time, silver from the solution was deposited on the copper plate. Which metal is more reactive, copper or silver? How?

A more reactive metal displaces a less reactive metal from its salt solution. Here, copper metal is displacing silver from silver nitrate solution (which then gets deposited on copper plate), therefore, copper metal is more reactive than silver metal.

6. An element react with oxygen to form an oxide which dissolves in dilute hydrochloric acid. The oxide formed also turns a solution of red litmus blue. Is the element a metal or a non-metal? Explain your answer.

Here the oxide of the given element dissolves in an acid, therefore, the oxide must be basic in nature. Moreover, since the oxide turns red litmus solution blue, this also confirms that the oxide is basic in nature. Basic oxides are formed by metals , so the element in this case is a metal.

7. Four elements A, B, C and D have the following electron arrangements in their atom.

A 2, 8, 6 B 2, 8, 8 C 2, 8, 8, 1 D 2, 7

(a) What type of bond is formed when element C combines with element D? (b) What will be the formula of the compound formed by the reaction of A and C?

(a) Ionic bond (b) C_2A

CHAPTER - 4

CARBON AND ITS COMPOUNDS

1. An organic compound 'A' is widely used as a preservative in pickles and has a molecular formula $C_2H_4O_2$. This compound reacts with ethanol to form a sweet smelling compound 'B.

(i) Identify the compound 'A'

(ii) Write the chemical equation for its reaction with ethanol to form compound 'B'.

(iii) How can we get compound 'A' back from 'B'?

(iv) Name the process and write corresponding chemical equation.

(v) Which gas is produced when compound 'A' reacts with washing soda? Write the chemical equation.

(i) Compound is CH_3COOH

(ii) $CH_3COOH + C_2H_5OH \rightleftharpoons CH_3 - COOC_2H_5 + H_2O$

(Ethanoic acid) Ethanol (B) Ethyl ethanoate (sweet smelling) Water

(iii) On hydrolysis of compound B, we get compound A and ethanol.

(iv) Hydrolysis of Ester

A carboxylic ester gets hydrolysed to give parent carboxylic acid and alcohol when heated with aqueous solution of an acid or alkali.

$CH_3COOC_2H_5 + H_2O \rightleftharpoons CH_3COOH + C_2H_5OH$

ethyl ethanoate ethanoic acid ethanol

Hydrolysis in the presence of alkali is much faster then that in the presence of an acid. This is because OH^- acts as a catalyst.

Esters on hydrolysis yield corresponding salt of carboxylic acid and alcohol.

$$CH_3COOC_2H_5 \xrightarrow{NaOH} CH_3COONa + C_2H_5OH$$

(v) CO_2 gas

The chemical equation is

$2CH_3COOH + Na_2CO_3 \rightarrow 2CH_3COONa + CO_2 + H_2O$

Ethanoic acid Sodium carbonate Sodium ethanoate Carbon dioxide Water

2. (a) Why does carbon form largest number of compounds?

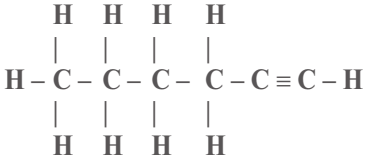
(b) Why are some of these compounds called saturated and other unsaturated?

(c) Which of these two is more reactive?

(d) Write the names of the compounds.

(i) $CH_3 - CH_2 - Br$

(ii)



a. Carbon forms largest number of compounds because, carbon atoms can link with one another by means of covalent bonds to form long chains (rings) of carbon atoms. This property is known as catenation.

b. A hydrocarbon in which the carbon atoms are connected by only single bonds is called a saturated hydrocarbon.

A hydrocarbon in which the carbon atoms are connected by a 'double bond' or a 'triple bond' is called unsaturated hydrocarbon.

c. Unsaturated compounds are highly reactive.

d. (i) Bromoethane

(ii) 1 - hexyne

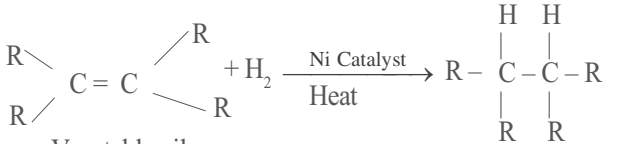
3. Two carbon compounds A and B have the molecular formula C_3H_8 and C_3H_6 respectively. Which one of the two is most likely to show addition reaction? Justify your answer. Explain with the help of a chemical equation. How an addition reaction is useful in vegetable ghee industry.

Compound A : $CH_3 - CH_2 - CH_3$

Compound B : $CH_3 - CH = CH_2$

Compound B is most likely to show addition reaction. It is an unsaturated compound. Addition reactions are shown by all unsaturated hydrocarbons containing a double bond or a triple bond.

The addition of hydrogen to the vegetable oil leads to the formation of vegetable ghee.



Vegetable oil (unsaturated) → Vegetable ghee (saturated)

3. Explain why soaps are not effective cleansing agents in hard water.

Hard water contains Ca^{2+} and Mg^{2+} ions. Soap forms precipitate with these ions and is thus thrown out of solution. So soaps are not effective cleansing agent in hard water. On the other hand, detergent does not give precipitate with metal ions.

CHAPTER - 5

PERIODIC CLASSIFICATION OF ELEMENTS

1. Choose the correct symbol for each of the descriptions provided below.

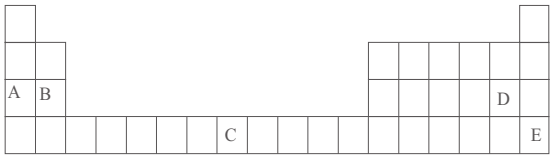
H	**He**	**Ra**	**Kr**	**Al**	**F**

(i) Although I sit on top of the alkali metal, I am not one of them.
(ii) I am in group 13 and period - 3
(iii) I am the heaviest of the alkaline earth metals.
(iv)I am a noble gas in period 4
(v) I am a halogen in period 2
(vi) I am the second most common element in the universe. I am the top of the noble gases.

Answer:

(i) H (ii) Al (iii) Ra (iv) Kr (v) F (vi) He

2. Some elements in the periodic table are represented by the letters A to E and are contained in the simplified table below.



Choose from A to E
(a) a noble gas (b) a halogen
(c) the most reactive metal
(d) the most reactive non-metal

Answer:

(a) E (b) D (c) A (d) D

3. Write the atomic number of the element present in the third period and seventeenth group of the periodic table.

In the third period filling up occurs only in 3s and 3p orbitals. Therefore, in this period there are only two s- and six p- block elements. Third period starts with z = 11 and ends at z = 18, therefore elements with z = 11 and z = 12 are s - block elements. The next 6 elements with z = 13 to18 are p - block elements and belong to groups 13, 14, 15, 16, 17 & 18. Therefore the element which will be in seventeenth group will have z = 12 + 5 = 17

4. The following table shows the position of six elements A, B, C, D, E and F in the periodic table.

Periods / Groups	1	2	3 to 12	13	14	15	16	17	18
2.	A					B			C
3.		D			E				F

Using the above table answer the following questions:

(a) Which element will form only covalent compounds?
(b) Which element is a metal with valency 2?
(c) Which element is a non-metal with valency of 3?
(d) Out of D and E, which one has a bigger atomic radius and why?
(e) Write a common name for the family of elements C and F.

(a) Elements E and B
(b) Element D (c) Element B
(d) Out of D and E, D has bigger atomic radius. This is because on moving from left to right in a periodic table atomic radius decreases.
(e) Noble gases (Inert gases).

CHAPTER1
Chemical Reactions and Equations

1. $CuSO_4 + Zn \rightarrow Cu + ZnSO_4$ This reaction is an example of a:
   a. Combination reaction.
   b. Double displacement reaction.
   c. Decomposition reaction.
   d. Displacement reaction.
2. What happens when dilute Sulphuric acid is added to Zn granules? Tick the correct answer.
   a. Hydrogen gas and Zinc chloride are produced.
   b. Chlorine gas and Zinc hydroxide are produced.
   c. No reaction takes place.
   d. Zinc salt and water are produced.
3. Translate the following statements into chemical equations and then balance it.
   Barium chloride reacts with aluminium sulphate to give aluminium chloride and a precipitate of barium sulphate.
   a. $BaCl_2 + Al_2(SO_4)_3 \rightarrow AlCl_3 + BaSO_4$
   b. $3BaCl_2 + Al_2(SO_4)_3 \rightarrow 2\ AlCl_3 + 3BaSO_4$
   c. $BaCl_2 + AlSO_4 \rightarrow AlCl_2 + BaSO_4$
   d. $BaCl_3 + Al(SO_4)_3 \rightarrow AlCl_3 + Ba(SO_4)_3$
4. Identify the type of reaction in each case.
   Zinc carbonate(s) → Zinc oxide(s) + Carbon dioxide(g)
   Hydrogen(g) + Chlorine(g) → Hydrogen chloride(g)
   a. Combination, Decomposition
   b. Double displacement, Combination
   c. Decomposition, Combination
   d. Displacement, Decomposition

5. The balancing of chemical equations is in accordance with:
   a. Law of combining volumes
   b. Law of constant proportions
   c. Law of conservation of mass
   d. Both b and c
6. Which of the statements about the reaction below are incorrect? $Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$
   a. Iron is getting reduced.
   b. Carbon dioxide is getting oxidised.
   c. Carbon monoxide is getting oxidised.
   d. Iron oxide is getting reduced.
      i. a&b
      ii. a & c
      iii. c & d
      iv. all
7. What type of reaction is respiration
   a. Exothermic
   b. Endothermic
   c. Reduction reaction
   d. Combination reaction
8. Identify the substances that are oxidised and the substances that are reduced in the following reactions. $CuO(s) + H_2(g) \rightarrow Cu(s) + H_2O(l)$
   a. Cu is oxidised, H_2O is reduced
   b. CuO is oxidised, H_2O is reduced
   c. H_2 is oxidised, CuO is reduced
   d. H_2 is oxidised, H_2O is reduced
9. A solution of a substance 'X' is used for white washing. Name the substance 'X' and write its formula.
   a. Lime stone, $CaCO_3$
   b. Lime , $CaCO_3$
   c. Calcium oxide , CaO
   d. Calcium carbonate , $CaCO_3$
10. Write the balanced reaction of Calcium oxide with water and state what type of reaction is this
    a. $CaO + H_2O \rightarrow CaOH + H_2$, displacement
    b. $CaO + H_2O \rightarrow Ca(OH)_2$, combination
    c. $CaO + H_2O \rightarrow Ca(OH)_2$, decomposition
    d. $CaO + H_2O \rightarrow CaOH$, combination

CHAPTER2

Acids, Bases and Salts

1. You have been provided with three test tubes. One of them contains distilled water and the other two contain an acidic solution and a basic solution, respectively. Which of them will turn red litmus to blue.
    a. Acid
    b. Base
    c. Water
    d. All of the above
2. Acids react with metals to liberate _____gas
    a. Carbon dioxide
    b. Carbon monoxide
    c. Hydrogen
    d. Water
3. Acids react with metal carbonates to liberate _____ gas
    a. Carbon dioxide
    b. Carbon monoxide
    c. Hydrogen
    d. Water
4. Lime water turns milky when carbon dioxide is passed due to the formation of _____.
    a. $CaCO_3$
    b. CaO
    c. CO_2
    d. $CaSO_4$
5. The milkiness (on passing excess carbondioxide gas through lime water) disappears due to the formation of:
    a. Calcium carbonate $CaCO_3$
    b. Calcium hydrogen carbonate $CaHCO_3$
    c. Calcium oxide CaO
    d. Calcium Nitrate $Ca(NO_3)_2$
6. Acids react with bases to form salt and water. This reaction is known as:
    a. Combination
    b. Decomposition
    c. Neutralisation
    d. reduction
7. A calcium compound reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. Identify the compound and the gas evolved.
    a. Calcium Carbonate, Carbon dioxide
    b. Calcium chloride, carbondioxide
    c. Calcium oxide, hydrogen
    d. Calcium carbonate, hydrogen
8. How is the concentration of hydronium ions (H_3O^+) affected when a solution of an acid is diluted?
    a. Increases
    b. Decreases
    c. Remains the same
    d. Becomes zero
9. Why does dry HCl gas not change the colour of the dry litmus paper?
    a. Blue litmus becomes dry in presence of dry HCl gas
    b. No H_3O^+ ions will be present, litmus changes colour only in the presence of H_3O^+ ions

c. HCl gas acts a dehydrating agent
d. None of the above

10. When a bee stings, immediately a paste of lime is put on the sting. Why?
    a. Bee sting is made of a base
    b. Bee sting contains an acid called formic acid. It gets neutralised with CaO .
    c. Bee sting is acidic due to hydrochloric acid and this is neutralised
    d. All of the above.
11.

CHAPTER3Metals and Non-metals

1. An example of a metal which is a liquid at room temperature
    a. Zinc
    b. Copper
    c. Mercury
    d. Bromine
2. Gold is used in making ornaments because it is:
    a. Lusturous
    b. Unreactive
    c. Malleable
    d. All of the above
3. You are given two statements a and b, select the correct inference from this:
    a. Metals conduct heat.
    b. Diamond is the best conductor of heat.
        i. Hence diamond is a metal
        ii. Statement a is correct
        iii. Statements a and b is correct
        iv. None of the above
4. A list of metals arranged in the order of their decreasing activities is known as:
    a. Periodic table
    b. Reactivity series
    c. Newland's law of octaves
    d. All of these
5. Sodium is kept immersed in kerosene oil because:
    a. It reacts with moisture in the air
    b. Immersing in kerosene cuts off the supply of air
    c. The reaction of sodium with air is very violent.
    d. All of the above.

6. Samples of four metals A, B, C and D were taken and added to the following solution one by one. The results obtained have been tabulated as follows
    a. Which is the least reactive metal?
        i. A ii. B iii. C iv. D

Metal	Iron(II) sulphate	Copper(II) sulphate	Zinc sulphate	Silver nitrate
A	No reaction	Displacement		
B	Displacement		No reaction	
C	No reaction	No reaction	No reaction	Displacement
D	No reaction	No reaction	No reaction	No reaction

7. In the above table arrange the metals A, B, C and D in increasing order of reactivity:
   a. D < A < C < B
   b. D < C < B <A
   c. D < C < A < B
   d. C < D < A < B
8. What are the ions present in Na_2O?
   a. Na^+, O^-
   b. Na^{2+}, O^{2-}
   c. Na^{2+}, O^-
   d. Na^+, O^{2-}
9. Among the following select the metal found free in nature:
   a. Au b. Cu c. Na d. Mg
10. Ores mined from the earth are usually comtaminated with large amounts of impurities such as soil, sand, etc called_____.
    a. Gravel
    b. Gangue
    c. Sand
    d. Granite

CHAPTER4

Carbon and itsCompounds

1. –C=O represents the functional group:
   a. Alcohols
   b. Carboxylic acids
   c. ketones
   d. Acids

2. A functional group mainly determines the
   a. Physical properties
   b. Chemical properties
   c. Both
   d. None of these

3. 100% pure ethanol is called
   a. Rectified spirit
   b. Absolute alcohol
   c. Denatured alcohol
   d. Power alcohol

4. Carboxylic acid containing one carbon atom is

a. Formic acid
b. Acetic acid
c. Citric acid
d. Vinegar

5. The odour of acetic acid resembles that of:
   a. Tomato
   b. Kerosene
   c. Vinegar
   d. Lemon juice

6. Sodium carbonate solution is added to dilute ethanoic acid. It is observed that :
   a. A gas evolves
   b. A solid settles at the bottom
   c. The mixture becomes warm
   d. The colour of the mixture

7. 2ml of acetic acid is added to 5ml of water and was shaken up for 1minute, it was noticed that:
   a. The acid formed a separate layer on the top of water
   b. Water formed a separate layer on the top of the acid
   c. A clear and homogeneous solution is formed
   d. A pink and clear solution is formed

8. On adding $NaHCO_3$ to acetic acid, a gas is evolved which turns lime water milky due to the formation of:
   a. Calcium Carbonate
   b. Calcium Hydroxide
   c. Calcium bicarbonate
   d. Calcium Acetate

9. Which among the following contains triple bond:
   a. C_2H_4
   b. C_2H_2
   c. C_3H_4
   d. C_2H_6

10. The number of covalent bonds in C_5H_{12} is:
    a. 15 b. 16 c. 17 d. 18

11. Which amongst the following does not conduct electricity:
    a. CH_3COOH
    b. C_3H_7OH
    c. HCOOH
    d. NaCl(aq)

12. Methane reacts with one mole of Chlorine in presence of sunlight to give _____. The reaction is called_____.
    a. Chloromethane, substitution
    b. Dichloromethane, addition

c. Trichloromethane, elimination
d. Tetra chloro methane, combustion

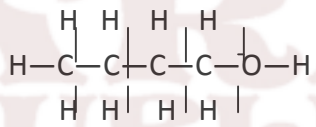
13. Catenation is maximum in:
a. Carbon
b. Oxygen
c. Sulphur
d. Phosphorous

14. Ethane and ethene can be distinguished by using:
a. Bromine water
b. Chlorine water
c. I_2
d. HCl

15. The number of isomers of C_6H_{14} are
a. 4 b. 5 c. 6 d. 7

16. Which of the following represents cyclohexane:
a. C_6H_{14}
b. C_6H_{12}
c. C_6H_{10}
d. C_6H_6

17. The IUPAC name of the following;



a. Butanal
b. Butanoic acid
c. Butanol
d. Pentane

18. Which of the following are members of the same homologous series:
a. CH_4 and C_2H_4
b. CH_3OH and CH_3Cl
c. C_2H_5OH and C_3H_7OH
d. CH_3OCH_3 and C_2H_5OH

19. The difference in the molecular formula and molecular mass of CH_4 and C_2H_6 is:
a. CH_3 and 12u
b. CH_2 and 12u
c. CH_3 and 14u
d. CH_2 and 14u

20. Which of the following statements about diamond and graphite is true?
a. They have same crystal structure
b. They have same degree of hardness
c. They have same electrical conductivity
d. They have same chemical properties.

CHAPTER5
Periodic Classification of Elements

1. The period that contains only gaseous elements are:

a. 1 b. 2 c. 3 d. 4

2. The longest and the shortest periods are:
   a. 1&6
   b. 2&6
   c. 6 &1
   d. 1&7
3. The number of elements present in the 2^{nd}, 3^{rd}, 4^{th} and 5^{th} periods of the modern periodic table are:
   a. 2,8,8,18
   b. 8,8,18,32
   c. 8,8,18, 18
   d. 8,18,18,32
4. The pairs of elements with the following atomic numbers have the same chemical properties:
   a. 13 & 12
   b. 3 &11
   c. 4&24
   d. 2 &1
5. Elements with atomic number 15 and mass number 31 is present in:
   a. Group 5 and period 4
   b. Group5 and period 3
   c. Group15 and period 3
   d. Group15 and period 4
6. Which of the following will form acidic oxide? An element with atomic number:
   a. 7 b. 11 c. 21 d. 19
7. Which amongst the following represents the correct order of decreasing metallic character of elements Na, Si, Cl, Mg, Al
   a. Cl> Si> Al> Mg> Na
   b. Na> Mg> Al> Si> Cl
   c. Na> Si> Mg> Al> Cl
   d. Al> Na> Si> Cl> Mg
8. Which of the following are characteristics of isotopes of an element?
   a. Isotopes of an element have same atomic masses
   b. Isotopes of an element have same atomic number
   c. Isotopes of an element show same physical properties
   d. Isotopes of an element have same chemical properties
      i. A, c, d
      ii. B, c, d
      iii. B and c
      iv. B and d
9. Where would you locate an element with electronic configuration 2, 8,7 in the modern periodic table?
   a. Group 7 and period 2
   b. Group7 and period 3
   c. Group 17 and period 3
   d. Group17 and period 3
10. Which of the given elements A, B , C, D and E with atomic numbers 2, 4, 8, 10 and 18 respectively belong to the same period?
   a. A, B, C
   b. B,C,D
   c. A,D,E
   d. B,D,E
11. Which of the following hydroxides are most basic:

a. $Be(OH)_2$ c. $Ca(OH)_2$

b. $Mg(OH)_2$ d. $Ba(OH)_2$

12. Which of the following is the correct order of size:

a. $I^+ > I^- > I$ c. $I > I^+ > I^-$

b. $I^- > I > I^+$ d. $I > I^- > I^+$

13. Which of the following is the correct order of size:

a. Cl< F< Br< I c. I<Br< Cl< F

b. F< Cl< Br< I d. Br< I< Cl< F

14. The lightest metal is :

a. Li b. Na c. K d. Mg

15. Which of the following has most non metallic character:

a. N b. C c. O d. F

16. The most metallic element in the fourth period is:

a. Ca b. K c. S d. P

17. An element has 13 protons. The group and period to which it belongs:

a. 3^{rd} period and 13^{th} group c. 3^{rd} period and 3^{rd} group

b. 2^{nd} period and 13^{th} group d. 2^{nd} period and 3^{rd} group

18. Which of the following elements would lose an electron easily:

a. K b. Na c. Ca d. Mg

19. Which of the following elements would accept an electron readily:

a. F b. Cl c. Br d. I

ANSWERS

CHAPTER1

Chemical Reactions and Equations

1. d	3. b	5. d	7. a	9. c
2. a	4. c	6. c	8. c	10. b

CHAPTER2:

Acids, Bases and Salts

1. b	2. c	3. a	4. a	5. b

6. c 7. a 8. a 9. b 10. b
11.

CHAPTER3: Metals and Non-metals

1. c 3. b 5. d 7. b 9. a
2. d 4. b 6. d 8. d 10. b

CHAPTER4:Carbon and itsCompounds

1. c 5. c 9. b 13. a 17. c
2. b 6. a 10. b 14. a 18. c
3. b 7. c 11. b 15. c 19. d
4. a 8. a 12. a 16. b 20. d

CHAPTER5Periodic Classification of Elements\

1. a 5. c 9. b 13. b 17. a
2. c 6. a 10. b 14. a 18. a
3. b 7. b 11. d 15. d 19. b
4. b 8. c 12. b 16. b

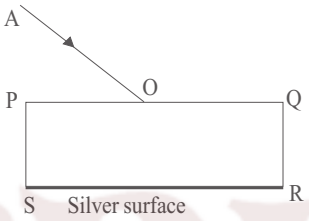
CHAPTER - 10

LIGHT - REFLECTION AND REFRACTION

1. The face of a person is 24 cm long and 20 cm wide. What is the minimum size of the mirror required to see the full face?

The size of the mirror required to see full face should be half the size of the face. Hence mirror should be 24/2 = 12 cm long and 20/2 = 10 cm wide. The mirror should be placed with longer side vertical and eyes kept at proper height.

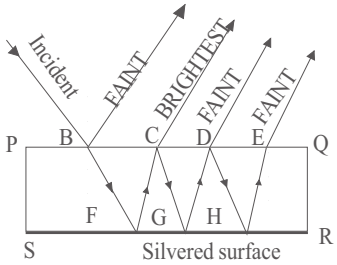
2. In the figure, a ray of light AO is incident on a glass black silvered on one surface. The ray suffers refractions as well as reflections.



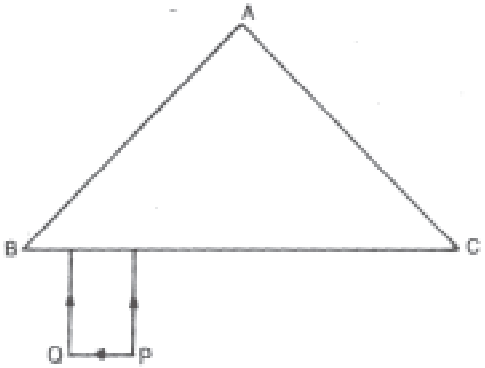
(i) Copy the diagram and trace out the path of refracted and reflected ray. Show at least 2 rays emerging out from surface PQ.

(ii) How many images are formed in the above case? Which image is the brightest?

This is a case of both refraction as well as reflection. The ray suffers a number of reflections and refractions at B, C, D, E and also reflection at SR. First image formed due to reflection only at B will be faint. A major portion of light at B is refracted striking SR at F. It gets reflected from here and strikes PQ at C. Major portion refracts and forming the brightest image shown in figure. Small portion of light is reflected towards CG. The process continues forming a large number of faint images. Theoretically there will be infinite images but practicaly, we shall have one faint image before the brightest image and 3-4 on the other side of brightest image. Remaining will be too faint to be visible.



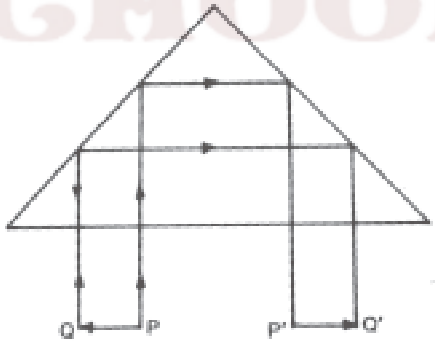
3. Diagram shows a right angled prism of refractive index 1.5. An object PQ is placed infront of its base BC. Copy the diagram.



(i) Complete the diagram showing the image produced by the prism.

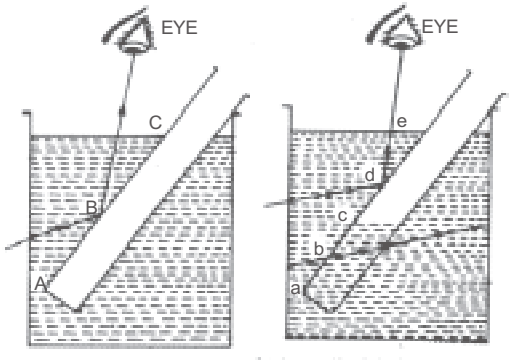
(iii) Name the instrument in which such a prism is used.

The complete diagram is given below. Such a prism is used in prism binoculars and periscopes. Image gets inverted.



4. An empty test tube is placed slanting in water and viewed from above, what will you observe? What difference will it make when the tube is partially filled with water?

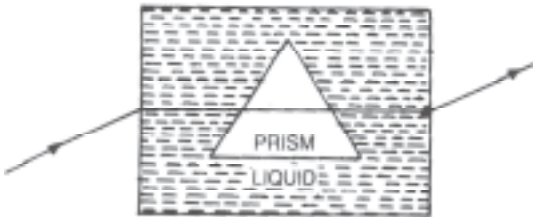
Portion of tube within water will appear to be silvery (like a mirror) due to total internal reflection. If the tube is partially filled with water only portion **ce** will appear silvery. The lower portion **ad** will not be silvery since total internal reflection takes only if there is an optically rarer medium also.



(a) empty tube
Empty tube appears silvery when placed in water and seen from top.

(b) partially filled tube
When partially filled tube is put only water upper portion appears silvery.

5. A glass prism is kept immersed in a liquid as shown in figure. A ray of light passes through the prism undeviated, what do you infer about the refractive index of the liquid as compared to that of glass?



The ray goes undeviated through the prism without any refraction. This is possible only if the refractive index of the liquid is the same as that of glass.

6. Refractive index of media A, B, C and D are

A	**1.33**
B	**1.52**
C	**1.44**
D	**1.65**

In which of the four media is the speed of light (i) maximum (ii) minimum.?

(i) The speed of light is maximum in the medium A.
(ii) The speed of light is minimum in the medium D.

CHAPTER - 11

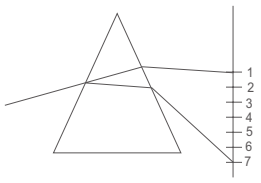
HUMAN EYE AND COLOURFUL WORLD

1. Why stars are twinkling, while the planets do not?

Different layers of atmosphere have different refractive indices. Even in a particular layer refractive index varies periodically due to atmospheric winds. These variations of atmospheric refraction are the causes of twinkling. In the case of stars these variations are seen because they are at large distance from the earth and hence their angular size is very small. Planets are near to the earth and their angular size is much larger. Hence variations of atmospheric refraction are not observable.

2. A beam of white light falling on a glass prism gets split up into seven colours marked 1 to 7 as shown in the diagram.

A student observed the spectrum on the screen and make the following statements about it.



a) The colours at positions marked 3 and 5 are similar to the colour of the sky and to the core of a hard boiled egg respectively.

Is the above statement made by the student correct or incorrect? Justify.

b) Which two positions correspond closely to the colour of

(i) a solution of potassium permanganate?

(ii) 'danger' or stop signal lights?

(a) The statement made by the student is incorrect. The white light splits into seven colours when passed through the prism and the colours at positions marked 3 and 5 are yellow and blue respectively which is just opposite to the given statement.

(b) (i) The position 7 corresponds to a solution of potassium permanganate.

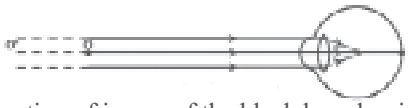
(ii) The position 1 corresponds to danger or stop signal lights.

3. A student finds the writing on the blackboard as blurred and unclear when sitting on the last desk in the classroom. He however, sees it clearly when sitting on the front desk at an approximate distance of 2m from the blackboard.

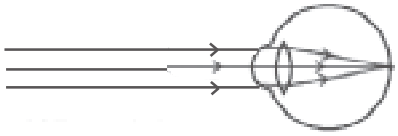
Draw ray diagrams to illustrate the formation of

image of the blackboard writing by his eye-lens when he is seated at the (i) last desk (ii) front desk. Name the kind of lens that would help him to see clearly even when he is seated at the last desk. Draw a ray diagram to illustrate how this lens helps him to see clearly.

(i) Formation of image of the black board writing when the student is seated at the last desk.



(ii) Formation of image of the black board writing when the student is seated at the front desk.



A concave lens of suitable power would help him to see clearly even when he is seated at the last desk.

4. Give reasons for the following:

(i) The sky appears to be blue during day time to a person on earth.

(ii) The sky near the horizon appears to have a reddish heu at the time of sunset and sun-rise.

(iii) The sky appears dark instead of blue to an astronaut.

(i) When sunlight passes through the atmospheric air, it is scattered by the suspended particles and molecules of air. The colour having shorter wavelength gets scattered the most. Scattering takes place in all directions and a portion of the scattered light reaches our eyes from all parts of the sky. The combined effect of the scattered colours is blue. Hence the sky appears blue.

(ii) Light from the sun near the horizon passes through thicker layers of air and larger distance in the earth's atmosphere before reaching our eyes. During sunrise, most of the blue light and shorter wavelengths are scattered away by the particles. Therefore, the light that reaches our eye is of longer wavelengths. This gives rise to the reddish appearance of the sun.

(iii) There is no atmosphere at such heights and so scattering is not prominent. Then, the sky seems to be dark for an astronaut.

CHAPTER - 12

ELECTRICITY

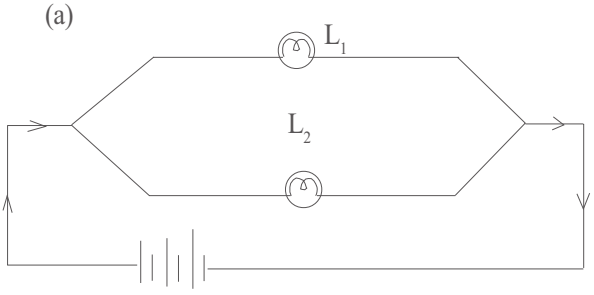
1. Two lamps, one rated 40 W at 220 V and the other 60 W at 220 V, are connected in parallel to the electric supply at 220 V.

(a) Draw a circuit diagram to show the connections.

(b) Calculate the current drawn from the electric supply.

(c) Calculate the total energy consumed by the two lamps together when they operate for one hour.

(a)



(b) $P = VI$

watt = volt × ampere

$40\ W = 220\ I_1$

$P = 40W$

$V = 220\ V$

$I = ?$

$I_1 = \frac{40}{220} = 0.1818$ A through 40 W lamp.

$I_2 = \frac{60}{220} = 0.273$ A through 60 W lamp

Total current $I = I_1 + I_2 = 0.1818 + 0.273$

$= 0.4548$ A

(c) Energy consumed by 40 W bulb

$$= \frac{\text{Wattage of bulb} \times \text{hours}}{1000}$$

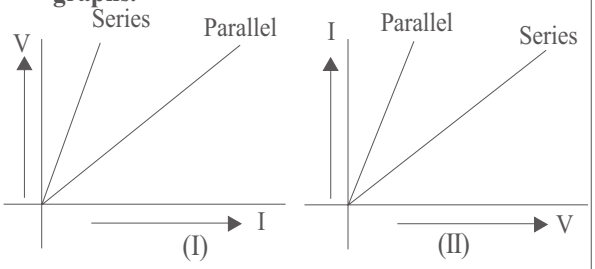
$$= \frac{40 \times 1 \text{ hour}}{1000} = 0.04 \text{ kWh}$$

Energy consumed by 60 W bulb

$$= \frac{60 \times 1\,\text{hour}}{1000} = 0.06\ \text{kWh}$$

Total energy consumed = 0.04 + 0.06 = 0.1 kWh.

2. Two students perform the experiments on series and parallel combinations of two given resistors R_1 and R_2 and plot the following V-I graphs.



Which of the graphs is (are) correctly labelled in terms of the words 'series' and parallel'. Justify your answer.

Graph (II) is correctly labelled because

(i) The voltage can be varied directly and corresponding variation in current can be plotted.

(ii) When resistors are connected in parallel the effective resistance decreases and current increases as shown in graph (II).

3. A student performs an experiment to study the magnetic effect of current around a current carrying straight conductor. He reports that

(i) the direction of deflection of the north pole of a compass needle kept at a given point near the conductor remains unaffected even when the terminals of the battery sending current in the wire are interchanged.

(ii) for a given battery, the degree of deflection of a N-pole decreases when the compass is kept at a point farther away from the conductor.

Which of the above observations of the student is incorrect and why?

The observation (i) is incorrect. When the terminals of the battery sending current in the circuit are interchanged, the direction of current changes and as a result the compass needle will be deflected in the opposite direction.

4. A bird sitting on 11,000V wire not hurt while a person touching 220V wire dies. Why?

Death is caused not due to potential but due to flow of current through the body. The current through a body flows due to potential difference and not due to potential. When a bird is sitting on 11,000 V cable, whole of its body is at 11,000 V. No current flows through it, since there is no potential difference. When a man standing on earth at(0V) touches a line wire at 220V, the current flows due to potential difference between line wire(220V) and his body(0V).

5. In a household electric circuit different appliances are connected in parallel to one another. Give two reasons. An electrician puts a fuse of rating 5A in that part of domestic electrical circuit in which an electrical heater of rating 1.5kW, 220V is operating. What is likely to happen in this case and why? What change, if any, needs to be made?

In a household electric circuit different appliances are connected in parallel because,

(i) In parallel connection if one of the appliances is switched off or gets fused, there is no effect on the other appliances and they keep on operating.

(ii) The same voltage of the mains line is available for all the electrical appliances.

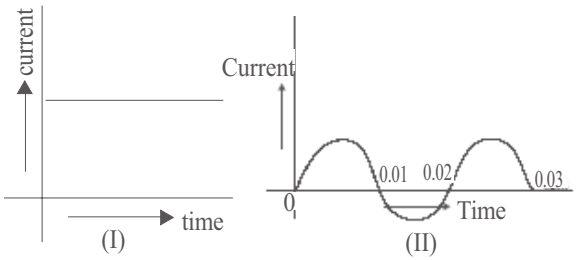
Power = 1.5 kW = 1.5 × 1000 W = 1500 W

V = 220 V Current drawn I = ?

$P = V \times I$ $\therefore\ I = \frac{P}{V} = \frac{1500}{220} = 6.8\text{A}$

ie, the current drawn by the electric heater is 6.8 amperes which is very high. But the fuse in this circuit is only of 5 ampere capacity. So when a high current of 6.8 A flows through the 5A fuse, the fuse wire will get heated too much, melt and break the circuit, cutting of the power supply. So the fuse of 5A is to be replaced with a rating more than 7A.

6. You are given following current-time graphs from two different sources:



(i) Name the type of current in two cases.

(ii) Identify any one source for each type of these currents.

(iii) What is the frequency of current in case II in India?

(iv) Use above graphs to write two difference between the current in two cases.

(i) In case I it is direct current

In case II it is alternating current

(ii) Alternating current - AC generator

Direct current - DC generator

(iii) The frequency of current in case II in India is 50 Hz.

(iv) Two differences between AC and DC:

(i) Direct current always flows in one direction. An alternating current flows periodically in alternate directions in the circuit.

(ii) A direct current has a constant value where as the value of alternating current varies from instant to instant.

7. Tap water conducts electricity whereas distilled water does not. Why?

Tap water conducts electricity due to the presence of ions in it. But distilled water which is ion free does not conduct electricity.

8. An electric geyser has the ratings 2000W, 220V marked on it. What should be the minimum rating, in whole number of a fuse wire, that may be required for safe use with this geyser?

Power P = 2000 W, V = 220 V

Current drawn I = ?

P = VI I = P/V = 9 A

Minimum rating of required fuse wire is 9 A

9. The electric power consumed by a device may be calculated by using either of the two expressions P = I^2R or P = $\frac{V^2}{R}$. The first expression indicates that it is directly proportional to R whereas the second expression indicates inverse proportionality.

How can the seemingly different dependence of P on R in these expressions be explained?

b) Explain the following:

(i) Why is tungsten used almost exclusively for filament of electric lamps?

(ii) Why are copper and aluminium wires usually used for electricity transmission?

When the resistors are connected in series, the current is constant and then power is directly proportional to the resistance R ie P = I^2R. But when resistors are connected in parallel, voltage remains constant and power is inversely proportional to R

ie P = $\frac{V^2}{R}$

(b) (i) Tungsten is used almost exclusively for filament of incandescent lamps because:

(a) Tungsten is a metal having very high resistance.

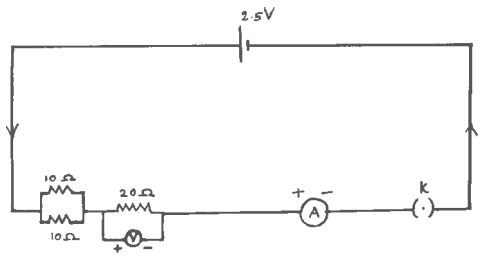
(b) Its melting point is very high (3410°C).

(c) It can be drawn into very thin wires.

(d) When current flows through it, it immediately becomes hot and emits light.

(ii) Copper and aluminium wires have very low resistance. Due to this, very little heat is produced and power loss is less. ie P = $\frac{V^2}{R}$. So they are usually used for electrical transmission lines.

10. You are given three resistors of 10 Ω , 10 Ω and 20 Ω, a battery of emf 2.5V, a key, an ammeter and a voltmeter. Draw a circuit diagram showing the correct connections of all given components such that the voltmeter gives a reading of 2.0V.



Total resistance = 20 + 5 = 25 Ω

I = $\frac{V}{R}$ = $\frac{2.5}{25}$ = 0.1

p.d across 20 Ω resistance = IR = 0.1 × 20 = 2V

11. A household uses the following electric appliances:

(i) Refrigerator of rating 400W for ten hours each day.

(ii) Two electric fans of rating 80W each for twelve hours each day.

(iii) Six electric tubes of rating 18W each for 6 hours each day.

Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00.

Energy consumed by 400 W refrigerator = P × t

$$= \frac{400 \times 10 \times 30}{1000} = 120 \text{ kWh}$$

Energy consumed by two electric fans of rating 80 W

$$= \frac{2 \times 80 \times 12 \times 30}{1000} = 57.6 \text{ kWh}$$

Energy consumed by six electric tubes of rating 18 W

$$= \frac{6 \times 18 \times 6 \times 30}{1000} = 19.44 \text{ kWh}$$

Total energy consumed = 120 + 57.6+ 19.44*l*
= 197.04 kWh

∴ Electric bill of the household for the month of June = 197.04 × 3 = Rs. 591

12. What is the meaning of the term 'frequency' of an alternating current? What is its value in India?

Why is an alternating current considered to be advantageous over direct current for long range transmission of electric energy?

Alternating current changes its direction periodically. The no. of times it changes per second is meant by the term 'frequency'.

In India frequency of AC is 50 Hz. Alternating current is considered to be advantageous over direct current for long range transmission of electric energy because electric power can be transmitted over long distances without much loss of energy.

CHAPTER - 13

MAGNETIC EFFECTS OF ELECTRIC CURRENT

1. A student performs an experiment to study the magnetic effect of current around a current carrying straight conductor. He reports that

(i) the direction of deflection of the north pole of a compass needle kept at a given point near the conductor remains unaffected even when the terminals of the battery sending current in the wire are interchanged.

(ii) for a given battery, the degree of deflection of a N-pole decreases when the compass is kept at a point farther away from the conductor.

Which of the above observations of the student is incorrect and why?

The observation (i) is incorrect. When the terminals of the battery sending current in the circuit are interchanged, the direction of current changes and as a result the compass needle will be deflected in the opposite direction.

2. Explain the meaning of the word 'electromagnetic' and 'induction' in the term electromagnetic induction. On what factors does the value of induced current produced in a circuit depend? Name and state the rule used for determination of direction of induced current. State one practical application of this phenomenon in everyday life.

The word 'electromagnetic' means that electricity is produced from magnetism. The word 'induction' means there is no physical connection between the magnetic field and the conductor. Thus the production of electricity from magnetism is called electromagnetic induction.

The magnitude of induced current depends on

(i) the nature of the core material of the solenoid.

(ii) the number of turns in the coil

(iii) strength of the magnet.

(iv) The speed of rotation of coil .

Fleming's right hand rule-Hold the thumb, forefinger and the central finger of your right hand at right angles to one another. Adjust your right hand in such a way that the forefinger points in the direction of magnetic field; the thumb in the direction of motion of the conductor, then the direction in which the central finger points, gives the direction of induced current in the conductor.

Application - Electric generator.

CHAPTER - 14

SOURCES OF ENERGY

1. Which way of using cow-dung as fuel for domestic use is better: use of cow-dung cakes or use of cow-dung in a biogas plant? Give three reasons in support of your answer.

When cow-dung burns, it produces a lot of smoke, which causes air pollution as well as loss of very useful elements. However, the use of cow-dung in biogas plant is better because of the following reasons:

(i) biogas burns without smoke

(ii) biogas produces a large amount of heat.

(iii) the residue (slurry) left in the plant is rich in nitrogeneous and phosphorus compounds and can be used as manure.

2. Classify the following as renewable and non-renewable sources of energy.

Wind energy, biogas, solar energy, firewood, cow-dung cakes, Naphtha, coal, kerosene, LPG, petrol, natural gas, diesel, tidal energy, ocean thermal energy, geothermal theory, biomass.

Renewable sources	Non-Renewable sources
• Wind energy • solar energy • firewood • cow-dung cakes • biogas • tidal energy • ocean thermal energy • biomass • geothermal energy	• Kerosene • LPG • petrol • natural gas • diesel • naphtha • coal

3. Find the situations where solar panels are made use of . What are the drawbacks of solar panel? Find out and list them.

(i) To light street lamps (ii) To work TV, radio etc. at places where electric power is not available (iii) activate solar lamps taken to sea (iv) to operate traffic signal lights (v) to operate electronic watches and calculators.

Drawbacks

(i) In order to store electric power, a battery is required.

(ii) There must be an arrangement to convert DC into AC.

(iii) All these cause great expense. That is the total cost increases.

4. Hydrogen is a combustible gas. When it burns, it releases a lot of heat. No poisonous gas is produced when it burns. Then why is hydrogen not used as fuel in our daily life?

Hydrogen, when buns in air, there is the possibility of an explosion. Moreover it is not easy to store hydrogen safely. So hydrogen is not used as a fuel in our day to day life.

CHAPTER10

Light – Reflection & Refraction

Choose the correct answer from the following.

1. Coin placed in a bowl when seen from a place just disappears. When water is poured into the bowl without disturbing the coin , the coin
   a. Will not be seen
   b. Appears above the water surface
   c. Becomes visible again
   d. Appears very much deep inside the water

2. Nature of the image formed by a convex mirror is
   a. Real, inverted, diminished
   b. Virtual, erect, diminished
   c. Real , inverted , enlarged
   d. Virtual, erect, enlarged

3. The property of a mirror used in burning a paper is
   a. Rays from an object placed at a large distance in a concave mirror after reflection forms the image at the Focus
   b. Rays from an object placed at Focus after reflection in a concave mirror forms the image at a very large distance.
   c. Rays from an object placed at a large distance in a convex mirror after reflection forms the image at the Focus
   d. Rays from an object placed between F and 2F in a concave mirror after reflection forms the image beyond the Focus

4. The focal length of a concave mirror is 10cm. The position of the object that is useful for getting an enlarged image which can be caught on a screen is
   a. Placed at a distance of 5 cm. from the pole of the mirror
   b Placed at a distance of 35 cmfrom the pole of the mirror
   c. Placed at a distance of 15 cmfrom the pole of the mirror
   d. Placed at a distance of 4. 5 cmfrom the pole of the mirror

5. The power of a lens is -3.5D. The lens is
   a. Convex
   B Plano-convex
   c. concave
   d. Plano-concave

6. Formula to find the refractive index of a medium is
   a. n=speed of light in the medium /speed of light in air
   b. n=1 /speed of light in air
   c. n=speed of light in the air/speed of light in the medium
   d. n=1 /speed of light in the medium

7. In case of refraction through a glass slab
   a. Incident ray is parallel to the refracted ray
   c. Angle of incidence is equal to the angle of refraction

b. Incident ray is parallel to the emergent ray

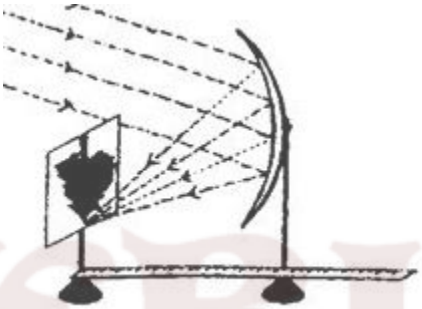
d. Angle of refraction is equal to the angle of emergence

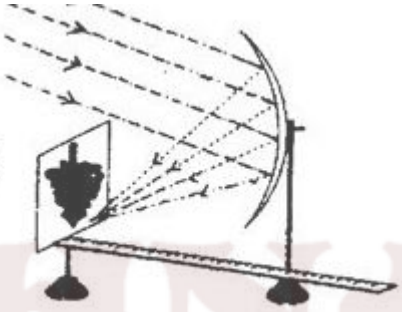
8. Mirror that can be chosen to view a tall building in a small mirror is
   a. Plane mirror
   b. Concave mirror
   c. Convex mirror
   d. Plano-Convex mirror

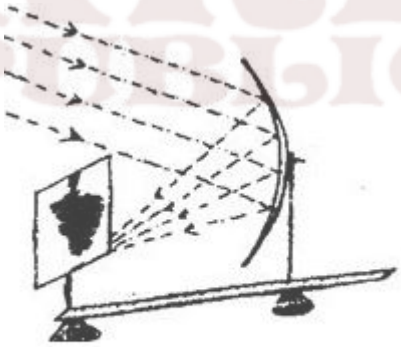
9. Mirror formula is
   a. 1/v-1/u =1/f
   b. M=v/u
   c. 1/v+1/u =1/f
   d. M=h/h'

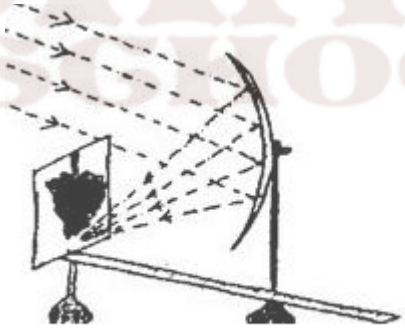
10. The mirror used by ENT specialists is
   a. Plane mirror
   b. Concave mirror
   c. Convex mirror
   d. Plano-convex mirror

11 11 Four students A, B, C and D carried out the experiment of finding out focal length

a 

c 

b 

d 

12 A student obtained a blurred image of an illuminated distant tower on a screen by using a convex lens In order to obtain sharp image of the tower on the screen ,he must shift the lens

a towards the screen

b away from the screen

c away from the lens

d either towards away or near the screen

13 An object AB is placed in front of a convex Lens at its principal focus The image will be formed at

a focus

b beyond C

c Between F & C

d infinity

14 When an object moves closer to a concave lens, the Image formed by it shifts

a Away from the lens
b Towards the lens
c First away and then towards the lens
d First towards and then away from the lens

15 When a ray of light passes from a denser medium to a rarer medium which angle is greater

a angle of incidence
b angle of refraction
c both
d none

CHAPTER11

The Human Eye and theColourful World

1. The ability of the eye to adjust its focal length according to the distance of the object and intensity of light falling on it is called

a. Power of adjustment of the eye
b. Power of accommodation of the eye
c. Power of enabling of the eye
d. Power of observation of the eye

2. The value of least distance of distinct vision for a normal human eye is

a. 35cm
b. 25cm
c. 45cm
d. 70cm

3. The defect of vision in which a person is able to see nearby objects clearly, but not far objects is called

a. Long sightedness or Hypermetropia
b. Short sightedness or myopia
c. cataract
d. Astigmatism

4. The defect in which a person is able to see far objects clearly but not nearby objects is called

a. Long sightedness or Hypermetropia
B Short sightedness or myopia
c. cataract
d. Astigmatism

5. Myopia can be corrected by using

a. Convex lens
B Plano convex lens
c. Concave lens
d. Plano- concave lens

6. Hypermetropia can be corrected by

a. Convex lens
b. Plano convex lens
c. Concave lens
d. Plano convex lens

7. The defect caused by the weakening of ciliary muscles is

a. Myopia
b. Hypermetropia
c. Presbyopia
d. Astigmatism

8. Splitting of white light into seven colours is called

a. Refraction
b. Reflection
c. Dispersion
d. Total internal reflection

9. A rainbow is always formed in a direction

a. Opposite to the sun
b. Below the sun
c. Above the sun
d. At a level of the sun

10. Twinkling of stars is due to

a. Atmospheric refraction of star light
b Atmospheric dispersion of star light
c. Atmospheric reflection of star light
d. Atmospheric refraction of sun light

11 The image formed on the retina of the human eye is:

a Virtual and erect
b real and inverted
c virtual and inverted
d real and erect

12 The persistence of image for normal human eye is

a (1/10) of a second
b (1/16) of a second
c (1/6) of a second
d (1/18) of a second

13 Which part of the eye refracts light entering the eye from external objects?

a Lens
b cornea
c iris
d pupil

14 The colour of the sky is blue during the day time and red during sunset and black at night due to:

a Scattering of light
b Atmospheric refraction
c Small particles present in the atmosphere
d All of the above

15 The phenomenon responsible for working of human eye is

a Refraction
b reflection
c Persistence of vision
d power of accommodation

CHAPTER 12

Electricity

1. 30 electrons are flowing through a electric wire in a time of 3sec. Then the amount of current flowing through the wire is

   a. 1.6×10^{-18}A
   c. 4.8×10^{-19} A
   b. 9×10^{-18}A
   d. 9×10^{-19} A

2. A current of 0.5A is drawn by a filament of an electric bulb for 10 minutes. The amount of electric charge flowing through the bulb is

   a. 400C
   c. 300C
   b. 500C
   d. 600c

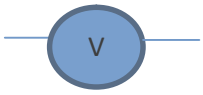
3. Current flows through a wire only when there is _____between the ends of the wire

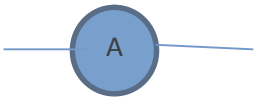
   a. Potential difference
   c. Work is done in moving a charge
   b. Potential difference at one end is more than at the other end
   d. All of the above

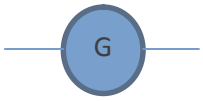
4. The SI unit of Potential difference is

   a. Volt
   c. JC^{-1}
   B $JA^{-1}s^{-1}$
   d. All of the above

5. The symbol used for denoting battery in a circuit is

   a.
   
   c.
   

   B
   

   d.
   

6. The amount of work done in moving a charge of 2C across two points having a potential difference of 24 V is

   a. 50J
   c. 24 J
   b. 48J
   d. 54J

7. The resistance of the wire when the length of the wire increases two times

   a. Becomes 2 times
   c. Becomes 3 times
   b. Becomes 6 times
   d. Becomes 4 times

8. Resistance of the wire is given by

a. R= V/I
c. R= I/V
b. R= IV
d. R= I^2V

9. The resultant resistance when three resistances 2ohms, 4ohms, 5ohms , when connected in series is
a. 12 ohms
c. 11ohms
b. 13 ohms
d. 15 ohms

10. Potential difference in a circuit in which components are connected in series
a. Remains the same across each component
c. Gets divided across each component
b. Gets distributed equally
d. Potential difference does not appear

11 The resultant value of resistances each of value r ohms when connected in parallel is x, when these resistances are connected in series the resultant resistance is :

a nx
c x/n
b n^2x
d x/n^2

12 Electric fuse is connected with:
a Live wire
c earthing
b neutral wire
d parallel to the line wire

13 To determine the equivalent resistance of two resistors, when connected in series, the correct way of connecting ammeter and voltmeter in the circuit is
a Both ammeter and voltmeter in series
c ammeter in parallel and voltmeter in series
b Both ammeter and voltmeter in parallel
d ammeter in series and voltmeter in parallel

14 While performing the experiment to study the dependence of current on potential difference ,if the circuit used to measure the current and voltage is kept in on position for a longer time ,then
a Voltmeter reading will change
c The resistor will get heated up changing the value of "R"
b Ammeter reading will change
d All of the above

15 In a voltmeter there are 20 divisions between 0 to 0.5 the least count of voltmeter is

a 0.0020
c 0.050
b 0.025
d 0.250

16 Student sets- up an electric circuit for the verification of Ohm's law. He observes that voltmeter reading gets in reversed direction. The student should

a Get the voltmeter replaced

b decrease resistance with the help of rheostat

c Reverse connection of voltmeter

d Connect voltmeter in series

CHAPTER 13

Magnetic Effects of Electric Current

1. SI unit of magnetic field strength is
   a. Oersted
   b. Ampere
   c. Volt
   d. Ohm

2. Inside the magnet the field lines run
   a. From south to north
   b. Away from north pole
   c. From north to south
   d. Away from the south pole

3. The magnetic field strength of a solenoid can be increased by inserting
   a. A wooden piece into it
   b. An iron piece into it
   c. A glass piece into it
   d. Paper roll into it

4. Strength of the magnetic field at a point in the space surrounding the magnet is measured by
   a. Thickness of the magnet
   B The resistance of it
   c. The number of lines crossing a given point
   d. Length of the magnet

5. The magnetic field inside the solenoid is
   a. Non uniform
   B Variable
   c. same at all points
   d. zero

6. An electron enters a magnetic field at right angles to it. The direction of force acting on the electron will be
   a. To the right
   b. Out of the page
   c. To the left
   d. Into the page

7. At the time of short circuit , the current in the circuit

a. Reduces instantaneously
b. Increases heavily
c. Does not change
d. Vary continuously

8. Device used to test whether the current is flowing in a conductor or not is
a. Ammeter
b. Voltmeter
c. Galvanometer
d. Battery

9. The process of Inducing current in a coil of wire by placing it in a region of changing magnetic field is
a. Electrical effect
b. Heating effect of current
c. Magnetic effect of current
d. Electromagnetic induction

10. The frequency of power supply used in India is
a. 70Hz
b. 50Hz
c. 60 Hz
d. 30Hz

11 Which of the following property of proton will change while it moves freely in a magnetic field
a Mass
b speed
c velocity
d momentum

12 Which one is correct among the following?
a Red insulated wire is called live wire
b Black insulated wire is called neutral wire
c Green insulated wire is called earthing
d All of the above

13 The magnetic field lines inside a solenoid is in the form of :
a Curved line
b circular lines
c Zig -zag lines
d parallel straight lines

14 The core of electromagnet is:
a Soft iron
b steel
c magnesium
d copper

CHAPTER 14

Sources ofEnergy

1. Factors which decide whether the given fuel is a good fuel are
   a. Heat it releases on burning
   b. Availability of the fuel
   c. Smoke produced by it on heating
   d. All of the above

2. In case of Thermal power plant
   a. Electrical energy is converted into mechanical energy
   b. Heat energy is converted into sound energy
   c. Heat energy is converted into electrical energy
   d. Mechanical energy is converted into electrical energy

3. Tehri Dam is constructed on the river
   a. Narmada
   b. Yamuna
   c. Ganga
   d. Mahanadi

4. The largest wind energy farm is established in
   a. Chennai
   b Kanyakumari
   c. Madurai
   d. Kalpakkam

5. The value of solar constant is
   a. 1.8kW/m^2
   B 1.6kW/m^2
   c. 1.4kW/m^2
   d. 1.2kW/m^2

6. The device which converts solar energy into electricity is
   a. Solar cell
   b. Electric motor
   c. Generator
   d. Solar cooker

7. More amount of heat energy can be produced in a solar cooker by using
   a. A plane mirror
   b. A convex mirror
   c. A concave mirror
   d. A glass plate

8. In a nuclear fission reaction the mass of the original nucleus is
   a. Just little more than the sum of the masses of the individual products
   b. Just equal to the sum of the masses of the individual products
   c. Just little lesser than the sum of the masses of the individual products
   d. not comparable with individual masses of the products

9. The working of atom bomb is based on the principle of
   a. Release of energy in Nuclear fusion
   b. Conversion of mechanical energy into electrical energy
   c. Release of energy in Nuclear fission
   d. Conversion of wave l energy into electrical energy

10. The energy from the hot water springs of the underground used to produce electrical energy that is Geo-thermal energy is operational in
   a. India
   b. New Zealand
   c. Africa
   d. Syria

11 What is the ultimate source of energy?
   a Water
   b sun
   c uranium
   d fossil fuel

12 Tidal energy is harnessed by constructing
   a Bridge
   b dam
   c pipe
   d road

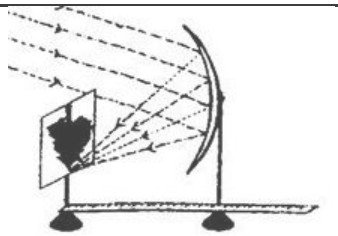
13 The energy possessed by huge waves needed to generate electricity is :

   a Solar energy
   b Kinetic energy
   c potential energy
   d heat energy

14 The most common material used for making solar cell is
   a Silicon
   b magnalium
   c bronze
   d aluminium

Answer –Key(PHYSICS-X)

Chapter-10			Chapter-11		
Q.No	option	Correct Answer	Q.No	option	Correct Answer
1	c	Becomes visible again	1	b	Power of accommodation of the eye
2	b	Virtual, erect, diminished	2	b	25cm
3	a	Rays from an object placed at a large distance in a concave mirror after reflection forms the image at the Focus	3	b	Short sightedness or myopia
4	c	Placed at a distance of 15 cm from the pole of the mirror	4	a	Long sightedness or Hypermetropia
5	c	concave	5	c	Concave lens

6	c	n=speed of light in the air/speed of light in the medium	6	a	Convex lens
7	b	Incident ray is parallel to the emergent ray	7	c	Presbyopia
8	c	Convex mirror	8	c	Dispersion
9	c	1/v+1/u =1/f	9	a	Opposite to the sun
10	b	Concave mirror	10	a	Atmospheric refraction of star light
11	a		11	b	real and inverted
12	b	away from the screen	12	b	(1/16) of a second
13	d	infinity	13	a	Lens
14	a	Away from the lens	14	d	All of the above
15	b	angle of refraction	15	a	Refraction

Chapter-12		
Q.No	option	Correct Answer
1	a	1.6×10^{-18}A
2	c	300C
3	d	All of the above
4	d	All of the above
5	a	
6	b	48J
7	d	Becomes 4 times
8	a	R= V/I
9	c	11ohms
10	c	Gets divided across each component
11	c	n^2x
12	d	parallel to the line wire
13	d	ammeter in series and voltmeter in parallel
14	d	All of the above
15	b	0.025
16	c	Reverse connection of voltmeter

Chapter-13			Chapter-14		
Q.No	option	Correct Answer	Q.No	option	Correct Answer
1	a	Oersted	1	d	All of the above
2	a	From south to north	2	c	Heat energy is converted into electrical energy
3	b	An iron piece into it	3	c	Ganga
4	c	The number of lines crossing a given point	4	b	Kanyakumari
5	c	same at all points	5	c	$1.4kW/m^2$
6	d	Into the page	6	a	Solar cell
7	b	Increases heavily	7	c	A concave mirror
8	c	Galvanometer	8	a	Just little more than the sum of the masses of the individual products
9	c	Electromagnetic induction	9	c	Release of energy in Nuclear fission
10	b	50Hz	10	b	New Zealand
11	c,&d	Velocity ,&momentum	11	b	sun
12	d	All of the above	12	b	dam
13	d	parallel straight lines	13	b	Kinetic energy
14	a	Soft iron	14	a	Silicon

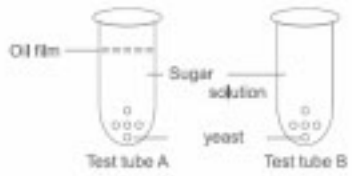
****

HOTS (HIGHER ORDER THINKING SKILLS)

Chapter 6
Life Processes

1. **A few tapioca plants remained in the farmland after all the others were harvested. The harvesting was done in summer. Then there was a summer rain. When these plants were harvested and the tubers eaten raw, they tasted sweet. Can you explain the reason for the sweet taste of the tubers?**
   Before the rains, the tubers contained starch. When it rained the plants started growing again producing new foliage. For this, food was needed. So the plant converted the starch in the tuber into sugar, a water soluble form in order to be transported. This sugar made the tuber sweet.
2. **A newborn infant's skin appeared blue. The doctor remarked it is due to an abnormal opening in the septum separating the atria. Can you explain how this deformity resulted in the baby's skin becoming blue?**
   The right atrium contains deoxygenated blood and the left atrium contains oxygenated blood. It is this oxygenated blood that is circulated through the aorta. The opening causes a mixing of the deoxygenated blood in the right atrium with the oxygenated blood in the left atrium . So the aortic blood contains blood that is poor in oxygen. This deficiency of oxygen causes the skin to appear blue.
3. **A man eats food standing upside down. Still the food goes up and reaches his stomach. What is the reason?**
   Food moves as a result of the contraction of the involuntary muscles in the oesophagus. This wave-like movement is called peristalsis. As this movement takesplace throughout the alimentary canal in only one direction, the food goes up into the stomach. The food is not falling into the stomach when one stands on one's legs; it is being pushed towards the stomach by peristalsis.
4. **In CAM plants, the stomata are closed during day time. But they can perform photosynthesis. Why?**
   It is found that CAM plants are better adapted to live under extreme conditions of drought and water stress. These plants have to keep their stomata closed during daytime to prevent loss of water due to transpiration. Hence such plants do not get CO_2 for their photosynthetic process during the day. So they depend on a special device. They absorb CO_2 during night when stomata are open. This CO_2 is not at once used for photosynthesis. Instead of that they convert this CO_2 into malic acid. This malic acid is subjected to decarboxylation process and CO_2 is evolved. This CO_2 is used for photosynthesis during the day. Hence in such plants CO_2 is available for photosynthesis although stomata remain closed during daytime.
5. **The left side of the heart is completely separated from the right side by a partition called septum. Why?**
   The separation of the left and right sides of the heart is necessary to prevent the mixing of the oxygenated blood in the left ventricle with the deoxygenated blood in the right ventricle. Such a mixing will lower the O_2 concentration.
6. **Arteries carry oxygenated blood. Do you agree with this statement? Substantiate your answer.**
   All arteries do not carry oxygenated blood. The pulmonary arteries carry deoxygenated blood. They carry deoxygenated blood from the right ventricle to the lungs. All the other arteries carry oxygenated blood.
7. **Arteries have no valves but veins have. Why?**
   There is pressure in arteries because the flow of blood in them is due to the pumping action of the heart. As blood will not flow in the reverse direction there is no need of any valve to prevent such back flow.
   In veins pressure is very low. So blood can blow in the reverse direction sometimes. Valves are provided in the veins to prevent such flow.
8. **The chewing of starchy food in the mouth for sometime results in the sensation of sweetness. Why?**
   Saliva contains an enzyme called salivary amylase. It breaks down starch into sugar. It is this sugar that gives sweet taste.
9. **After a vigorous exercise, you may experience cramps in your leg muscles. Why does this happen?**
   As a result of an anaerobic respiration, lactic acid is deposited in the leg muscles.

10. In the test tubes A and B shown below, yeast was kept in sugar solution. Which products of respiration would you expect in tubes A and B?



Test tube A
Products - Ethanol + CO_2 + Energy
Test tube B
$CO_2 + H_2O$ + Energy

Chapter 7
Control and Coordination

1. The "brain is the most protected organ in our body" How is it protected?

The brain is kept in a bony case called 'cranium'. It has a covering of three membraneous layers called 'meninges'. They protect the brain and also supply nutrients and oxygen to the brain tissue. The space between the meninges is filled with a fluid called cerebrospinal fluid. It is through this fluid medium that the brain tissue gets nutrients and oxygen. The cerebro spinal fluid protects the brain from external shocks and maintains the pressure inside the cranium constant.

2. Tongue has different areas for tasting different tastes but we do not have to place each substance at that area to know the taste. Why?

The basic tastes are associated with specific molecular shapes or charges that bind to separate receptor molecules. The tongue detects tastes through tiny organs called taste buds, containing gustatory receptors. Particular chemicals in the food dissolve in the saliva and stimulate gustatory receptors in specific taste buds. Since the chemicals dissolve in the saliva, they spread throughout the surface of the tongue.

3. The brain controls voluntary actions. But when we touch a hot object, we suddenly withdraw our hand which is an involuntary action. Explain how we are able to withdraw our hand.

The withdrawal of the hand occurs due to reflex action performed by the spinal cord, not by the brain. When impulses reach the spinal cord, the spinal cord sends signals to the muscles of the arm to withdraw the hand. The brain is not involved in this

4. A leprosy patient is unable to sense when we touch their affected parts. State the reason.

Nerve cells help in impulse transmission. In a leprosy patient the nerve cells in the affected region has deteriorated. So the leprosy patient is unable to sense when we touch their affected parts.

5. A hormone deficient person, approaches a doctor. The symptoms are the following:

- **Fasting blood sugar level is 165 mg/100 ml.**
- **Dehydration and thirst**
- **High intake of food and water and excessive urination.**

a. Name the disease and mention the hormone which is deficient.

b. As a student of biology, give four pieces of advice to the patient to keep the disease under control.

c. The treatment of this disease is done with a very familiar protein. But that medicine is injected rather than swallowed. Why?

a. Diabetes mellitus; Hormone - insulin

b. (i) Continuous exercise

(ii) Reduce the consumption of food rich in carbohydrates.

(iii) Periodical testing of blood sugar level

(iv)Avoid eating sweets.

c. The medicine for diabetes is insulin which is a protein. Since it is a protein, it will be completely digested if taken orally.

6. "ADH or vasopressin plays a major role in the reabsorption of water in the body."
a. Say whether the statement is true or false.
b. Substantiate your opinion.

a. True

b. When we feel thirsty or there is dehydration, it results in an osmolarity of the blood above the physi-

ologically set point. The osmoreceptors of the hypothalamus detect it. This results in the increase in blood solute concentration. This triggers the release of ADH. As a result water passes out of the descending loop in the nephron of the kidney into the surrounding tissue. This reduces the volume of urine and conserve the amount of body fluid.

7. **When there is anger or fear, there is an increased production of adrenaline and nor-adrenaline. Why? Explain.**

Under such a situation, the body has to act quickly. Adrenaline prepares us for action whenever there is a stress or an emergency situation. It also activates hypothalamus which in turn activates the pituitary gland. The pituitary then instantly gives alarm signals by secreting the hormone known as adrenocorticotropic hormone (ACTH). So this reaches the adrenal glands through the blood stream. So this produces the medullary hormones (Adrenaline and nor-adrenaline in large quantities.

8. **In chronic diabetic patients injection of insulin is very necessary. Why? Explain.**

- Insulin is necessary to regulate the level of glucose in blood.
- It causes the liver to take up and convert glucose into glycogen and fat.
- It also facilitates the uptake of glucose by the muscle and adipose cells.

Thus insulin helps in maintaining the normal blood glucose level. But in diabetic patients the production of insulin is very low. So Insulin injection is necessary for them.

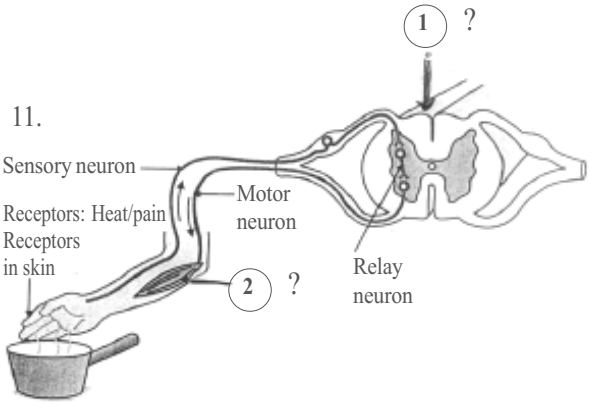
9. **A plant fell down on the ground after nightfall and its stem tip rose upwards before dawn. What is the reason?**

The stem is negatively geotropic. Hence the stem rose upwards.

10. **A particular hormone requires Iodine for its synthesis. Name the endocrine gland which secretes this hormone and state its location in the human body.**

Hormone - Thyroxine
Endocrine gland - Thyroid gland
Thyroid gland is attached to the wind pipe in our body.

11.

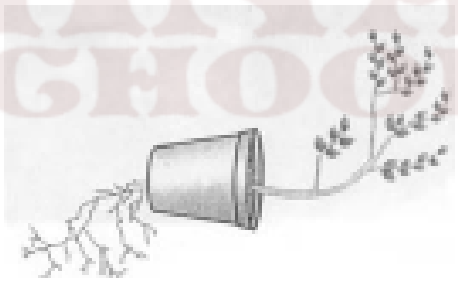


(i) Label the two parts indicated by question marks and labelled 1 and 2 in the above diagram.

(ii) Suggest a suitable caption or heading for the above diagram.

i) 1) - Spinal cord (CNS)
2 - Effector - Muscle in arm
ii) Reflex arc

13. The given experimental set up tests the response of different parts of plant towards gravity. Use scientific terms for the conclusions.



- Root: Positive geotropism
- Shoot: Negative geotropism

14. **Which hormone is released into blood when its sugar level rises? Name the organ which produces the hormone and its effect on blood sugar level. Also name one digestive enzyme that this organ secretes and the function of this enzyme.**

.• Insulin • Pancreas

• The function of insulin hormone is to lower the blood glucose level. It converts excess glucose into glycogen. and lowers the glucose level in blood.

• Trypsin

• Digestion of proteins

Chapter 8
How Do Organisms Reproduce?

1. **'The male honey - bee has no father' remarked Sini. (a) Do you agree with Sini? (b) Substantiate your answer.**

   (a)Yes

   (b) The male honey-bee hatches out from an unfertilised egg laid by the queen bee. The egg is haploid (n). Since fertilisation does not happen, there is no participation of the male gamete in the male bee's development. This kind of reproduction is called parthenogenesis.

2. **Offspring formed due to sexual reproduction have better chances of survival. Why? Is this statement always true?**

   Sexual reproduction involves the formation and fusion of gametes. There is a mixing of characters from two parents. This helps maintain the general vigour of the offspring. So the offspring formed due to sexual reproduction have better chances of survival. The statement may not be true if the parents do not possess good qualities.

3. **The circulatory system of humans undergo a switch- over process.**

   (a) Identify the stage at which it takes place?

   (b) Mention the importance of this?

   (a) Before childbirth, the infants lungs are not involved in its blood circulation. The switch-over takes place just after birth. The blood flow through the umbilical cord, ductus arteriosus and the foramen ovule stops. The blood flow through the heart and pulmonary blood vessels begins.

   (b) Before birth, the infant's lungs cannot be involved in respiration because the foetus is lying in the amniotic fluid. But after birth the circulation becomes normal involving all the chambers of the heart and the lungs.

4. **A pregnant woman happened to tumble down accidentally. But it did not at all affect the foetus. Why?**

   The amnion is a membraneous sac filled with a fluid. This fluid acts as a shock absorber. So the embryo is not affected by shocks.

5. **Doctors advise people that the first milk colostrum should necessarily be given to the newborn baby. State why.**

   Colostrum is rich in calories and proteins. It also contains antibodies that provide passive immunity to the newborn infant, so colostrum should be given to the newborn infant.

6. **Name those parts of the flower which serve the same function as the following do in the animals:- (i) testis (ii) ovary (iii) eggs (iv) sperms**

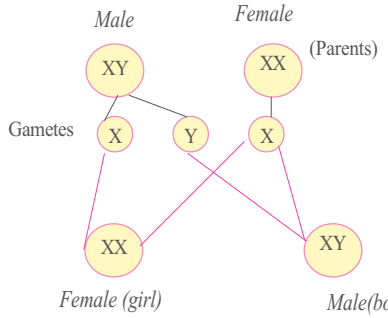
Animals		Plants
i) Testis	-	Stamen
ii) Ovary	-	Ovary
iii) Eggs	-	Eggs (ovules)
iv) Sperms	-	Male gametes

7. **'Malarial parasite' divides into many daughter individuals simultaneously through multiple fission. State an advantage the parasite gets because of this type of reproduction.**

   Due to this type of reproduction larger number of offspring are produced at the same time.

8. **Explain that it is a matter of chance whether a couple will give birth to a boy or a girl.**

- The sex of the individual is genetically determined.
- The sex chromosomes (genes) inherited from the parents determine whether the child will be a boy or girl. The sex chromosomes are X and Y. Males have XY and females have XX.



- Thus the sex of the newborn child is determined by the chromosomes inherited from the father.
- If the child inherits an X chromosome from the father it will be a girl. If it inherits a Y chromosome from the father, the child will be a boy.

Chapter 9
Heredity and Evolution

1. Australia has unusual organisms, because their evolution for the past 38 million years has some speciality. Give the speciality of this evolution?

In this case, the organisms are geographically isolated from other organisms. Geographical isolation is a very important factor in the production of new species. In geographical isolation, the original population is divided into two or more groups by geographical barriers which prevent interbreeding between them. During the course of time, different mutations may become incorporated in the gene pools of different groups. Thus, species have been formed by geographical isolation.

2. In America a bug with long beak usually feeds on seeds within the large round fruit of vine plant. After introducing a new variety of vine plant with long and thin fruits a bug with short beak evolved within 30 - 50 years.

a) Which of the theories of evolution can be explained within this evidence?

b) Substantiate your answer?

a) Theory of natural selection

b) Natural selection is the most critical evolutionary process that leads to changes in allelic frequencies and promotes adaptation as a product of evolution. Selection is the process by which those organisms which appear physically, physiologically and behaviourally better adapted to the environment, survive and reproduce while those organisms not so well adapted either fail to reproduce or die. The former organisms pass on their successful characteristics to the next generation, whereas the latter do not.

3. The conditions present in the early earth that led to chemical evolution can only be recreated in the laboratory. Why?

The following conditions prevailed in the primitive earth.

i) Presence of UV light
ii) Absence of oxygen
iii) Lightning, volcanoes, high temperature etc.
iv) Absence of microorganisms

But these conditions are absent today. So the conditions of the primitive earth can be recreated only in the laboratory.

4. By comparing the similarity of nucleotide sequences in DNA of different kinds of organisms, evolutionary relationships can be established

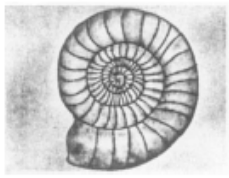
(i) Arrange the following according to their evolutionary closeness. (You may use your knowledge of classification also).

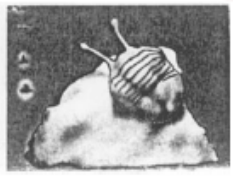
(ii) Whose DNA among the following do you think is most similar to that of humans?

Cockroach, Mango tree, Gorilla, Fish

i) Mango tree, Cockroach, Fish, Gorilla
ii) Gorilla

5. Give one term caption for the two pictures given here. Define the term and give its signifance in evolution.





Fossils (Invertebrate)

Fossils are the petrified remains or impressions of the organisms that lived in the past.

Significance

- Fossils provide direct evidence of past life.
- Broad historical sequence of biological evolution can be built up.
- Habits and behaviour of extinct species can be inferred.
- They provide convincing proof of organic evolution.

6. Study the given data and answer the questions following the data.

Parental plants cross fertilised & seeds collected	F_1(first generation off spring)	F_2(off spring of self pollination of F_1)
Male parent always bore red flowers. Female parent always had white flowers.	330 seeds sown and observed. All 330 gave red flowers.	Out of 44 seeds, 33 seeds gave plants with red flowers and 11 seeds gave plants with white flowers.

(i) What is the term for this type of cross?

(ii) What does the data of the column marked F_1 indicate?

(iii) Express the genotype of the (a) parents (b) F_1 Progeny and (c) F_2 Progeny .

1) Monohybrid cross.

ii) The data of the column F_1 indicates that all are red. ie Rr. The red colour is dominant over the white colour.

iii) a) Parents Red - RR

White - rr

b) F_1 progeny Red White

RR × rr

Gametes R r

F_1 progeny Rr Red

All are red.

c) F_2 Progeny

Rr × Rr (F_1 Progeny)

Gametes R r × R r

F_2 Genotype ratio = 1 homozygous red : 2 hetero zygous red: 1 homozygous white.

7. The genotype of green stemmed tomato plants is denoted as GG and that of purple stemmed tomato plants as gg. When these two are crossed,

(i) What colour of stem would you expect in their F1 progeny?

(ii) Give the percentage of purple stemmed plants if F1 plants are self pollinated.

(iii) In what ratio would you find the genotypes GG and Gg in the F_2 progeny?

green purple

GG × gg genotype

i) Green

GG × gg

Gametes G g

Gg Green

ii) Gg × Gg

Gametes G g G g

GG Gg Gg gg

green green green purple

Percentage of purple -stemmed plant = 25%

(iii) F_2 progeny GG : Gg : Gg : gg

1 : 2 ratio

8. The human hand, cat paw and the horse foot, when studied in detail show the same structure of bones and point towards a common origin.

(i) What do you conclude from this?

(ii) What is the term given to such structures?

(i) These are organs which have a similar basic plan of origin but are different in function. This shows that all these organisms have a common ancestor.

(ii) Homologous organs.

Chapter - 15
Our Environment

1. What initiatives were taken for reducing vehicular air pollution in Delhi? Has air quality improved in Delhi?

Delhi has the highest number of automobiles and formed one of the world's ten most polluted cities. A public interest litigation was filed under Article 21 of constitution of India regarding air pollution in Delhi. After being censured strongly by supreme Court, the government was asked to take suitable measures. This includes switching over the entire fleet of public transport from diesel to compressed natural gas (CNG). All the buses of Delhi were converted to run by CNG by the end of 2002. Phasing out of old vehicles, use of unleaded petrol, use of low sulphur petrol and diesel, use of catalytic converters in vehicles and application of Euro II norms reduced pollution by vehicles. This resulted in improving air quality of Delhi.

2. Why ozone hole forms over Antarctica? How will enhanced ultraviolet radiation affect us?

Ozone hole is formed due to decline in total ozone thickness over Antarctica during spring season. CFCs released from various sources reach stratosphere, which is blown towards the pole by wind. In Antarctica winter months receive no light and is very cold, resulting in the formation of ice clouds. Thus Antarctic air is completely isolated from the rest of the world by a natural circulation of wind called polar vortex. The ice cloud of Antarctica provide the catalytic surface upon which chlorine atoms can react with ozone and degrade it. Thus an ozone hole appears in Antarctica in spring.

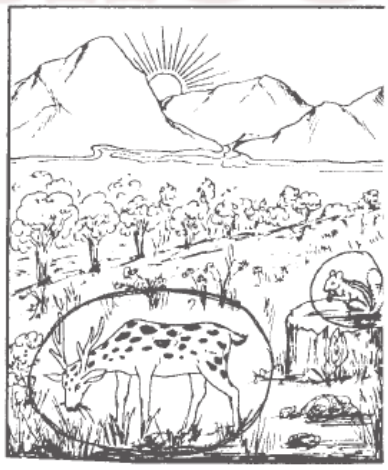
Effects of increased UV radiations- Intact ozone layer absorbs UV radiations of wavelengths shorter than UV-B. UV-B radiations damage DNA and mutation may occur. It causes aging of skin, damage skin cells and various types of skin cancers. In human eye, cornea absorbs UV-B radiation causing inflammation of cornea called snow blindness and cataract.

3. Study carefully the food chains given below:-
Food chain I : grass - grasshopper - frog
Food chain II : wheat - rat - snake - hawk
To which of the two consumers, snake or hawk will more energy (percent) be available and why?

Snake

The amount of energy flow decreases with successive trophic levels. At every step in a food chain, energy is transferred as heat to the surroundings. The amount of energy arising in a useful form at the end of a chain is only a small fraction of the amount of energy at the beginning.

4. Study the picture given below and comment on the encircled organisms with respect to
(i) the category according to the food they eat.
(ii) trophic level to which they belong.
(iii) percentage of energy available at their trophic level.
(iv) two abiotic components of the ecosystem inhabited by them.
(v) energy used for food production by the producers.



i) Herbivore ii) Second trophic level
iii) 10% of what they eat iv) Sunlight, soil
v) Sunlight

5. Write the number given to any six of the organisms shown in Figure B against their relevent Trophic levels given in figure given below.

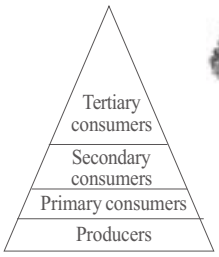


Figure A

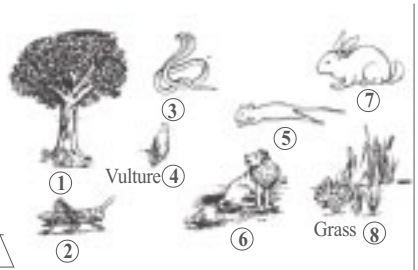


Figure B

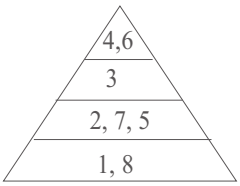


Figure - B

5.

Given above is a picture of an ecosystem. Identify any two abiotic components and any two biotic components of this ecosystem.

Abiotic components:

- Soil
- Light (sun)

Biotic components:

- Tree
- Deer

Chapter - 16

Management of Natural Resources

1. "All the plants in a forest grow luxuriantly although we don't apply any manure there. But in a farmland, manuaring is necessary for the healthy growth of crops". (a) Is it true? (b) Give reason.

(a) Yes

(b) The forest is a natural ecosystem. Forest soil consists of all the nutrients that plants need. All the plants grow there absorbing nutrients and water from the soil, and carbon dioxide from the atmosphere. Aged plant parts and leaves fall down to the soil. Thus the nutrients that are absorbed from the soil are being given back to the soil continuously. Therefore, there is no deficiency of any nutrient. Thus, the forest ecosystem is a self-sufficient one except for sunlight.

But in a farmland, continuous cultivation of crops reduces the nutrients in the soil. So manuring is necessary.

2. As a part of social forestry programme, the Nature Club of a Higher Secondary School released car stickers which say 'Have you thanked a green plant today?' Why do we have to thank plants for?

- Plants provide food to all living organisms.
- Plants provide oxygen to all organisms.
- It maintains O2 – CO2 ratio in the atmosphere .
- It reduces soil erosion.
- It increases soil fertility.
- It reduces sound pollution.

So we have to thank for plants everyday.

3. Name two gases, other than carbondioxide, that are given out during burning of fossil fuel and contribute towards acid rain formation.

Nitrogen oxides, Sulphur dioxide

4. Why are environmentalists insisting upon 'sustainable natural resource management'? Give any three reasons.

1) The resources of the earth are limited. Due to the rapid increase in human population, the demand for resources is increasing day by day. Proper management can ensure that the natural resources are used judiciously so that they fulfil the needs of the present generation as well as future generation. So conservation is important.

2) The Management of natural resources takes into consideration long -term perspective (Or view) and prevents their exploitation to the hilt for short -term gains.

3) Proper management will take into consideration the damage caused to the environment during the 'extraction' or 'use' of natural resources and find ways and means to minimise the damage.

5. Why are many thermal power plants set up near coal or oilfields?

Coal and petroleum are fossil fuels which are important sources of energy. In thermal power plants these reservoirs are largely used for the production of electricity. Because of the availability of these products many thermal power plants set up near these natural reservoirs. Expenditure on transportation can be minimised if the plants are set up near coal or oil fields.

6. How did the 'Chipko andolan' ultimately benefit the local population? Give any two benefits.

Experience has taught the people that the destruction of forests affected not just the availability of forest products, but also the quality of soil and the sources of water.

(i) They got employment

(ii) They got 25% of final harvest..

SCIENCE - PRACTICAL

SET I

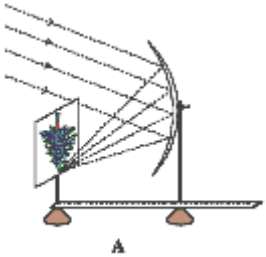
Time : 1½ Hours **Max. Marks : 20**

General Instructions

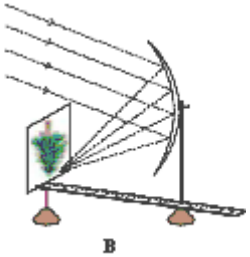
1. Attempt all questions.
2. There are 30 multiple choice questions in total. Only one of the options in every question is correct.
3. The question paper consists of two parts – Section A and Section B. Each of the 20 questions in Section A carries 0.5 mark and each of the 10 questions in Section B carries 1.0 mark.

SECTION A

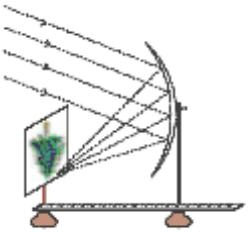
1. The two colours seen at the extreme ends of the pH chart are:
   (a) red and blue.
   (b) red and green.
   (c) green and blue.
   (d) orange and green.
2. A student observed that the colour of pH paper changes to green when she dipped it in water. She added a few drops of concentrated hydrochloric acid to the water. The colour of pH paper would turn to:
   (a) light red. (b) apple green.
   (c) dark blue. (d) lemon yellow.
3. When zinc reacts with dilute hydrochloric acid:
   (a) the surface of zinc becomes brighter.
   (b) the surface of zinc becomes black and dull.
   (c) the metal turns into powder.
   (d) the reaction mixture turns green.
4. Four students A, B, C and D carried out measurements of focal length of a concave mirror as shown in the four diagrams.



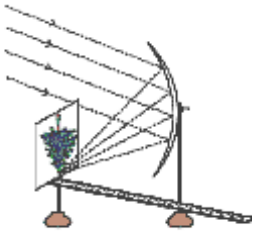
A



B



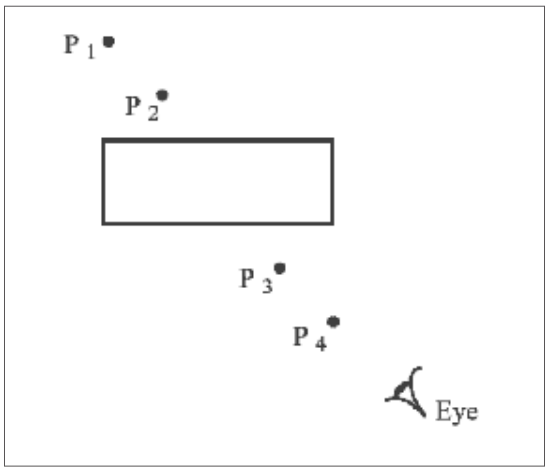
C



D

The best result will be obtained by student
(a) A. (b) B. (c) C. (d) D.

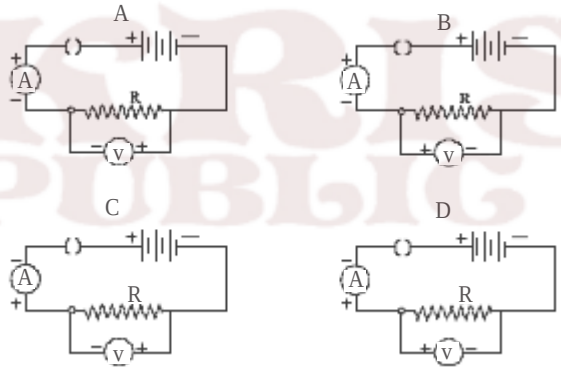
5. Three students measured the focal length of a convex lens using parallel rays from a distant object. All of them measured the distance between the lens and the inverted image on the screen.
   Student A saw a sharp image on the screen and labelled the distance as f_1.
   Student B saw a slightly larger blurred image on the screen and labelled the distance as f_2.
   Student C saw a slightly smaller blurred image on the screen and labelled the distance as f3.
   The relation between the three measurements would most likely be:
   (a) $f_1 = f_2 = f_3$.
   (b) $f_1 < f_2$ and f_3.
   (c) $f_3 < f_1 < f_2$.
   (d) $f_1 < f_2$ and $f_1 = f_3$.
6. In the glas slab experiment shown below, four students A, B, C and D did the following:
   A: kept the eyes far from the glass slab while placing both the pins P_3 and P_4.
   B: kept the eyes close to the glass slab while placing both the pins P_3 and P_4.
   C: kept the eyes close to the glass slab while placing pin P_3 and far from the slab while placing pin P_4.
   D: kept the eyes far from the glass slab while placing pin P_3 and close to the slab while placing pin P_4.



The correct procedure is that of student:

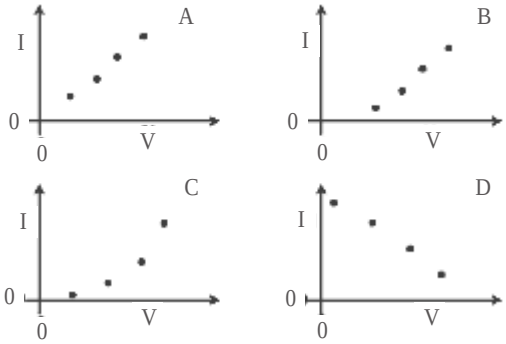
(a) A. (b) B. (c) C. (d) D.

7. Out of the four circuits shown for studying the dependence of the current on the potential difference across a resistor, the correct circuit is



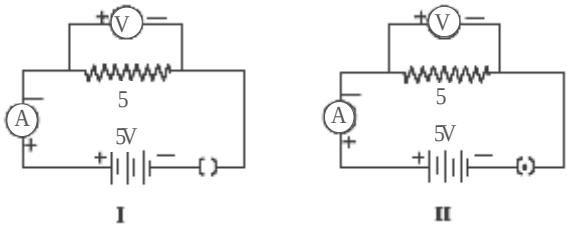
(a) A. (b) B. (c) C. (d) D

8. The plot correctly showing the dependence of the current I on the potential difference V across a resistor R is



(a) A. (b) B. (c) C. (d) D.

9. For the circuits shown in figures I and II, the ammeter readings would be:



(a) 1 A in circuit I and 0A in circuit II.

(b) 0 A in both circuits.

(c) 1 A in both circuits.

(d) 0 A in circuit I and 1 A in circuit II.

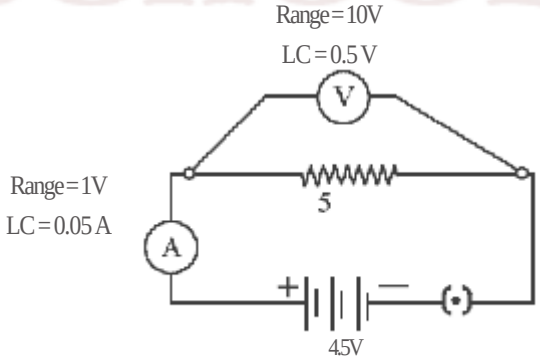
10. The voltmeter, ammeter and resistance in the circuit shown have been checked to be correct. On plugging the key, the ammeter reads 0.9 A, but the voltmeter reads zero. This could be because:

(a) the range of the voltmeter is more than the twice the battery voltage.

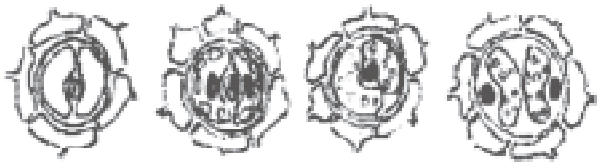
(b) the least count of the voltmeter is too high.

(c) the wires joined to the voltmeter terminals are loose.

(d) the voltmeter is incorrectly placed in the circuit.



11. Students observed the epidermal peel of a leaf under the high power of a microscope. The following are the sketches made by them.

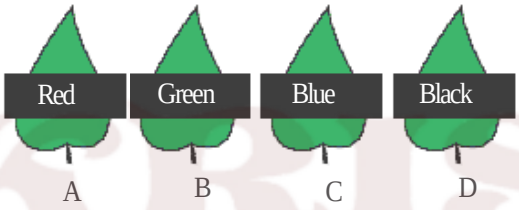


The correct sketch is:

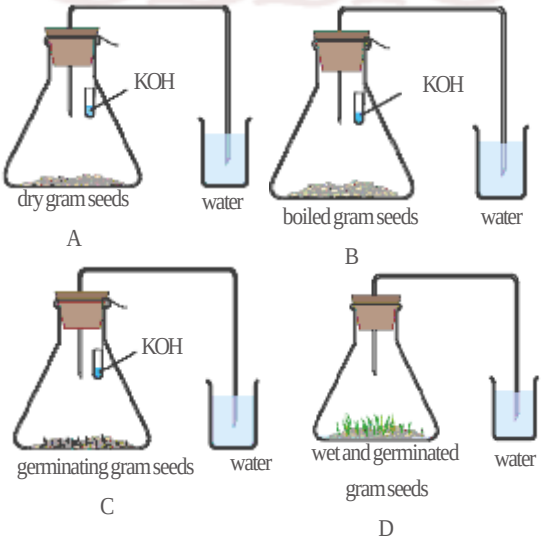
(a) A. (b) B. (c) C. (d) D.

12. In an experiment on photosynthesis, students were instructed to cover a portion of a leaf of a de-starched potted plant with opaque paper as shown in the figure.

"A" covered one of the leaves with red strip, "B" with green, "C" with blue and "D" with black. When the starch test was done on the leaves after 4 hours, the result showed no starch in (a) the portion covered with red, green and blue strips. (b) the portion covered with green strip. (c) the portion covered with black and blue strips. (d) any of the covered portions.



13. Given below are four different set ups to show that CO_2 is released during respiration.



The set up that will give the desired result is:

(a) A. (b) B. (c) C. (d) D.

14. Students A, B and C were given five raisins each of equal weight. The raisins were soaked in distilled water at room temperature. A removed the raisins after 20 minutes, B after two hours and C after 40 minutes. If PA, PB and PC denote percentage absorption of water obtained by students A, B and C respectively, then:

(a) PA > PB > PC. (b) PA < PB < PC.

(c) PA < PB > PC. (d) PA = PB = PC.

15. The budding in yeast is illustrated by the diagram:

(a) A (b) B (c) C (d) D.

16. A student dissolved 1 g of sugar in 10 mL of distilled water in a beaker A. He dissolved 10 g of sugar in 100mL of distilled water in beaker B. Then he dropped a few raisins, in each. After two hours he found the raisins:

(a) swollen in A and shrunken in B.

(b) shrunken in A and swollen in B.

(c) swollen in both. (d) shrunken in both.

17. 10 mL of freshly prepared iron sulphate was taken in each of four test tubes. Strips of copper, iron, zinc and aluminium were introduced, each metal in a different test tube. A black residue was obtained in two of them. The right pair of metals forming the precipitates is:

(a) copper and zinc. (b) aluminium and copper.

(c) iron and aluminium. (d) zinc and aluminium.

18. The following symbols are usually shown on the bottles of commercial acetic acid.

The symbols indicate that acetic acid is:

(a) corrosive and flammable.

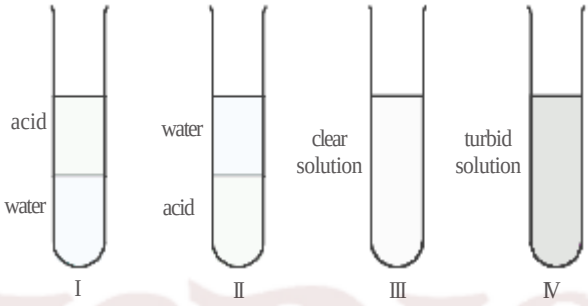
(b) radioactive and flammable.

(c) oxidizing and corrosive.

(d) flammable and explosive.

19. A strip of copper was placed in a beaker containing zinc sulphate solution. On observing the strip the next day, it was noticed that :
    (a) the copper strip remained as it was.
    (b) the copper strip became thinner.
    (c) the copper strip became thicker.
    (d) the colour of the strip changed.

20. Amount of 5 mL each of acetic acid and water are mixed together and shaken well.



The resulting mixture would appear as in:
(a) I (b) II (c) III (d) IV.

SECTION B

21. Four students studied reactions of zinc and sodium carbonate with dilute hydrochloric acid and dilute sodium hydroxide solutions and presented their results as follows. The ✓ represents evolution of gas, whereas X represents absence of any reaction.

	Zn	Na_2CO_3
HCl	✓	✓
NaOH	✓	X

A

	Zn	Na_2CO_3
HCl	✓	X
NaOH	✓	✓

B

	Zn	Na_2CO_3
HCl	X	X
NaOH	✓	✓

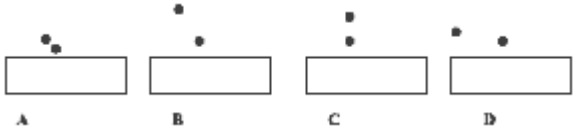
C

	Zn	Na_2CO_3
HCl	✓	✓
NaOH	X	X

D

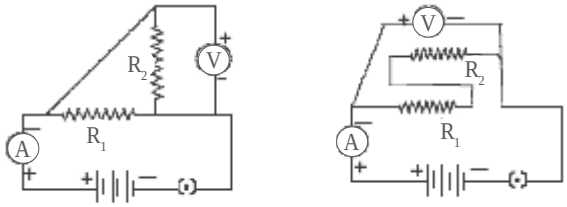
The right set of observations is that of student:
(a) A (b) B (c) C (d) D.

22. Out of the four set ups shown for carrying out the experiment to trace the path of a ray of light through a rectangular glass slab, the best set up is:



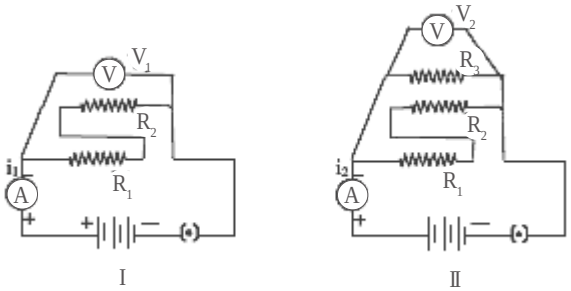
(a) A (b) B (c) C (d) D.

23. The resistors R_1 and R_2 are connected in:



(a) parallel in both circuits.
(b) series in both circuits.
(c) parallel in circuit I and in series in circuit II.
(d) series in circuit I and in parallel in circuit II.

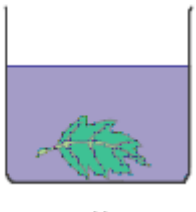
24. Circuit I: ammeter reads current i_1 and voltmeter reads V_1.
Circuit II: ammeter reads current i_2 and voltmeter reads V_2.



The relationship between the readings is:
(a) $i_1 > i_2$; $V_1 = V_2$.
(b) $i_1 < i_2$; $V_1 = V_2$.
(c) $i_1 > i_2$; $V_1 > V_2$.
(d) $i_1 < i_2$; $V_1 < V_2$.

25. A student performed the starch test on a leaf. Some steps involved are shown below.

i
leaf in boiling water



ii
leaf in iodine solution

iii
leaf in ethanol heated in a water bath

iv
leaf in water at room temperature

The correct sequence of steps should be:

(a) iv; iii; ii; i. (b) i; ii; iii; iv.

(c) ii; iii; iv; i. (d) i; iii; iv; ii .

26. A part of de-starched leaf of a potted plant was covered with black paper strips on both sides and the plant was kept in sunlight for 8 hours. The leaf was then tested with iodine after boiling it in alcohol. Only the uncovered part of the leaf turned blue black. The inference is that:

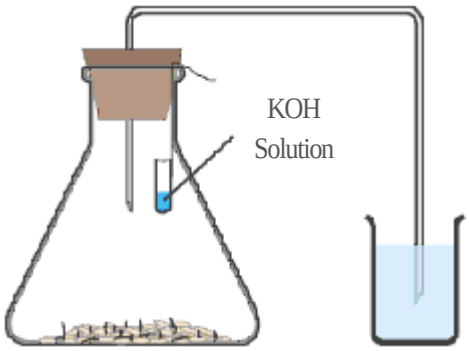
(a) CO_2 is necessary for photosynthesis.

(b) light is necessary for photosynthesis.

(c) chlorophyll is necessary for photosynthesis.

(d) water is necessary for photosynthesis.

27. In the experiment shown in the figure, water is found to rise in the bent tube.



The reason is that:

(a) seeds use up oxygen in the flask.

(b) carbon dioxide is given out by the germinating seeds.

(c) germinating seeds attract water from the beaker.

(d) seeds use oxygen and release carbon dioxide which is absorbed by potassium hydroxide.

28. A student is given a permanent slide showing binary fission in Amoeba. The following are the steps in focussing the object under the microscope.

(i) Place the slide on the stage; look through the eye piece and adjust the mirror and diaphragm to get even illumination.

(ii) Look through the eye piece and raise the objective using coarse adjustment until the object is focused.

(iii)Make the focus sharp with the help of fine adjustment.

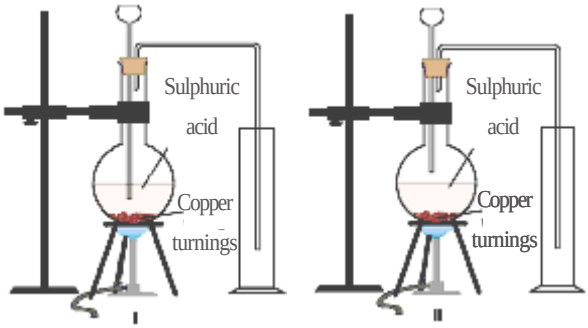
(iv)Look through the eye piece and move the slide until the object is visible.

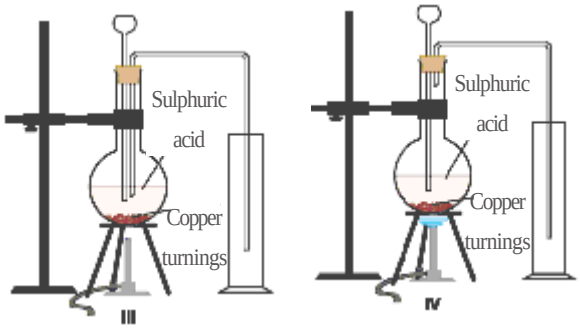
The proper sequence of steps is:

(a) (i), (iii), (iv), (ii). (b) (ii), (iii), (iv), (i).

(c) (iv), (iii), (ii), (i). (d) (i), (iv), (ii), (iii).

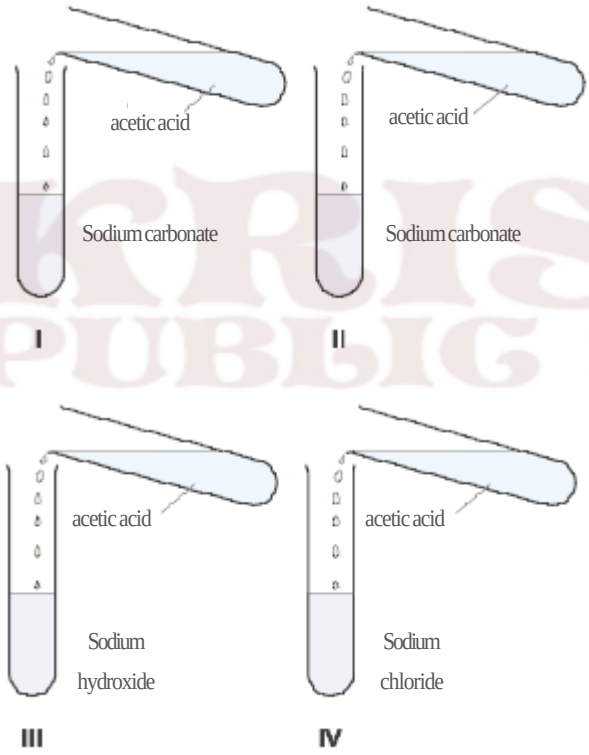
29. For preparing sulphur dioxide in the laboratory the correct set up is shown in figure.





(a) I (b) II (c) III (d) IV.

30. A student added acetic acid to test tubes I, II, III and IV and then introduced aburning candle near the mouth of each test tube.



The candle would not be extinguished near the mouths of test tubes:

(a) I and II

(b) II and III.

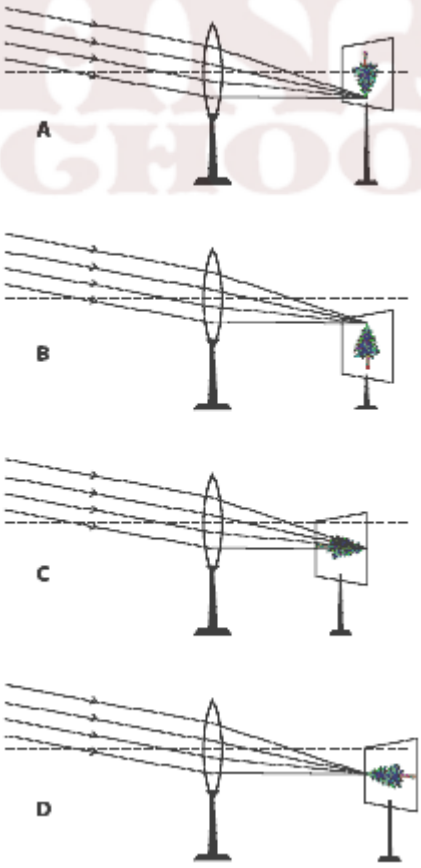
(c) III and IV

(d) I and IV.

SET II

SECTION A

1. A student tested the pH of distilled water and found that the colour of the pH paper changed to green. He checked the pH again after dissolving a pinch of common salt in it. The colour of the pH paper this time was:
   (a) green (b) yellow (c) red (d) blue.
2. Bottle A contains oxalic acid and bottle B contains sodium carbonate solution.When pH paper is dipped in each of the solutions, the colour seen in A and B respectively be:
   (a) orange, blue (b) blue, orange.
   (c) green, blue (d) orange, green.
3. The zinc metal used in the laboratory for doing experiments is available in the form of:
   (a) filings (b) strips (c) granules (d) pellets.
4. Parallel rays from a distant tree incident on a convex lens form an image on the screen.



The diagram correctly showing the image of the tree on

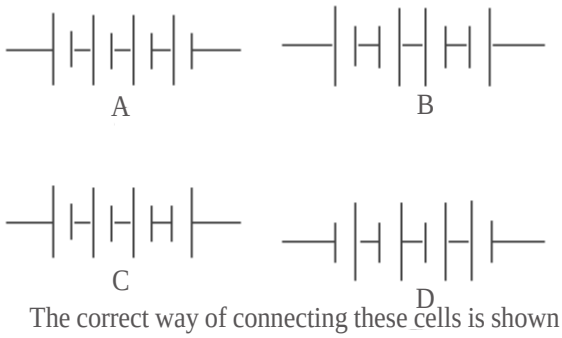
the screen is:

(a) A (b) B (c) C (d) D.

5. In an experiment, the image of a distant object formed by a concave mirror is obtained on a screen. To determine the focal length of the mirror, you need to measure the distance between the:
   (a) mirror and the screen.
   (b) mirror and the object.
   (c) object and the screen.
   (d) mirror and the screen and also between the object and the screen.
6. In the experiment to trace the path of a ray of light through a rectangular glass slab using pins P_1, P_2, P_3 and P_4, four students did the following
   A looked at heads of P_1 and P_2 while placing P_3, and heads of P_1, P_2 and P_3 while placing P_4
   B: looked at feet of P_1 and P_2 while placing P_3, and feet of P_1, P_2 and P_3 while placing P_4
   C: looked at heads of P_1 and P_2 while placing P_3, and feet of all the pins while placing P_4
   D: looked at feet of P_1 and P_2 while placing P_3, and heads of all the pins while placing P_4.
   The correct procedure is that of student:
   (a) A (b) B (c) C (d) D.
7. The normal positions of the pointers of the two ammeters A_1 and A_2, and two voltmeters V_1 and V_2 available in the laboratory were as shown. For an experiment to study the dependence of the current on the potential difference across a resistor, the student should select:
   (a) ammeter A_1 and voltmeter V_1.
   (b) ammeter A_2 and voltmeter V_1.
   (c) ammeter A_1 and voltmeter V_2.
   (d) ammeter A_2 and voltmeter V_2.

A_1 A_2 V_1 V_2

8. A student has to connect 4 cells of 1.5 V each, to form a battery of voltage 6 V.

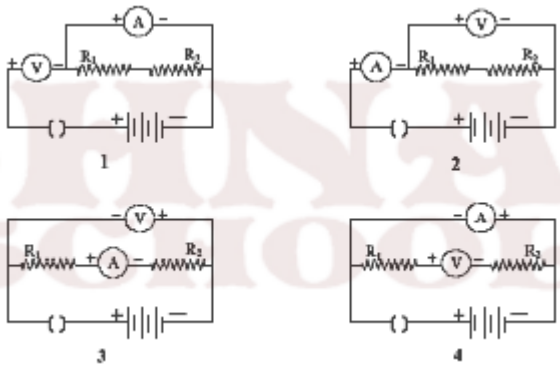


A B C D

The correct way of connecting these cells is shown in figure:

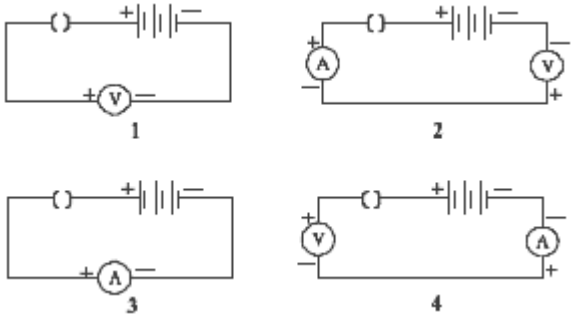
(a) A (b) B (c) C (d) D.

9. The correct way of connecting the ammeter and voltmeter with a series combination of two resistors in a circuit for finding their equivalent resistance, is shown in diagram:
   (a) 1 (b) 2 (c) 3 (d) 4.



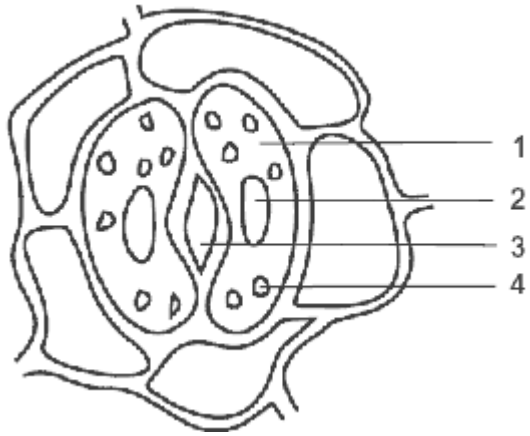
1 2 3 4

10. On plugging the key, the voltmeter/ ammeter is likely to be damaged in the circuit shown in figure:
    (a) 1 (b) 2 (c) 3 (d) 4.



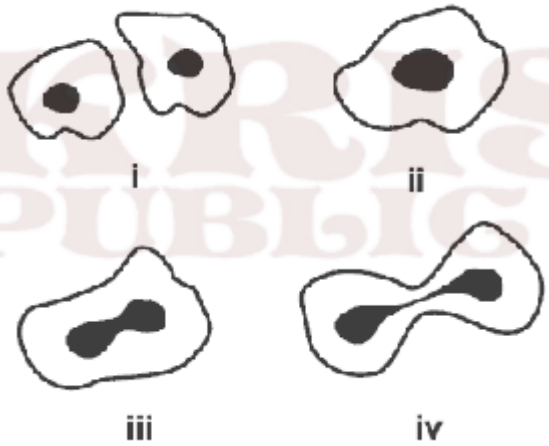
1 2 3 4

11. A student draws the following sketch of stomatal apparatus and numbers the parts to label them.



The chloroplast is denoted by:
(a) 1 (b) 2 (c) 3 (d) 4.

12. The following figures illustrate binary fission in Amoeba in an incorrect sequence.



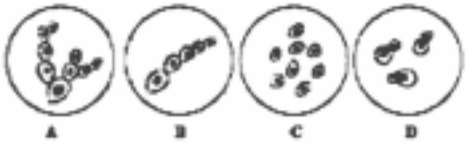
The correct sequence is:
(a) (i), (iii), (iv), (ii). (b) (ii), (iii), (iv), (i).
(c) (iv), (iii), (ii), (i). (d) (iii), (iv), (ii), (i).

13. The teacher instructed a student to place a healthy potted shoe flower plant in a dark room for 24 hours prior to an experiment on photosynthesis. The purpose of placing it in a dark room is:
(a) to increase the intake of CO_2.
(b) to activate the chloroplasts in the leaves.
(c) to de-starch the leaves.
(d) to denature the enzymes in the leaves.

14. In an experiment to show that sunlight is necessary for photosynthesis, the leaf is boiled in alcohol for a few minutes using a water bath. It is essential because:
(a) alcohol is highly volatile.
(b) steam from the water bath heats the leaf rapidly.
(c) steam from the water bath dissolves the chlorophyll.
(d) alcohol is flammable.

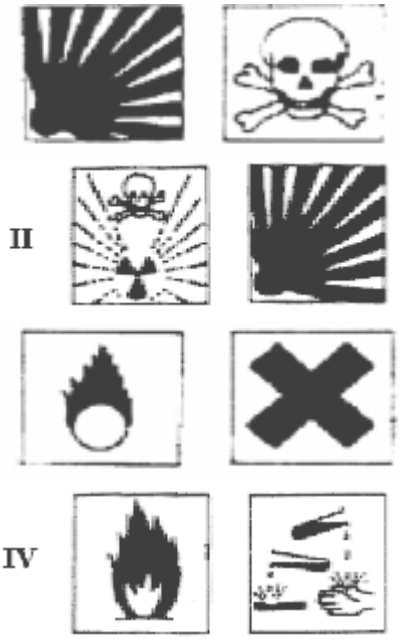
15. A student soaked 10 g of raisins in 50 mL of distilled water in two beakers A and B each. She maintained beaker A at 25 °C and beaker B at 50 °C. After an hour, the percentage of water absorbed will be:
(a) the same in both A and B.
(b) more in A than in B.
(c) more in B than in A.
(d) exactly twice as much in B as in A.

16. The following are the sketches made by some students.



The sketch not illustrative of budding in yeast is:
(a) A (b) B (c) C (d) D.

17. The pair of safety symbols you notice on the bottles of commercial acetic acid available in the laboratory, is shown in:
(a) I (b) II (c) III (d) IV.



18. When you place an iron nail in copper sulphate solution,

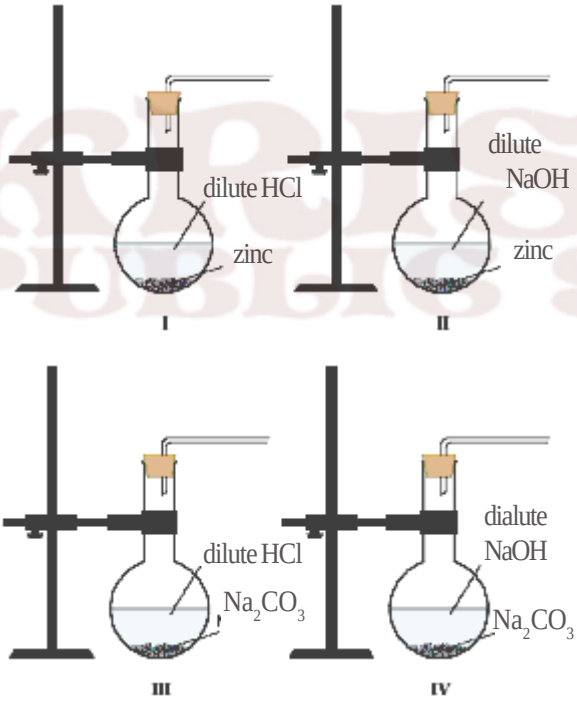
the reddish brown coating formed on the nail is:
(a) soft and dull (b) hard and flaky
(c) smooth and shining (d) rough and granular.

19. When you place an iron strip in the solution of copper sulphate, the time required for the colour of the solution to change from blue to green is about:
(a) a second (b) an hour.
(c) 8 hours (d) 24 hours.

20. On adding sodium bicarbonate to acetic acid, you immediately:
(a) observe strong effervescence.
(b) hear hissing sound.
(c) get pungent smell.
(d) notice formation of bubbles.

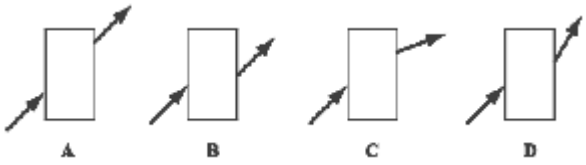
SECTION B

21. Four experimental set ups are shown below.



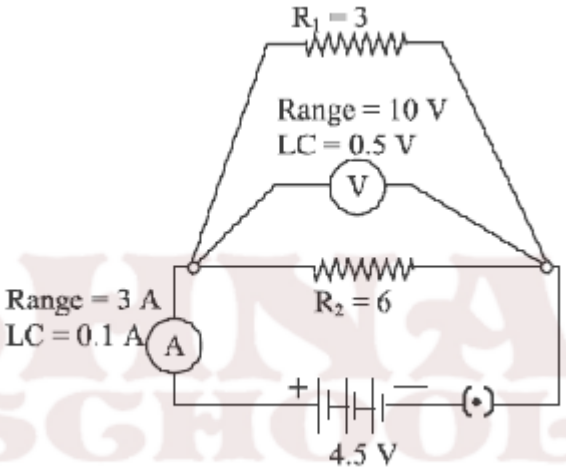
The set ups that would result in a rapid evolution of gas would be:
(a) I and III. (b) II and IV.
(c) I and II. (d) III and IV.

22. Four students showed the following traces of the path of a ray of light passing through a rectangular glass slab.



The trace most likely to be correct is that of student:
(a) A (b) B (c) C (d) D.

23. The voltmeter, ammeter and resistance in the circuit shown have been checked and found to be correct. On plugging the key, the voltmeter reads 4.5V, but the ammeter reads 1.5 A.



This could most likely be because the wires joined to:
(a) the resistor R_1 are loose.
(b) the resistor R_2 are loose.
(c) both the resistors R_1 and R_2 are loose.
(d) the ammeter terminals are loose.

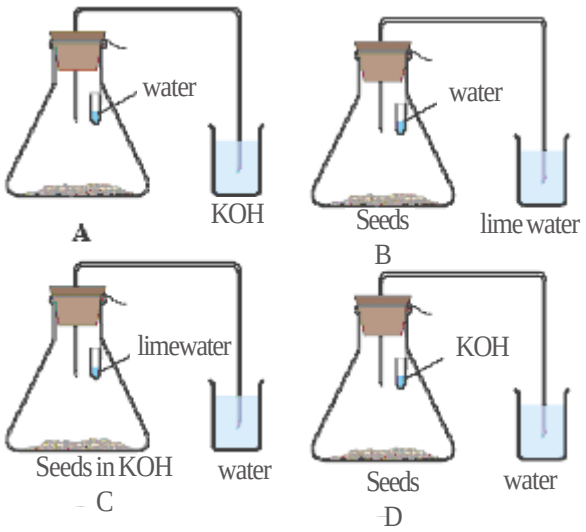
24. The following apparatus is available in a laboratory:
Battery : adjustable from 0 to 4.5 Volt
Resistors : 3 W and 6 W
Ammeters : A_1 of Range 0 to 3 A; Least Count 0.1A
A_2 of Range 0 to 1 A; Least Count 0.05 A
Voltmeters : V_1 of Range 0 to 10 V; Least Count 0.5 V
V_2 of Range 0 to 5 V; Least Count 0.1 V
The best combination of voltmeter and ammeter for finding the equivalent resistance of the resistors in series would be:
(a) ammeter A_1 and voltmeter V_1.
(b) ammeter A_1 and voltmeter V_2.

(c) ammeter A_2 and voltmeter V_1.
(d) ammeter A_2 and voltmeter V_2.

25. In an experiment on photosynthesis, a student fixed a strip of black paper on the dorsal surface of a Bougainvillea leaf in the morning. In the evening she tested the leaf for starch. The result was:
(a) the dorsal surface of the leaf was white but the ventral surface turned blue.
(b) both the surfaces of the covered portion remained white.
(c) the entire leaf turned blue black.
(d) the entire leaf remained white.

26. Given below are the steps in the preparation of a temporary mount of a stained leaf peel.
(i) Cover the material with the cover slip.
(ii) Transfer the stained peel to the clean glass slide and add a drop of glycerine.
(iii) Remove the peel from the ventral surface of the leaf.
(iv) Drop it in the water in a petri dish and add a drop of safranin stain.
The correct sequence of steps is:
(a) (iii), (iv), (ii), (i). (b) (i), (ii), (iii), (iv).
(c) (ii), (iii), (iv), (i). (d) (iii), (iv), (i), (ii).

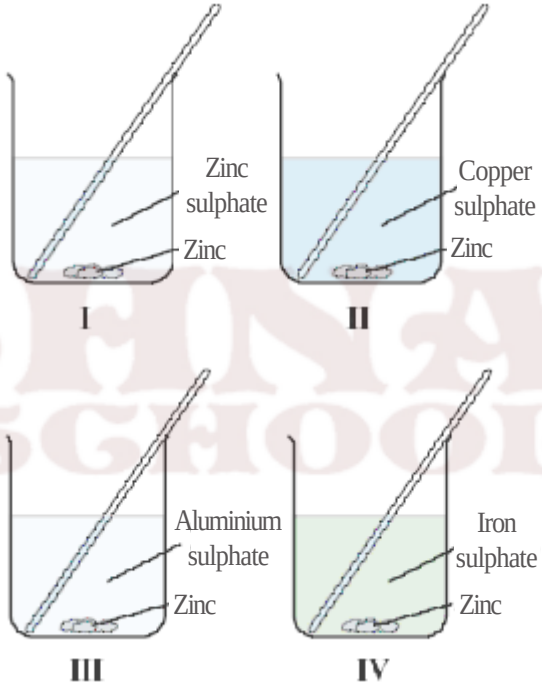
27. After performing the experiment to show that germinating seeds give out carbon dioxide during respiration, students drew the following diagrams.



The correct labelled diagram is:
(a) A (b) B (c) C (d) D.

28. A student sets up the apparatus for the experiment to show that CO_2 is released during respiration. After 2 hours, he would observe:
(a) KOH turning milky.
(b) water level rising in the bent tube in the beaker.
(c) water level decreasing in the bent tube in the beaker.
(d) water turning turbid in the beaker.

29. Zinc granules were added to zinc sulphate, copper sulphate, aluminum sulphate and iron sulphate solutions as shown below. You would observe the deposition of metal on zinc in beakers:



(a) I and III (b) II and IV .
(c) I and II (d) III and IV.

30. Among the four sets of apparatus given below, the correct one to prepare sulphur dioxide gas is:

Set I	Set II
Hard glass test tubes 2, double holed rubber cork 1, thistle funnel 1, delivery tube 1, spirit lamp 1	Round bottomed flask 1, gas jar 1, double holed rubber cork 1, thistle funnel 1, delivery tube 1, spirit lamp 1

Set III
Conical flask 2, delivery tube 1, thistle funnel 1, single holed rubber cork 2, spirit lamp 1

Set IV
Conical flask 1, beaker 1, funnel1, delivery tube1, double holed rubber cork 1, spirit lamp 1

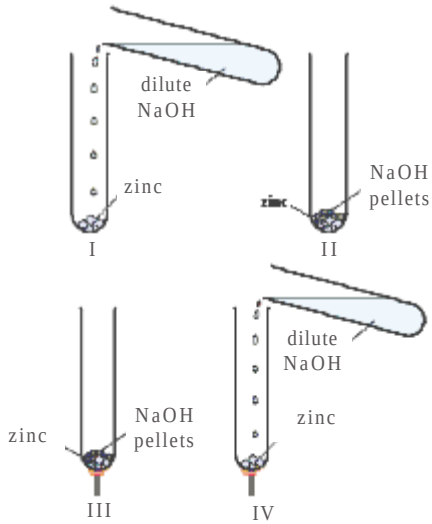
(a) Set I (b) Set II (c) Set III (d) Set IV

SET III

SECTION A

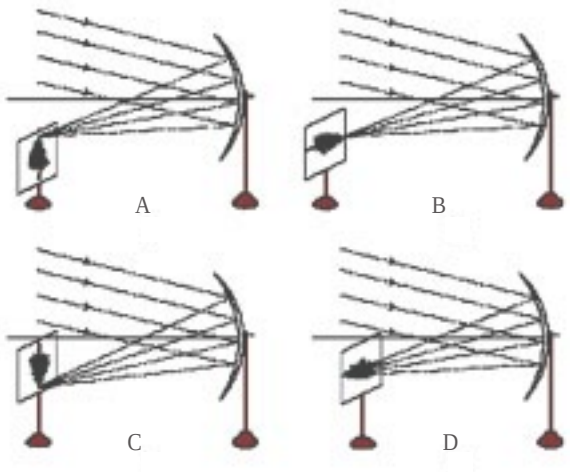
1. A student took the following samples to find out their pH using pH paper. The teacher remarked that one of the samples taken was not proper. The teacher was referring to:
   (a) dilute hydrochloric acid. (b) lemon juice.
   (c) washing soda. (d) soap solution.
2. To test the presence of an acid with a strip of red litmus paper you would:
(a) dip the strip as it is in the sample and see the colour change.
(b) moisten the paper with water and dip in the given sample.
(c) first dip strip in common salt solution and then use to it test the sample.
(d) first dip strip in alkaline solution and then use it to test the sample.
3. The figures below show set-ups for studying the reaction of zinc with sodium hydroxide.

Battery eliminater



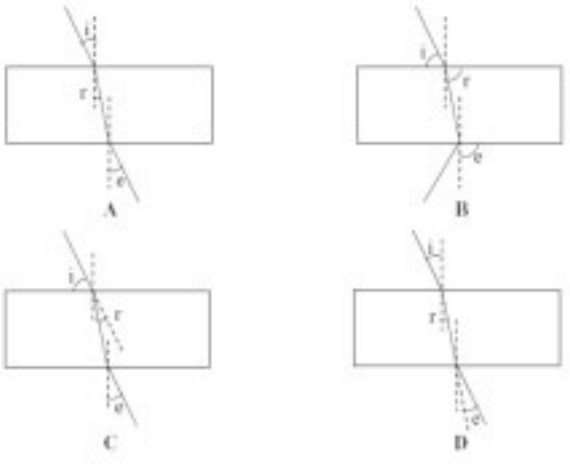
A rapid evolution of hydrogen gas will be observed in the test tube:
(a) I (b) II (c) III (d) IV.

4. Parallel rays, from the top of a distant tree, incident on a concave mirror, form an image on the screen.

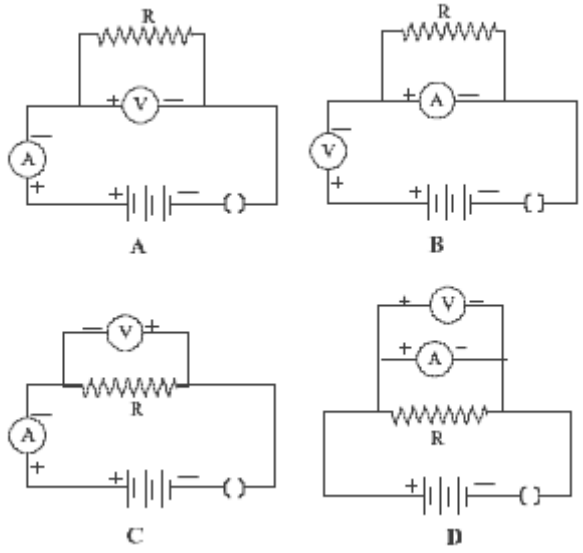


The diagram correctly showing the image of the tree on the screen is
(a) A (b) B (c) C (d) D.

5. In an experiment to trace the path of a ray of light passing through a rectangular glass slab, the correct measurement of angles of incidence (i), refraction (r) and emergence (e) is shown in diagram.
(a) A (b) B (c) C (d) D.



6. The correct set up for studying the dependence of the current on the potential difference across a resistor is:
(a) A (b) B (c) C (d) D.



7. In an experiment to determine the focal length of a convex lens, a student obtained a sharp inverted image of a distant tree on the screen behind the lens.She then removed the screen and looked through the lens in the direction of the object. She will see:

(a) an inverted image of the tree at the focus of the lens.

(b) no image as the screen has been removed.

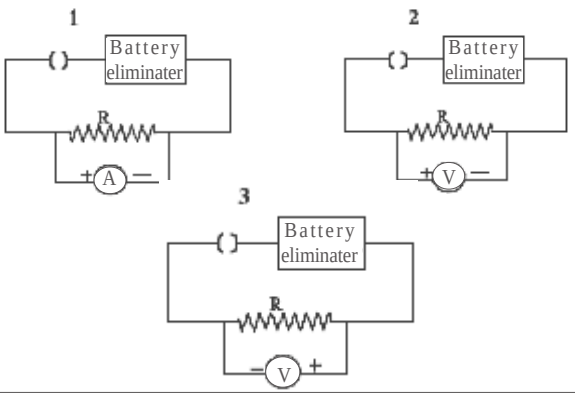
(c) a blurred image on the wall of the laboratory.

(d) an erect image of the tree on the lens.

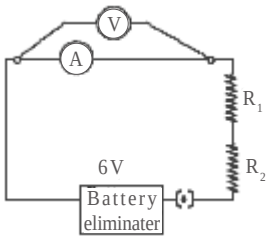
8. The positive and negative terminal markings are missing from a given battery eliminator. The correct terminal markings can be best identified by the arrangement shown in:

(a) figure 1 (b) figures 1 and 2

(c) figures 2 and 3 (d) figures 3 and 1.



9. In an experiment, to find the equivalent resistance of a series combination of two resistors R_1 and R_2, a student uses the circuit shown here.



The circuit will give:

(a) correct reading for voltage V, but incorrect reading for current I.

(b) correct reading for current I, but incorrect reading for voltage V.

(c) correct readings for both current I and voltage V.

(d) incorrect readings for both current I and voltage V.

10. In an experiment to study dependence of current I on the potential difference across a given resistor, students kept the plug key in the circuit closed for time t_1 and then open for time t_2. The times t_1 and t_2 for students P, Q, R and S are given in the table below.

Student	Closed time t_1 seconds	Open time t_2 seconds
P	30	60
Q	60	30
R	60	15
S	45	15

The best choice of open and closed times is that of student:

(a) P (b) Q (c) R (d) S.

11. When students observed a stained epidermal peel of a leaf under the microscope,it appeared pinkish red. The stain used was:

(a) iodine

(b) acetocarmine.

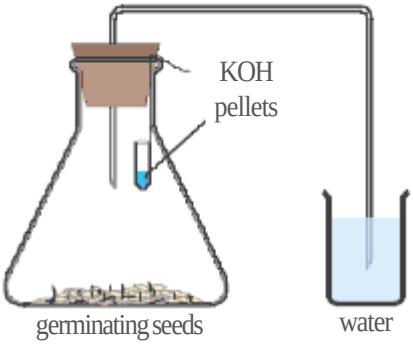
(c) safranin

(d) colchicin.

12. The process represented in the diagram below is the:

(a) formation of spores in Amoeba.
(b) formation of bud taking place in Amoeba.
(c) identical gametes being formed in Amoeba.
(d) formation of daughter cells in Amoeba.

13. The following experiment is set up to show that a gas is released during respiration.



In this set up, the small test tube containing pellets of KOH is kept in the conical flask to absorb:
(a) air in the flask
(b) moisture in the flask.
(c) O_2 in the air in the flask.
(d) CO_2 released by the germinating seeds.

14. A leaf from a de-starched plant is covered with black paper strip as shown in figure 1. The starch test is done on the leaf after 8 hours.

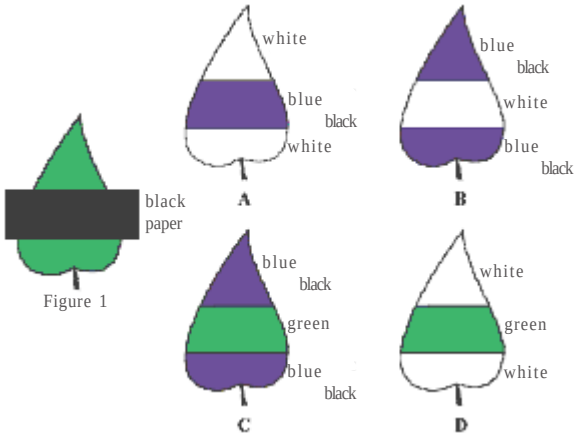


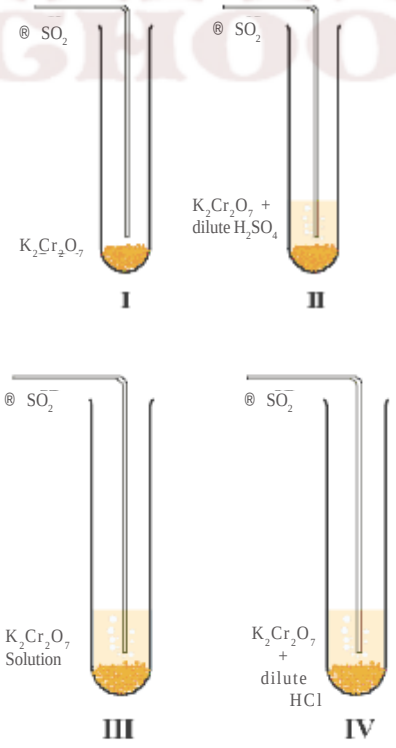
Figure 1

The results will be as shown in diagram:
(a) A (b) B (c) C (d) D.

15. A student dissolved 5 g of sugar in 100 mL of distilled water in beaker A. She dissolved 100 g of sugar in100 mL of distilled water in beaker B. Then she dropped a few raisins of equal weight in each beaker. After two hours she found the raisins in A swollen and those in B shrunken. The inference drawn is that:
(a) sugar concentration of raisins is lower than that of solution A and higher than that of solution B.
(b) sugar concentration of raisins is higher than that of solution A and lower than that of solution B.
(c) in B the cell membrane of raisins was damaged resulting in leaching.
(d) in A the permeability to water of the cell membrane of raisins was enhanced.

16. The figure given bellow illustrates the step leading to:
(a) binary fission in Amoeba.
(b) longitudinal binary fission in Paramecium.
(c) transverse binary fission in Euglena.
(d) transverse binary fission in Paramecium.

17. Four different arrangements used by students to test the effect of sulphur dioxide on potassium dichromate are shown below:



The correct arrangement is shown in:

(a) I (b) II (c) III (d) IV.

18. Four safety symbols are given below.

I II III IV

The most appropriate one for sulphur dioxide gas is:

(a) I (b) II (c) III (d) IV.

19. An iron nail was suspended in copper sulphate solution and kept for a while. The solution:

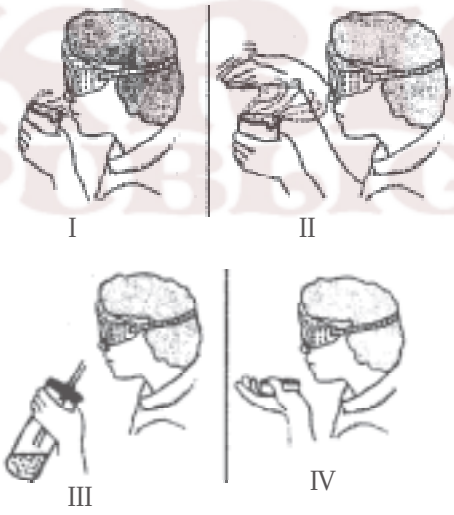
(a) remained blue and a coating was formed on the nail.

(b) turned green and a coating was found on the nail.

(c) remained blue and no coating was formed on the nail.

(d) turned green and no coating was formed on the nail.

20. The most appropriate method of testing the odour of a given liquid is:



I II III IV

(a) I (b) II (c) III (d) IV.

SECTION B

21. A student was given three samples containing ethanoic acid, sodium bicarbonate solution and water in test tubes I, II and III, respectively. On dipping a pH paper in them, he observed that the colour turned orange in I, blue in II and green in III.

If arranged in increasing order of their pH, the sequence of these bottles would be:

(a) I, III, II. (b) I, II, III.

(c) III, I, II. (d) II, III, I.

22. The following apparatus is available in the laboratory

Battery : adjustable from 0 to 6 V

Resistors : 3W and 6W

Ammeters : A_1 of Range 0 to 5 A;

Least Count 0.25 A

A_2 of Range 0 to 3 A; Least Count 0.1 A

Voltmeters : V1 of Range 0 to 10 V; Least Count 0.5 V.

V_2 of Range 0 to 5 V; Least Count 0.1 V

For the experiment to find the equivalent resistance of the parallel combination of the two given resistors, the best choice would be:

(a) ammeter A_1 and voltmeter V_1.

(b) ammeter A_1 and voltmeter V_2.

(c) ammeter A_2 and voltmeter V_1.

(d) ammeter A_2 and voltmeter V_2.

23. In an experiment to trace the path of a ray of light passing through a rectangular glass slab, four students tabulated their observations as given below.

A)

S.No.	Angle of incidence degree	Angle of refraction degree	Angle of emergence degree
1	30	18	32
2	45	28	43
3	60	35	60

B)

S.No.	Angle of incidence degree	Angle of refraction degree	Angle of emergence degree
1	30	15	38
2	45	20	53
3	60	28	67

C)

S.No.	Angle of incidence degree	Angle of refraction degree	Angle of emergence degree
1	30	10	31
2	45	15	44
3	60	22	60

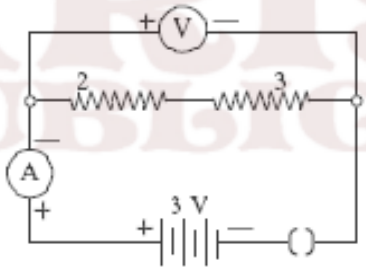
D)

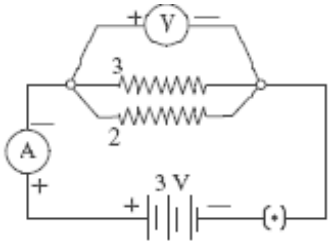
S.No.	Angle of incidence degree	Angle of refraction degree	Angle of emergence degree
1	30	28	28
2	45	40	40
3	60	56	56

The student most likely to have done the experiment properly is:

(a) A (b) B (c) C (d) D.

24. For the circuits A and B shown below, the voltmeter readings would be:





(a) 0.6 V in circuit A and 2.5 V in circuit B.

(b) 0 V in both circuits.

(c) 3 V in both circuits.

(d) 0 V in circuit A and 3 V in circuit B.

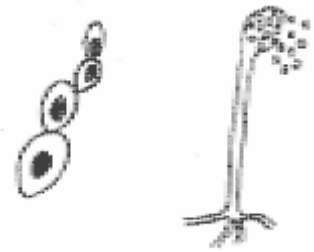
25. Two of the following four figures that illustrate budding are:

(a) 1 and 2.

(b) 1 and 3.

(c) 1 and 4.

(d) 2 and 4.



1 2

3 4

26. The correct procedure to prepare a temporary mount of a stained leaf epidermis is:

A	B
Take a peel of a leaf	Take a peel of a leaf;
Stain it with safranin;	Wash it in water;
Transfer the peel to the slide	Place it on the slide;
Remove the excess stain;	Add a drop of glycerin on it;
Put a cover slip on it	Put a cover slip gently.

C	D
Stain the leaf;	Take a peel;
Take a peel;	Stain it with iodine;
Wash the peel in water;	Transfer the peel to the slide;
Place it on a slide;	Remove excess stain with blotting paper;
Put a cover slip on it	Put a cover slip on it.

(a) A. (b) B. (c) C. (d) D.

27. While performing an experiment with raisins, a student recorded the following data.

Mass of water taken in the beaker = 50 g

Mass of raisins before soaking = 20 g

Mass of raisins after soaking = 30 g

Mass of water in the beaker left after experiment
= 40 g

The % of water absorbed by the raisin is:

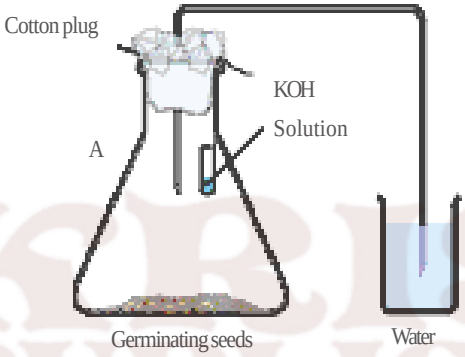
(a) 10 %.

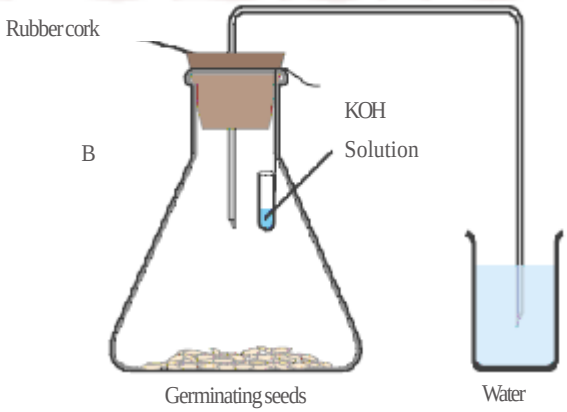
(b) 20 %.

(c) 45 %.

(d) 50 %.

28. Using the same number of given germinating gram seeds, two students A and B set up the experiment separately. Student A used a cotton plug to hold the bent tube in the mouth of the flask. Student B used a rubber cork.





After 4 hours they noticed that:

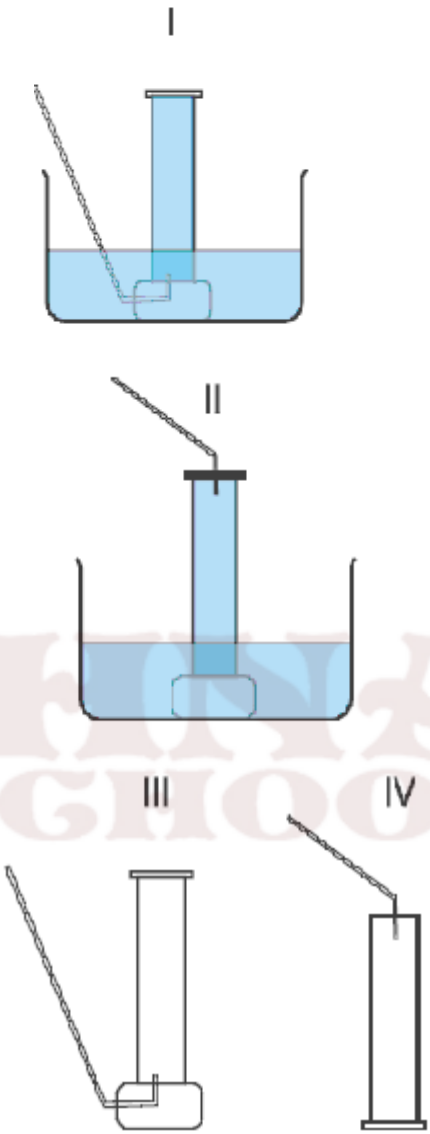
(a) water level increased in the bent tube only of A.

(b) water level increased in the bent tube only of B.

(c) the cotton plug was wet.

(d) the water in the beaker of B turned milky.

29. The proper experimental arrangement to collect sulphur dioxide is as shown in:



a) I b) II c) III d) IV

30. To show that zinc is more reactive than copper, the correct procedure is to:

(a) prepare copper sulphate solution and dip zinc strip in it.

(b) prepare zinc sulphate solution and dip copper in it.

(c) heat zinc and copper strips.

(d) add dilute nitric acid on both the strips.

ANSWERS

SET I

1. (a)Red colour is at the top and blue colour is at the bottom.
2. (a) The colour of pH paper is green in neutral medium, whereas it is red in acidic medium.
3. (b) The surface becomes black and dull as the reaction proceeds.
4. (a) For the correct measurement of focal length, must have a sharp image on the screen and the meter scale must be correctly positioned between the (sharp image) screen and the centre of the concave mirror.
5. (c) The image gets blurred and enlarged/shortened when the screen is pushed farther/nearer from the focus of the convex lens.
6. (a)We need to keep the eye far from the glass slab to have a good and proper alignment of the pins.
7. (b)We must not only put the ammeter in series and the voltmeter in parallel (with the resistor) but also ensure that the polarities of both the instruments are correct.
8. (a)The plotted points should not only lie (nearly) on a straight line but the straight line must also pass through the origin. Also the current should increase (proportionally) with the applied potential difference.
9. (d) Circuit (I), with no dot put in between the plug key symbol, is an open circuit. Circuit (II), with the dot put there, is a closed circuit in which a current of 5/5 A i.e. 1 A would flow.
10. (c) We would have a current flowing in the ammeter but no deflection in the voltmeter only if the voltmeter connections are loose.
11. (b) Guard cells have nucleus as well as chloroplasts.
12. (d) Covered portion of the leaf does not get sunlight irrespective of the colour of the strip.
13. (c) In (a) seeds are dormant, in (b) killed by cooking and in (d) there is no KOH.
14. (c) Absorption of water increases with time up to its maximum limit.
15. (b) The bud in yeast appears as a protuberance.
16. (c) Solutions in both A and B are hypotonic to raisins and hence they swell.
17. (d) Zinc and aluminium being more reactive will replace iron from iron sulphate.
18. (a) Acetic acid is corrosive and flammable.
19. (a) Copper is less reactive than zinc and, therefore, no reaction occurs.
20. (c) Acetic acid is miscible with water forming a clear solution.
21. (a) Zinc reacts with dilute HCl and NaOH, whereas Na_2CO_3 reacts only with dilute HCl.
22. (b)We must not only ensure that the two pins (on the incident ray) are relatively far apart but also keep the angle of incidence preferably between 30^0 and 60^0.
23. (c) We must not look for a stereotyped circuit diagram but look for the basic condition for (i) parallel (ii) series connection of two resistors in a given circuit.
24. (b) The equivalent resistance, of a parallel combination of resistors, is less than the resistance of either of its two branches. The equivalent resistance, in circuit 2, is, therefore, less than (R_1+R_2) (the equivalent resistance of circuit 1) and hence the current flowing through it increases. The voltage reading, in both cases, is, however, the same.
25. (d) Boiling kills the cells, chlorophyll leaches out when boiled in ethanol, but the leaf becomes brittle, made normal by washing it in water. Starch gets stained with iodine.
26. (b) Black paper covering prevents light.
27. (d) Seeds release CO_2 during respiration, which is absorbed by KOH creating a partial vacuum in the flask. To fill that water rises.
28. (d) Proper sequence is to be followed to handle the microscope and to focus the specimen.
29. (d) Copper reacts with concentrated H_2SO_4 on heating to give SO_2. The tip of the thistle funnel should dip into conc. H_2SO_4 .
30. (a) Acetic acid reacts with Na_2CO_3 and $NaHCO_3$ to liberate CO_2.

SET II

1. (a) The pH paper in neutral medium gives green colour.
2. (a) The colour of pH paper is orange in acidic medium while it is blue in basic medium.
3. (c) Zinc is available in the form of granules in the laboratory.
4. (b) The image of the (vertical) tree on the screen will be an inverted vertical image.
5. (a) The focal length of the lens equals the distance between the lens and the (sharp) image obtained on the screen.
6. (b) It is difficult to fix the pins vertically and we can have a proper alignment of the feet of the pins.
7. (b) We should select instruments without any zero error.
8. (a) The four cells must be connected in series to get a total voltage of 4x1.5=6.0V. For this, the negative of the first cell must be connected to the positive of the second cell, and so on, leaving the positive of the first cell and negative of the fourth cell to be connected to the circuit.
9. (b) The ammeter must be connected in series, between the battery and the series combination of the two resistors, and the voltmeter should be put in parallel across the series combination of the two resistors. All the polarities must also be correct.
10. (c) The ammeter, being a very low resistance device, would draw a very large current when connected directly to the battery. This burns out/ damages its coil.
11. (d) No. 4 is chloroplast.
12. (b) Nucleus divides first and then the cytoplasm, when Amoeba undergoes fission.
13. (c) 24 hours to shunt starch from the leaves to the rest of the plant. De-starched leaf will show the colour change.
14. (d) Water bath is a must to boil the leaf in ethanol as a precaution.
15. (c) Absorption is facilitated in warm water.
16. (c) Buds appear as protuberances.
17. (d) Acetic acid is flammable and corrosive.
18. (a) The freshly deposited copper is soft and dull.
19. (b) Metal deposition is not very fast and takes some time.
20. (a) The reaction between acetic acid and sodium bicarbonate to produce carbon dioxide is very fast.
21. (a) The reactions between (i) Zinc and dil. HCl and (ii) dil. HCl and Na_2CO_3 are fast whereas the reaction between Zn and NaOH is slow.
22. (b) The emergent ray, from the rectangular glass slab, is parallel to the incident ray and is laterally displaced to the left (lower side) of the incident ray.
23. (b) The ammeter reading being 1.5 A (=4.5V/3), only the three ohm resistor is connected to the circuit while the other six ohm resistor, because of its loose connection, is not part of the circuit at all.
24. (d) The overall range of the voltage is from 0 to 4.5V and that of current is from 0 to 4.5/9 A= 0.5A. We, therefore, prefer instruments that cover these ranges and also have a better least count.
25. (c) In the diffused light reaching the ventral surface, photosynthesis takes place, and so the whole leaf responds to starch test.
26. (a) The sequence is important to get the best stained material for the temporary mount.
27. (d) Proper labelling of KOH in the suspended test tube, water in the beaker and seeds in the conical flask.
28. (b) CO_2 released is absorbed by KOH. To fill the partial vacuum created in the conical flask, water rises in the bent tube.
29. (b) Zinc displaces iron and copper from their salt solutions.
30. (b) The apparatus required for the preparation and collection of SO_2 is given in Set II only.

SET III

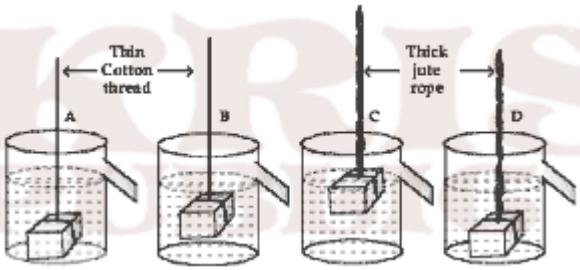
1. (c) For testing pH, aqueous solutions are used.
2. (d) Since red litmus shows no colour change with acids, it is first to be changed to blue litmus
3. (d) Zinc reacts with sodium hydroxide on heating to produce hydrogen gas rapidly.
4. (c) The sharp inverted vertical image of the distant tree is formed by a concave mirror.
5. (a) All the three angles, shown, here have to be measured with respect to the normal drawn at the points of incidence/ emergence.
6. (a) The ammeter has to be put in series and the voltmeter in parallel, with the resistor, with both instruments connected with their polarities also correct.
7. (a) The screen is just a device to observe the (real) image formed by a convex lens. The image of a distant object continues to get formed at the focus of the convex lens even when no screen is being used to show its formation.
8. (c) We can connect only the voltmeter (a high resistance device) in parallel with the resistor R. An ammeter, (a very low resistance device) would reduce the overall resistance of the circuit to almost zero. This would damage not only the ammeter but also the battery eliminator.
9. (b) The voltmeter has to be put in parallel with the resistances being measured and not across the ammeter.
10. (a) We must keep the circuit closed for a relatively shorter time and open for a relatively longer time. This would ensure minimal changes in the values of resistances due to the heating effects of currents.
11. (c) Safranin is pinkish red in colour.
12. (d) The sequence illustrates binary fission in Amoeba.
13. (d) KOH absorbs CO_2 released by the seeds.
14. (b) Sunlight is not available to the covered portion. Hence no starch. Remains white after starch test. The rest is stained.
15. (b) A is hypotonic to the sap of raisin. B is hypertonic. Hence endosmosis in A and exosmosis in B.
16. (d) Transverse fission in Paramecium.
17. (b) SO_2 reduces acidified $K_2Cr_2O_7$ and the most suitable acid used for acidification in dil H_2SO_4
18. (d) SO_2 is irritant/harmful.
19. (b) Iron being more reactive displaces copper from copper sulphate.
20. (b) The gases should not be smelt directly or kept too close to nose.
21. (a) Ethanoic acid has the lowest pH and $NaHCO_3$ has the highest pH whereas pH of water is in between the two.
22. (c) The equivalent resistance of 3 and 6 , in parallel is 2 . The current in the circuit can, therefore, go only up to 3 A. We therefore choose instruments of correct range and a better least count.
23. (a) We must not only have the angle of emergence (nearly) equal to the angle of incidence but also have an idea of the magnitude of the angle of refraction (for a glass slab) for the three most often used values (300, 450, 600) of the angle of incidence.
24. (d) Only circuit B, with a dot within the symbol of the plug key, is a closed circuit in which current is flowing and will show non-zero voltage. The voltmeter reading, for the set ups shown, would be(nearly) equal to the voltage of the battery.
25. (c) Yeast and Hydra reproduce by budding.
26. (a) Proper procedure to prepare a good stained temporary mount of leaf peel.
27. (d) Calculation using the formula.
28. (b) The conical flask should be closed with rubber cork to make it air tight. Otherwise partial vacuum will not be created.
29. (d) SO_2 is soluble in water and heavier than air.
30. (a) Zinc displaces copper from its salt solution.

Additional Questions and Answers

1. The following substances are added to water in a beaker as shown below. The mixture is stirred well. A true solution is found in the beaker.

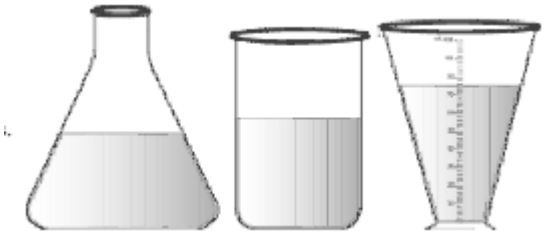
a) I b) II c) III d) IV

2. In the experiment to establish the relation between loss in weight of an immersed solid with the weight of water displaced by it, the correct setup is shown in figure.



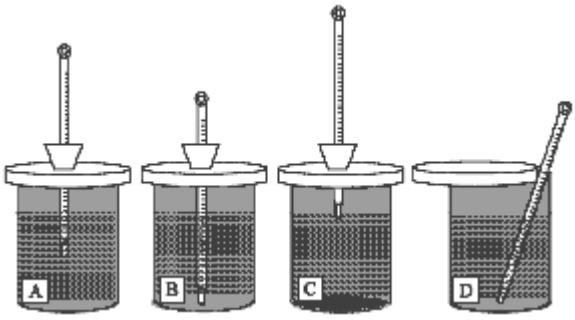
a) A b) B c) C d) D

3. A given solid is weighed in air using a spring balance. It is then weighed by immersing it fully, in each of the three vessels containing water, as shown. Its weight when immersed, will be:
   a) least in vessel C.
   b) least in vessel B
   c) least in vessel A
   d) equal in all the three vessels.



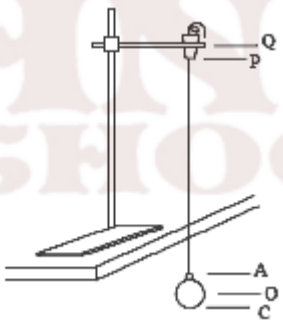
(A) (B) (C)

4. The correct arrangement for taking temperature in the study of the temperature time graph is shown in figure.

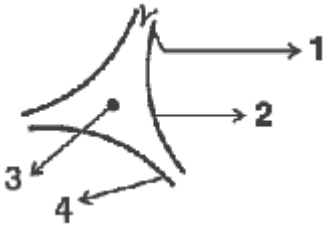


a) A b) B c) C d) D

5. For the simple pendulum shown in the figure, the effective length is :
   a) AP b) OP
   c) CP d) CQ



6. A figure depicting parts of a neuron is given below. The correct identification of the labels 1,2,3,4 respectively is:
   a) dendrite, cytoplasm, nissl granules, nerve fibre.
   b) cilia, endoplasmic reticulum, nucleoli, nerve fibre.
   c) dendrons, cell body, Nissl granuale, axon.
   d) dendrites, cyton, nuleus, axon.



7. The table below gives the observations reported by

two students X and Y for an experiment on the study of temperature-time graph. The experiment is likely to have been performed correctly by:

(a) X (b) Y

(c) both X and Y (d) neither X nor Y

Time (min)	Temp (°C) observed by Student X	Student Y
0	61.0	61.0
2	60.5	59.0
4	60.0	58.0
6	59.0	57.5
8	58.0	57.0
10	56.5	56.5
12	54.0	56.0

8. Observe the pictures of honey bee and cockroach. The common feature that assigns them to the same phylum is:

(a) wings

(b) three pair of legs

(c) jointed appendages

(d) antennae

9. A student found the posterior part of a male cockroach in the laboratory. The following sketch was made. The missing part in the sketch is:

(a) anal cerci

(b) anal style

(c) brood pouch

(d) antennae.

10. You are given solid cubes of aluminium and iron, each of side 4 cm, and two spring balances. Balance A has a range of 0 to 250 g and a least count of 2.5g, while balance B has a range of 0 to 1000 g and a least count of 10 g. The preferred option for mass measurement would be to use.

a) balance A for both the cubes.

b) balance B for both the cubes

c) balance A for the aluminium cube and balance B for iron cube.

d)balance A for the iron cube and balance B for aluminium cube.

11. A student observes that a block kept on a table, in the experimental set up used in the study of limiting friction, begins to move after adding 5g to the pan. The mass of the pan is 25g. If an identical block of the same mass is kept on the first block, the additional mass to be put in the pan needed to just move the blocks, would most likely be:

a) 10 g b) 20 g c) 30 g d) 40 g

12. You are viewing a prepared slide of striped muscle fibres from cockroach leg. When you focus the microscope, the striations appear pale and indistinct. To make the striations clearly visible, you would:

a) slowly close the diaphragm to reduce the light

b) remove the mirror to cut out light

c) change the eye piece to increase magnification.

d) replace the objective to decrease magnification.

13. A student was asked to mix the white of an egg with water and stir well. The student observed that:

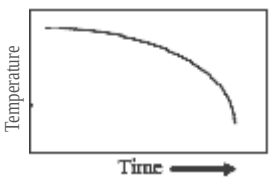
a) a transparent solution is formed

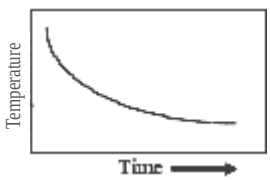
b) a translucent mixture is formed

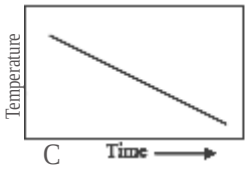
c) egg white settles down at the bottom

d) egg white floats on the surface of the water.

14. The temperature - time graph obtained when a hot liquid is allowed to cool, is likely to resemble graph.







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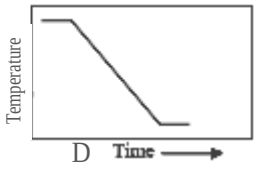
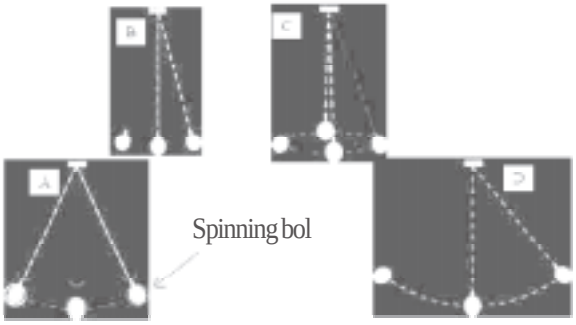


D

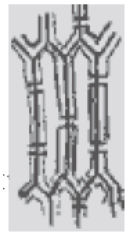
a) A b) B c) C d) D

15. Out of the following, the best choice for measuring the time period of a simple pendulum is:



a) A b) B c) C d) D

16. While observing a thin section of a plant stem, four students sketched sclerenchyma as given below. The correct diagram is:



a) A b) B c) C d) D

ANSWERS

1. b) Sugar makes a true solution.
2. b) The solid must be suspended by an inextensibl string in the centre of the overflow can without touching its bottom.
3. d) The loss in weight does not depend upon the shape of the vessel or the volume of water in it.
4. a) The thermometer must be dipped vertically in the water level away from the bottom and sides of the calorimeter and close to the middle of the water level.
5. b) The length of the pendulum equals the length fromthe bottom of the suspension to the centre of the bob.
6. d) Correct labelling.
7. b) The rate of fall of temperature is faster first and slower later.
8. c) All arthropods have jointed appendages.
9. b) Only male cockroaches have anal styles along with anal cerci.
10. c) While preferring a smaller least count, we should estimate the range needed for a given measurement and select accordingly.
11. c) We need to double the total mass of the pan and its weight to move a block of double the mass. That is, we need 35g in the pan. So additional mass to be put is 30 g.
12. a) Reduction of light gives a better contrast.
13. b) Egg white forms colloids.
14. b) The liquid cools faster first and slowly later on.
15. b) The pendulum bob must be made to swing with a small amplitude without spinning or moving in a circular path.
16. c) Pits, non - nucleated cells, thick cell walls characteristics.

Associated Value : The learners will appreciate the very idea of keeping the tourist spot clean whenever they visit their as these are our natural heritage.

ANS 62 1. Reduce reuse and recycle

2. By becoming Eco-friendly

By planting trees, by not throwing garbage etc.

Associated Value : Same as in 58.