

SUPPORT MATERIAL

CLASS – X (SCIENCE)

FIRST TERM

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TERM-1

Support Material for Class X

UNIT 1 : Chemical Substances

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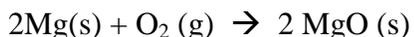
1. Chapter 14. Sources of Energy

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 same 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,



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

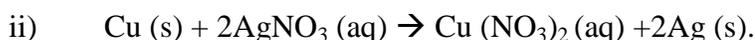
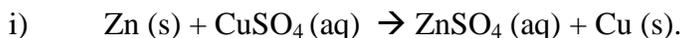


The decomposition of a substance by passing electric current through it is known as electrolysis.

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,

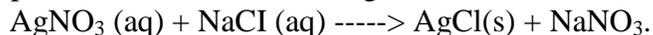


- d) **Double Displacement Reactions** - The chemical reactions in which compounds react to form two different compounds by mutual exchange of ions are called double displacement reactions.

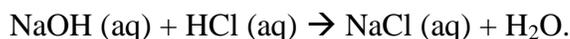
These reactions take place in solution two common types of this reaction are precipitation reactions and neutralization reactions

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

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



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

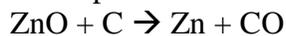


e) **Redox reaction:** Chemical reaction which shows both oxidation and reduction reaction.

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 reduce to Zn ---- reduction

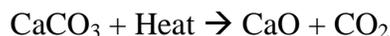
C oxidize to CO -----oxidation

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.



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



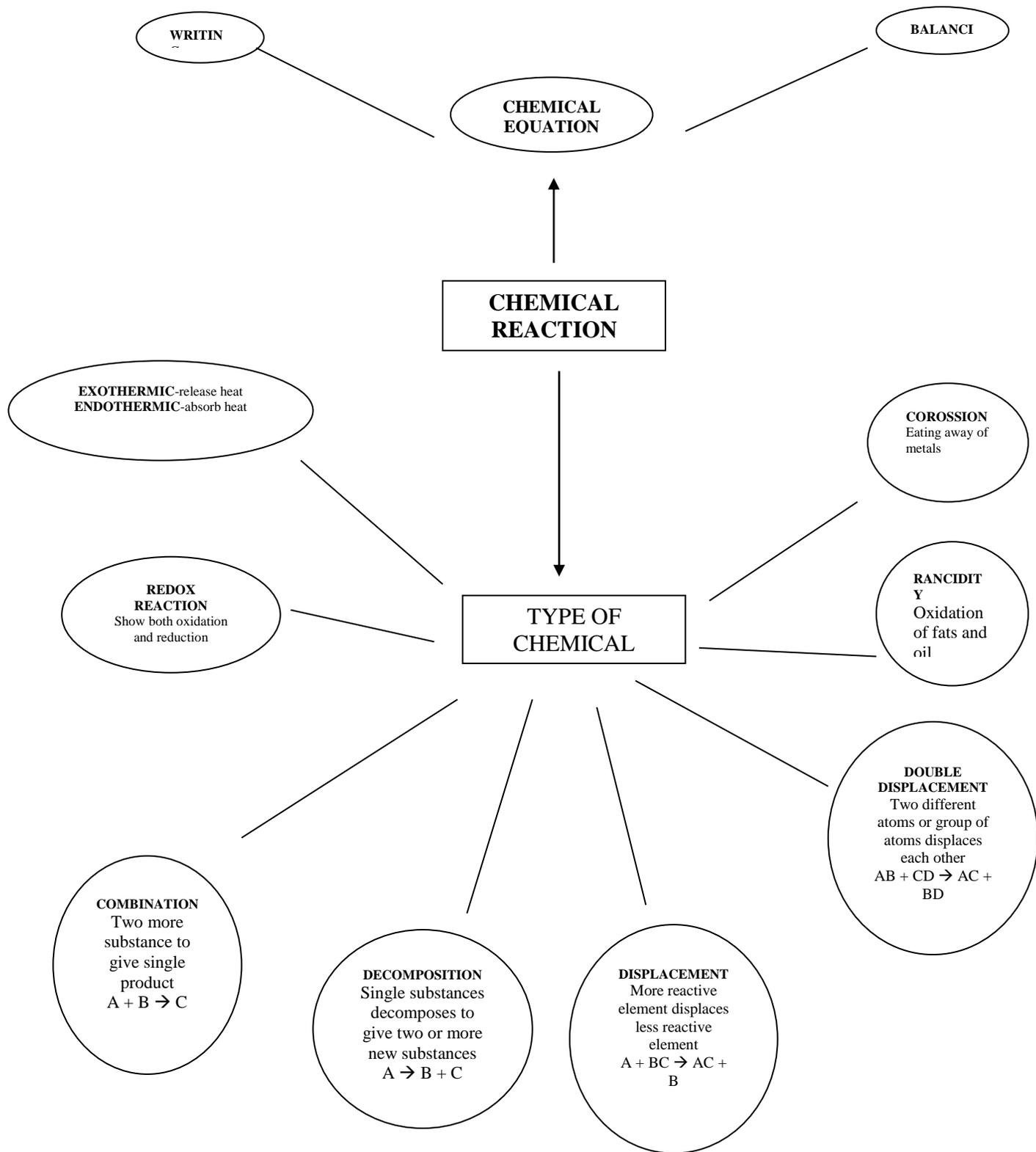
5 Corrosion – The process of slow conversion of metals into their undesirable compounds due to their reaction with oxygen, water, acids, gases etc. present in the atmosphere is called corrosion.

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



FA I
CHEMICAL REACTIONS AND EQUATIONS
FORMATIVE ASSESSMENT I
Q. PAPER

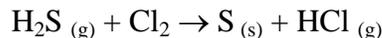
MARKS-30

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:



3. Give an example of photochemical reaction.
4. Name the reaction which forms insoluble salts.
5. Name the product obtained and type of reaction given below:
$$\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \rightarrow \text{_____} + \text{_____}$$
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 necessary 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.

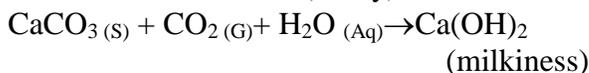
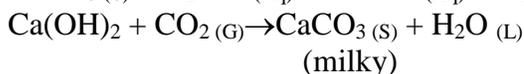
14.

- Why can not a chemical change be normally reversed?
- Why is it always essential to balance a chemical equation?
- What happens when CO₂ gas is passed through lime water and why does it disappear on passing excess CO₂?
- Can rusting of iron take place in distilled water?

HOTS QUESTIONS (SOLVED)

Q.1. A water insoluble substance 'X' on reacting with dilute H₂SO₄ 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 milkiness disappeared 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 CaCO₃.



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?

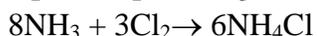
Ans. Red litmus paper turned blue.

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. $\text{O}_2 + 2\text{SO}_2 \rightarrow 2\text{SO}_3$



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

Q.5. Mohan took 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 of 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

FA II
CHEMICAL REACTION AND EQUATIONS

Oral questions (Conversation 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

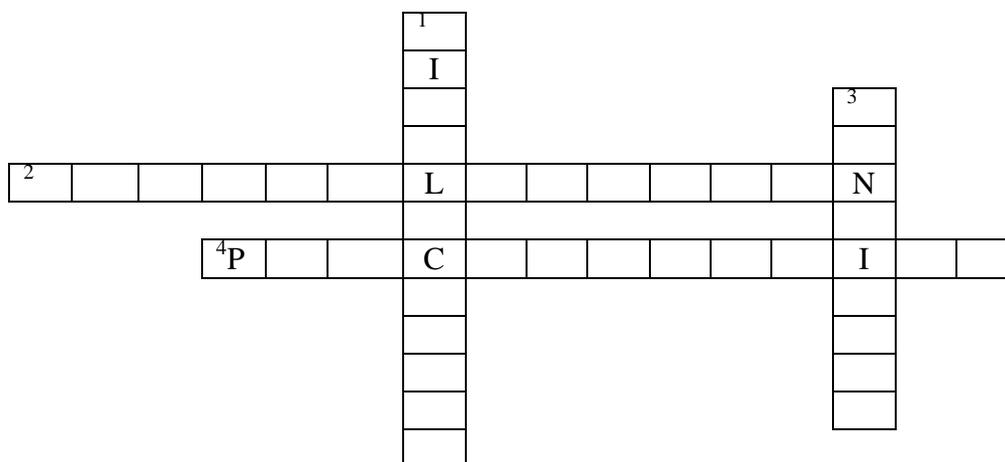
1. What is opposite to combination reaction?
2. To pack food articles, why do manufacturers flush out oxygen with nitrogen?
3. What is spoiling of food called when kept for a long time?
4. What is the chemical reaction called in which heat is evolved?
5. Silver articles get black coating. Name the phenomenon.
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?

2. ↓ Down

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 SALTS
GIST OF THE LESSON

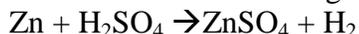
- 1) Acids are sour in taste, turn blue litmus red, and dissolve in water to release H^+ ions e.g. HCl, H_2SO_4 , HNO_3 etc.
- 2) Bases are bitter in taste, have soapy touch, turn red litmus blue and give hydroxide ions in solution.
e.g. NaOH, KOH etc.
- 3) A salt is a compound which is formed by neutralization 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:

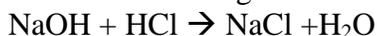
i) Acids react with active metals to give hydrogen gas.



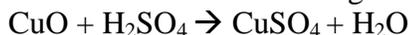
ii) Acids react with metal carbonate and metal hydrogen carbonate to give carbon dioxide.



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



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

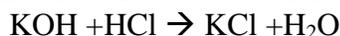


6) Chemical properties of Bases:

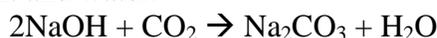
i) **Reaction with Metals** - Certain reactive metals such as Zinc, Aluminium, and Tin react with alkali solutions on heating and hydrogen gas is evolved.



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



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



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.

$$\text{pH} = -\log [\text{H}^+]$$

For water or neutral solutions, $\text{pH} = 7$; For acidic solutions, $\text{pH} < 7$; For basic solutions, $\text{pH} > 7$

8) Some Important Chemical Compounds:

a) Common Salt (NaCl)

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

Common salt 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.



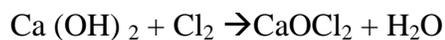
This process is known as chlor-alkali process.

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 (CaOCl₂)

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



Uses –

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

d) Baking Soda (NaHCO₃)

Chemical name is Sodium hydrogen carbonate.

It is prepared by passing CO₂ gas through brine solution saturated with ammonia.



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. Its aqueous solution is weakly alkaline due to hydrolysis.

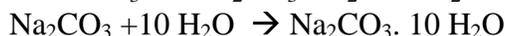
Uses:

1. It is used in soda – acid fire extinguisher.
2. It acts as a 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 (Na₂CO₃·10 H₂O)

Chemical name is sodium carbonate decahydrate.

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



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 (CaSO₄·1/2H₂O)

Its chemical name is calcium sulphate hemihydrate. It is obtained by heating Gypsum up to 373K.



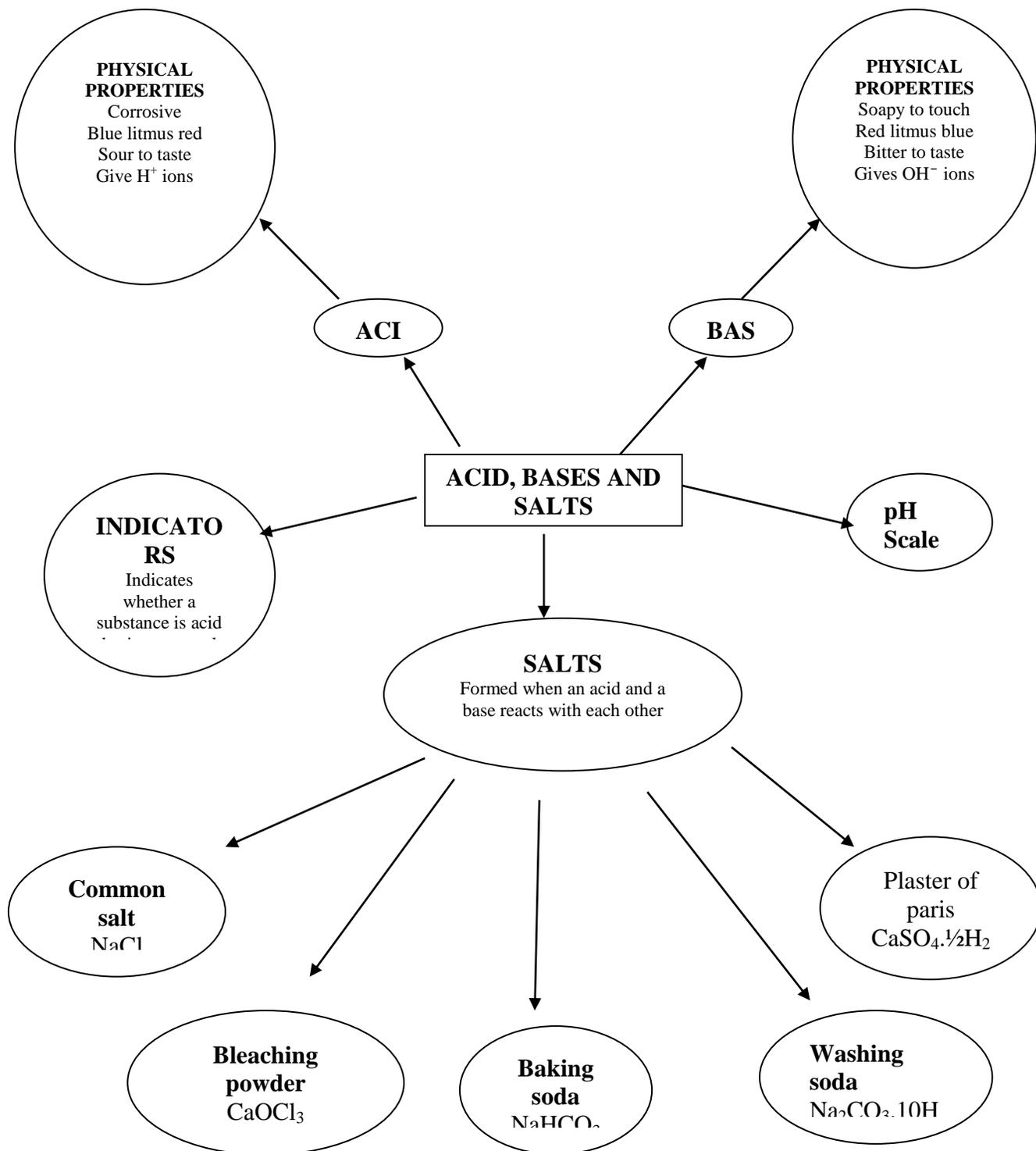
On treatment with water it is again converted into gypsum and sets as a hard mass.



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 SALTS
FORMATIVE 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

- 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?
- iv. 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 Crystallisation' 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?
- ix. 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 its 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 a tube. The tube immediately cracked and the liquid escaped out, that produced blisters on the skin of the student. Why?

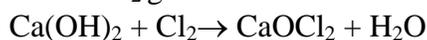
HOTS QUESTIONS

Q.1. In one of the industrial processes used for the manufacture of sodium hydroxide, a gas 'X' is formed as a by-product. The gas 'X' reacts with lime water to give a compound 'Y' which is used as a bleaching agent in the 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 oxychloride (bleaching powder) Y.



'X' \Rightarrow Cl_2 gas

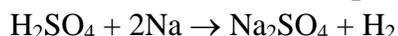


Q.2. Dry hydrogen chloride gas does not turn blue litmus, whereas hydrochloric acid does. Why?

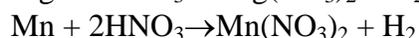
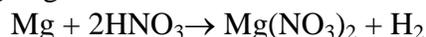
Ans. In the dry state, hydrogen chloride (HCl) does not release H^+ ions. Therefore, it cannot behave as an acid. When dissolved in water, it forms hydrochloric acid. It dissociates to give H^+ ions in solution and behaves as an acid.

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

Ans. $\text{Acid} + \text{Metal} \rightarrow \text{Salt} + \text{Hydrogen}$



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



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

Q. 5 What is meant by water of crystallisation 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?

FA II
ACIDS, BASES AND SALTS
ORAL QUESTIONS – (Conversation 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 CO₂ 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 salts?
- b) How many types of salts are formed?
- c) What are neutral salts?
- d) What do you mean by acidic salts?
- e) Define basic salts.
- f) Give the corresponding acid and base from which sodium carbonate is formed.
4. a) What is common salt?
- b) Why does common salt become moist in rainy season?
- c) How is it used as a freezing mixture?
- d) Name two important laboratory chemicals prepared from common salt 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?

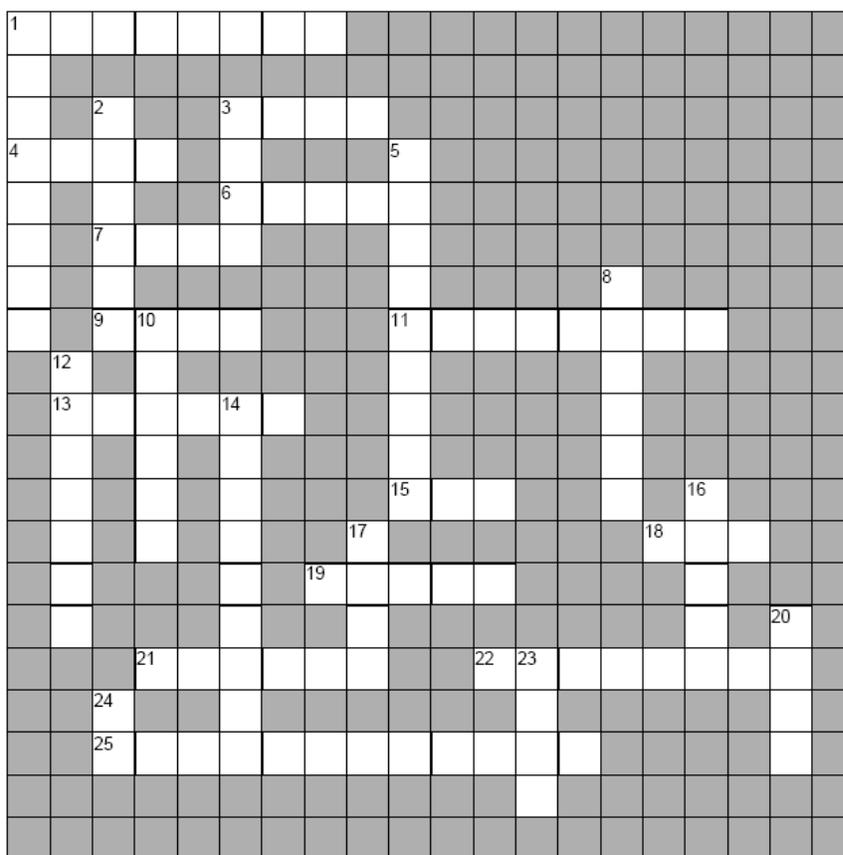
ORAL QUESTIONS

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 decolourisation.
5. I give different smell in acid and base solution.

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 | <p>Metal + Oxygen → Metal oxide</p> $4\text{Na(s)} + \text{O}_2\text{(g)} \rightarrow 2\text{Na}_2\text{O(s)}$ $4\text{Al(s)} + 3\text{O}_2\text{(g)} \rightarrow 2\text{Al}_2\text{O}_3$ <p>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</p> $\text{Na}_2\text{O(s)} + \text{H}_2\text{O(l)} \rightarrow 2\text{NaOH(aq)}$ | <p>Non-metal + Oxygen → Non-metal oxide</p> $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$ $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$ <p>Non-metals form acidic oxides CO and H₂O 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</p> $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$ |
| 2 | Reaction with water | <p>Metals react with water to form metal oxides or metal hydroxide and H₂ gas is released.</p> $2\text{Na(s)} + 2\text{H}_2\text{O(l)} \rightarrow 2\text{NaOH} + \text{H}_2\text{(g)}$ <p>+ heat</p> | <p>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 H₂ gas.</p> |
| 3 | Reaction with dilute Acids | <p>Metal + Acid → Metal salt + Hydrogen</p> <p>HCl</p> $\text{Mg(s)} + 2\text{HCl(aq)} \rightarrow \text{MgCl}_2\text{(aq)} + \text{H}_2\text{(g)}$ <p>H₂SO₄</p> $2\text{Na(s)} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4\text{(aq)} + \text{H}_2\text{(g)}$ <p>HNO₃</p> <p>Metal + HNO₃ → H₂ gas is not displaced. Reason- HNO₃ is strong oxidizing agent.</p> | <p>Non-metals do not react with acids to release H₂ gas Reason- Non-metals cannot loose electrons and give it to Hydrogen ions of acids so that the gas is released.</p> $\text{Mn} + 2\text{HNO}_3 \rightarrow \text{Mn(NO}_3)_2 + \text{H}_2$ <p>H₂ gas from HNO₃</p> |
| 4 | Reaction with salt solutions | <p>When metals react with salt solution, more reactive metal will displace a less reactive metal from its salt solution.</p> $\text{CuSO}_4\text{(aq)} + \text{Zn(s)} \rightarrow \text{ZnSO}_4\text{(aq)} + \text{Cu(s)}$ | <p>When non-metals react with salt solution, more reactive non-metal will displace a less reactive non-metal from its salt solution.</p> $2\text{NaBr(aq)} + \text{Cl}_2\text{(g)} \rightarrow 2\text{NaCl(aq)} + \text{Br}_2\text{(aq)}$ |
| 5 | Reaction | <p>Metal + Chlorine → Metal</p> | <p>Non-metal + Chlorine →</p> |

| | | | |
|---|------------------------|--|--|
| | with Chlorine | Chloride ionic bond is formed. Therefore Ionic compound is obtained. $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$ | Non-metal Chloride covalent bond is formed. Therefore covalent compound is obtained. $\text{H}_2(\text{g}) + \text{Cl}_2 \rightarrow 2\text{HCl}$ |
| 6 | Reaction with Hydrogen | Metals react with hydrogen to form metal hydride This reaction takes place only for most reactive metals. $2\text{Na}(\text{s}) + \text{H}_2(\text{g}) \rightarrow 2\text{NaH}(\text{s})$ | Non-metals react with hydrogen to form hydrides $\text{H}_2(\text{g}) + \text{S}(\text{l}) \rightarrow \text{H}_2\text{S}(\text{g})$ |

Properties of ionic compounds

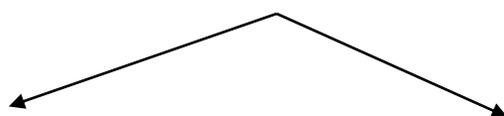
- 1. Physical nature:** solid and hard due to strong force of attraction. (generally brittle)
- 2. Melting point and boiling point:** have high M.P and B.P, as large amount of heat energy is required to break strong ionic attraction.
- 3. Solubility:** soluble in water and insoluble in kerosene and petrol.
- 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 Earth's crust, sea-water



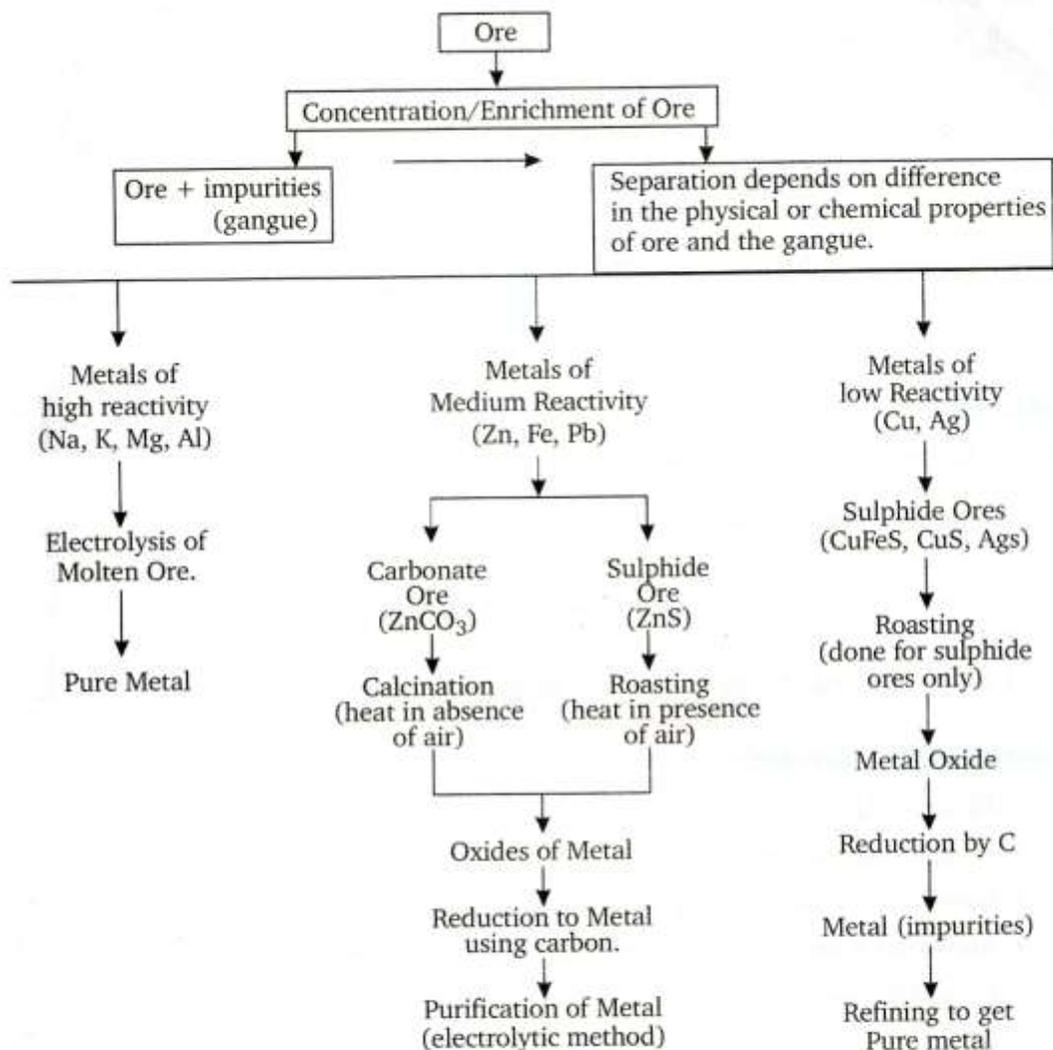
Minerals

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

Ores

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

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

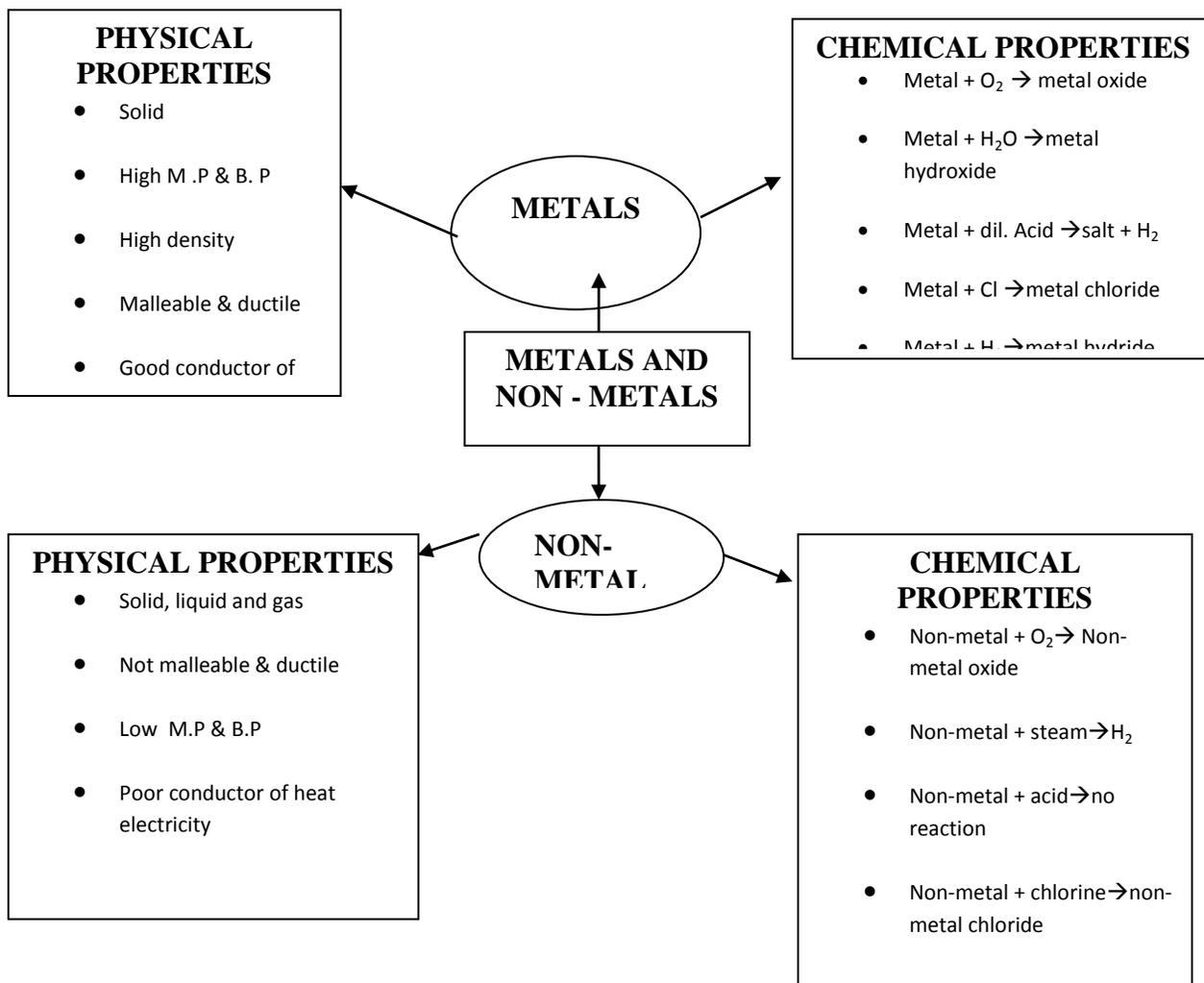


| Calcination | Roasting |
|--|---|
| <p>It is done for carbonate ores. Heating of ores in absence of oxygen. CO₂ gas is released and Metal oxide is obtained</p> | <p>It is done for sulphide ores. Heating of S. ore in presence of oxygen. SO₂ gas is released and Metal oxide is obtained.</p> |
| $\text{ZnCO}_2(\text{s}) \xrightarrow{\text{heat}} \text{ZnO}(\text{s}) + \text{CO}_2(\text{g})$ | $2\text{ZnS}(\text{s}) + 3\text{O}_2(\text{g}) \xrightarrow{\text{heat}} 3\text{ZnO}(\text{s}) + \text{SO}_2(\text{g})$ |

Refining of Metals

To obtain pure metal electrolytic refining of metals is done.

MIND MAP



METALS AND NON – METALS
FORMATIVE 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 lose 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) Metal 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?

FA 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 galvanisation 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 salts.
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 same category of elements but still combine to form molecules / compounds.

KEY CONCEPTS & GIST OF THE LESSON

- ❖ Life processes – The processes that are necessary 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-
$$6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow[\text{Chlorophyll}]{\text{sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2$$
- 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) **Saprophytic 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 | Salivary glands | Salivary 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 |
|----------------------------|------------------------------|

| | |
|--|--|
| <p>1. Takes place in presence of Oxygen.</p> <p>2. End products- Carbon dioxide & Water</p> <p>3. More energy is released.</p> <p>4. Takes place in Cytoplasm & Mitochondria</p> <p>5. Complete oxidation of glucose takes place.</p> <p>6. It occurs in most organisms.</p> <p>7. Equation- Glucose → Pyruvate → CO₂ + H₂O + Energy</p> | <p>1. Takes place in absence of Oxygen.</p> <p>2. End products- Ethanol & Carbon dioxide</p> <p>3. Less energy is released.</p> <p>4. Takes place in only in Cytoplasm.</p> <p>5. Incomplete oxidation of glucose takes place.</p> <p>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.</p> <p>7. Equation- <u>In Yeast-</u> Glucose → Pyruvate → Ethanol + H₂O + Energy <u>In muscle cells -</u> Glucose → Pyruvate → Lactic acid + Energy</p> |
|--|--|

- 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 → Nasal cavity → Trachea → Bronchi → Bronchioles → Alveoli
 - Rings of cartilage present in the throat ensure that the trachea (air passage) 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.

❖ 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, salts, 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 necessary for photosynthesis.
2. To prove that Carbon dioxide is necessary for photosynthesis.
3. To prove that light is necessary 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 salivary 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
FORMATIVE 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 leaf 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. Describe 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 necessary 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 necessary 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 pass through the alimentary canal?
3. What regulates the exit of food from the stomach into the small intestine?
4. In which part of the alimentary canal is food completely digested and absorbed?
5. In which cell organelle does the breakdown of pyruvate take place using oxygen?
6. Which structures stop the backward flow of blood in the atria and ventricles?
7. The filtered urine is collected in which part of the 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 the evaporation of water from plants is mainly through the stomata.

QUIZ

1. Digestion of starch in humans takes place from which organ?
2. Absorption of energy takes place in sunlight by the pigment.
3. Is the chloroplast a 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**

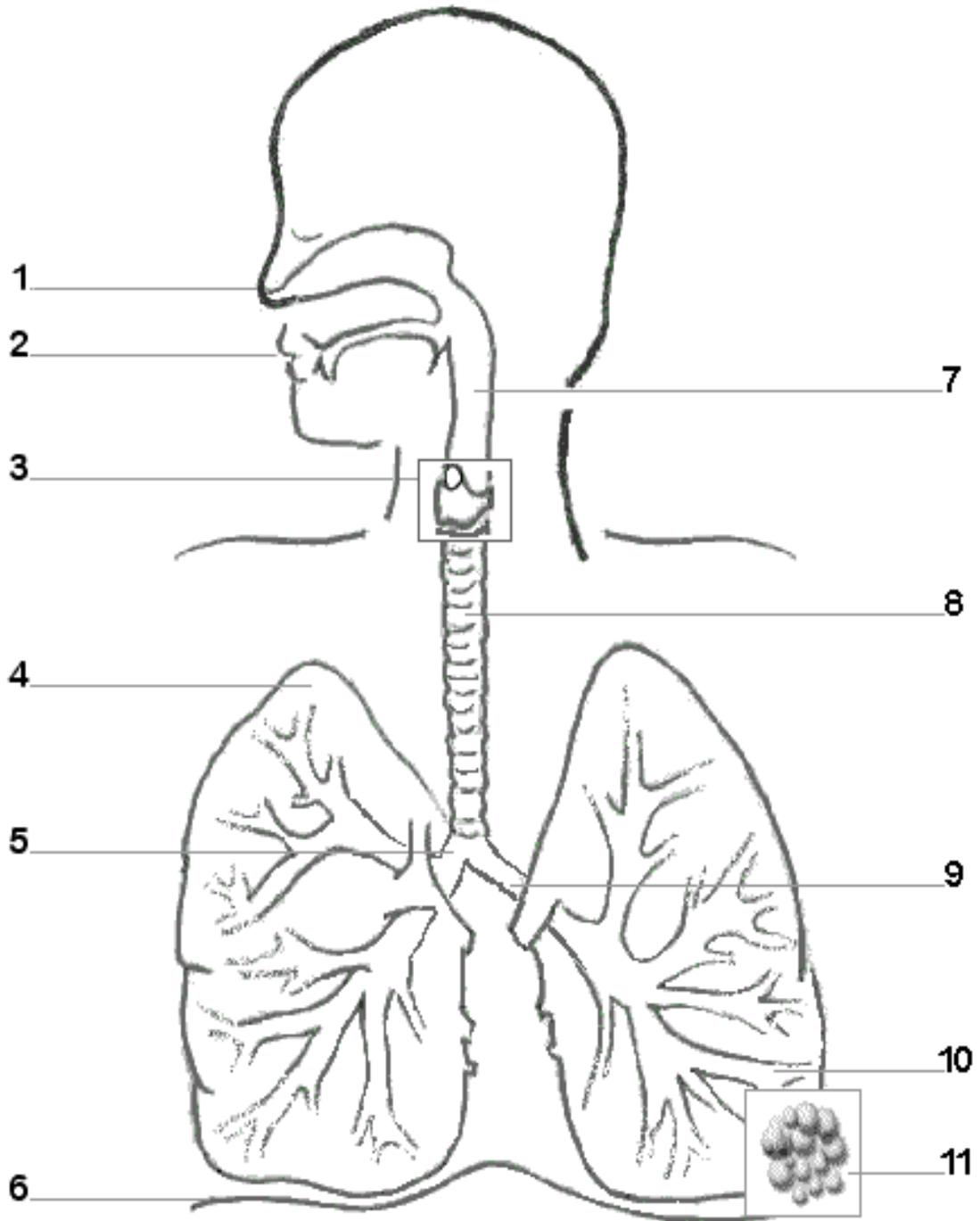
1. Transports oxygen in the body.
3. Carry impure blood.

| | | | | | | | | | | |
|---|--|--|---|--|---|--|--|--|--|--|
| | | | | | 4 | | | | | |
| 1 | | | | | | | | | | |
| 2 | | | 3 | | | | | | | |
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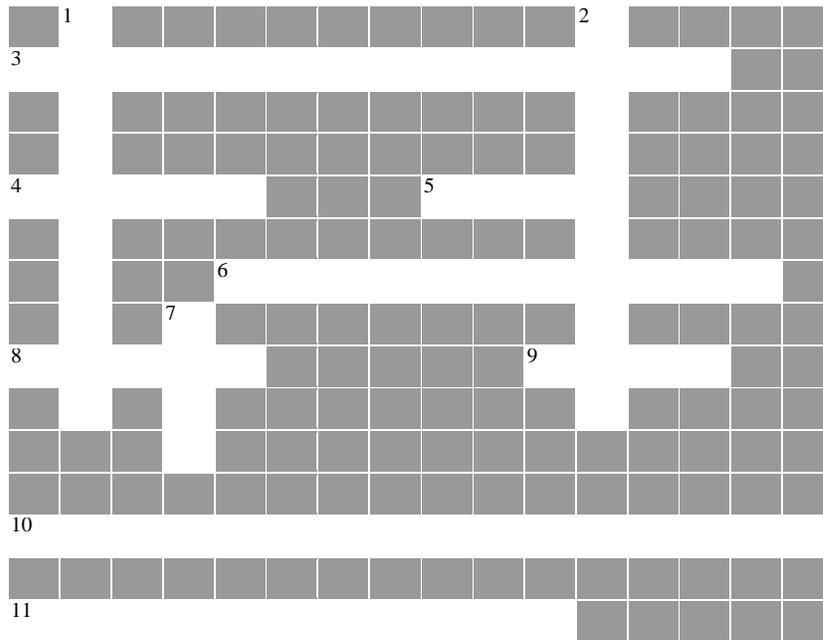
2. ⇒ **Across**
 1. Help in respiration in water.
 5. Removed through urine.
- ⇓ **Down**
2. Help to breath in air
 3. The process by nitrogenous waste is removed.
 4. Organism that takes in food with the help of pseudopodia.

| | | | | | | | |
|---|--|---|--|---|---|--|--|
| 1 | | 2 | | | | | |
| | | 3 | | 4 | 5 | | |
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Label The Diagram Of Respiratory System



➤ Cross word puzzle- Circulatory system



Clues for solving the cross word puzzle

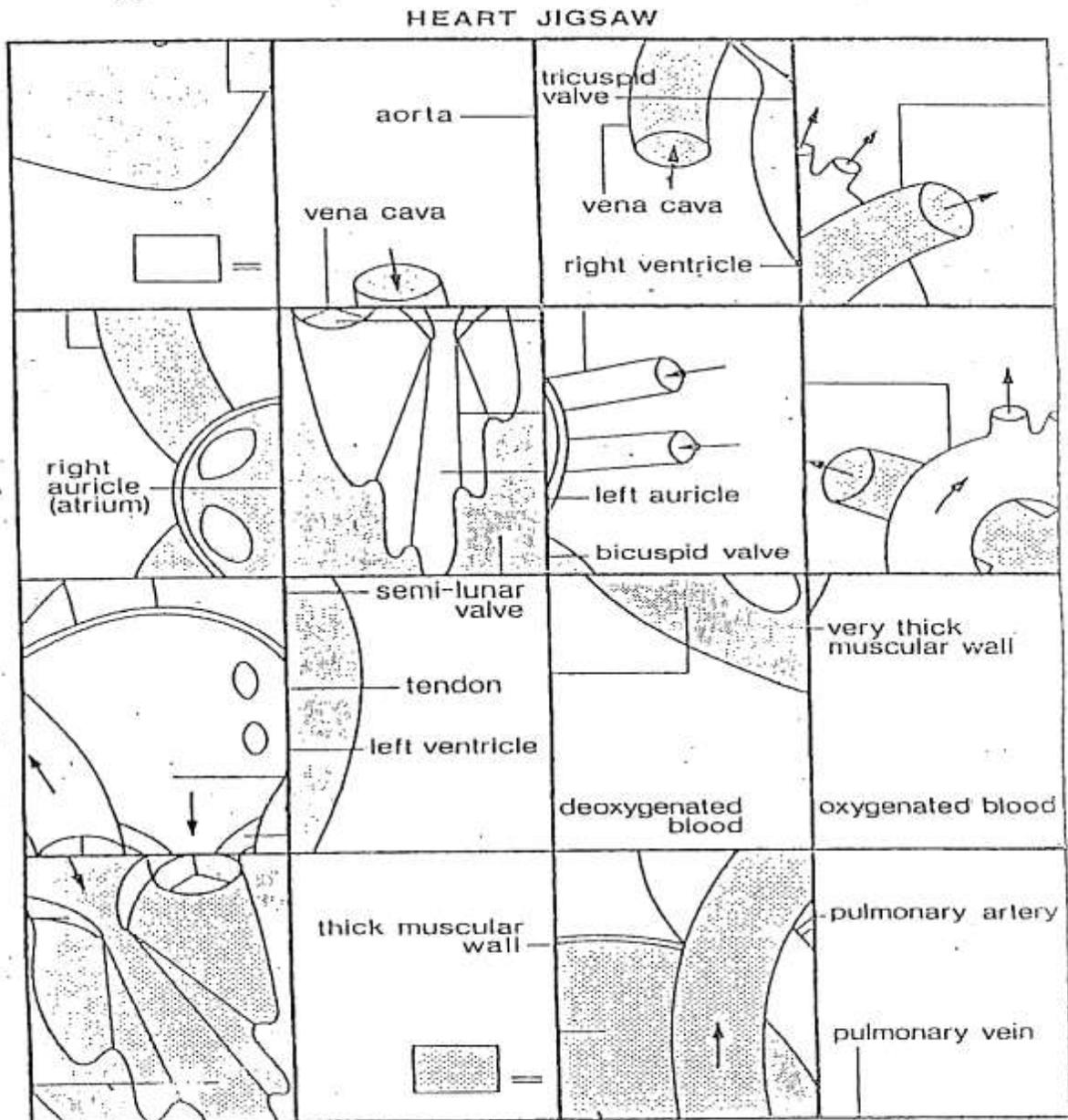
ACROSS

- 3. The only vein that carries oxygenated blood to the heart
- 4. The organ which beats continuously 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

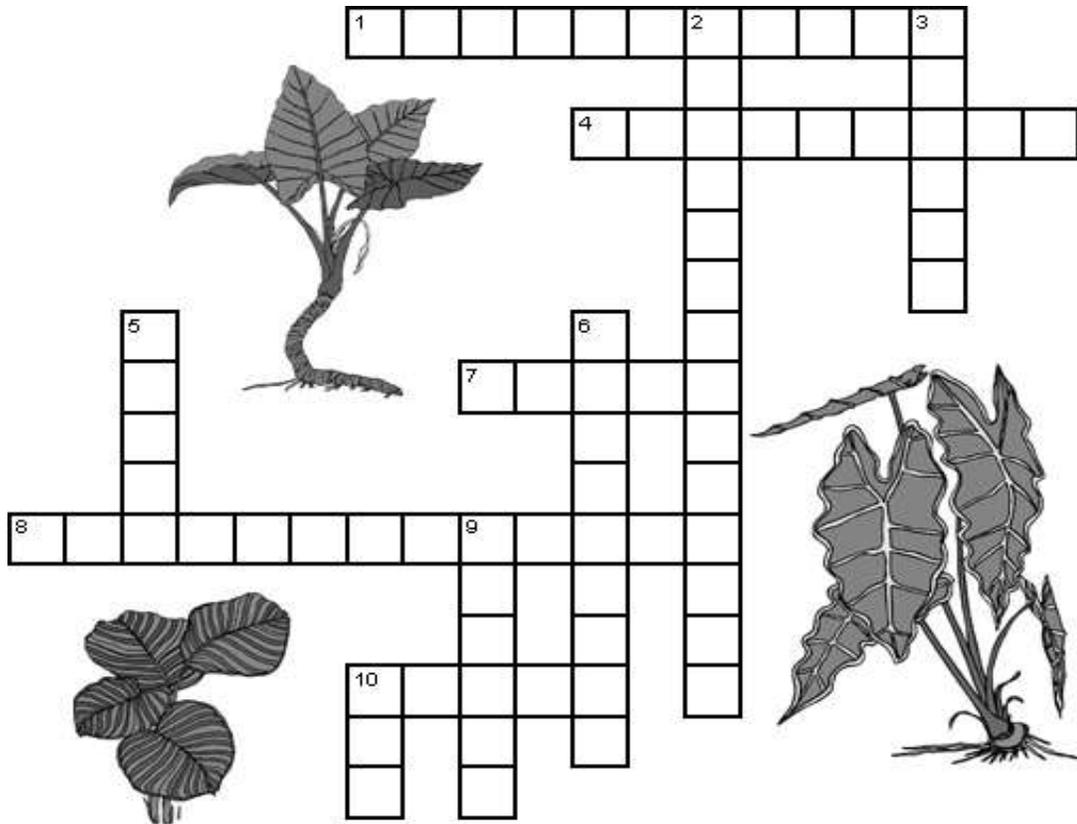
DOWN

- 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-saw 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) Hypothalamus | ----- | (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

Hypothalamus- 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, salivation, 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)

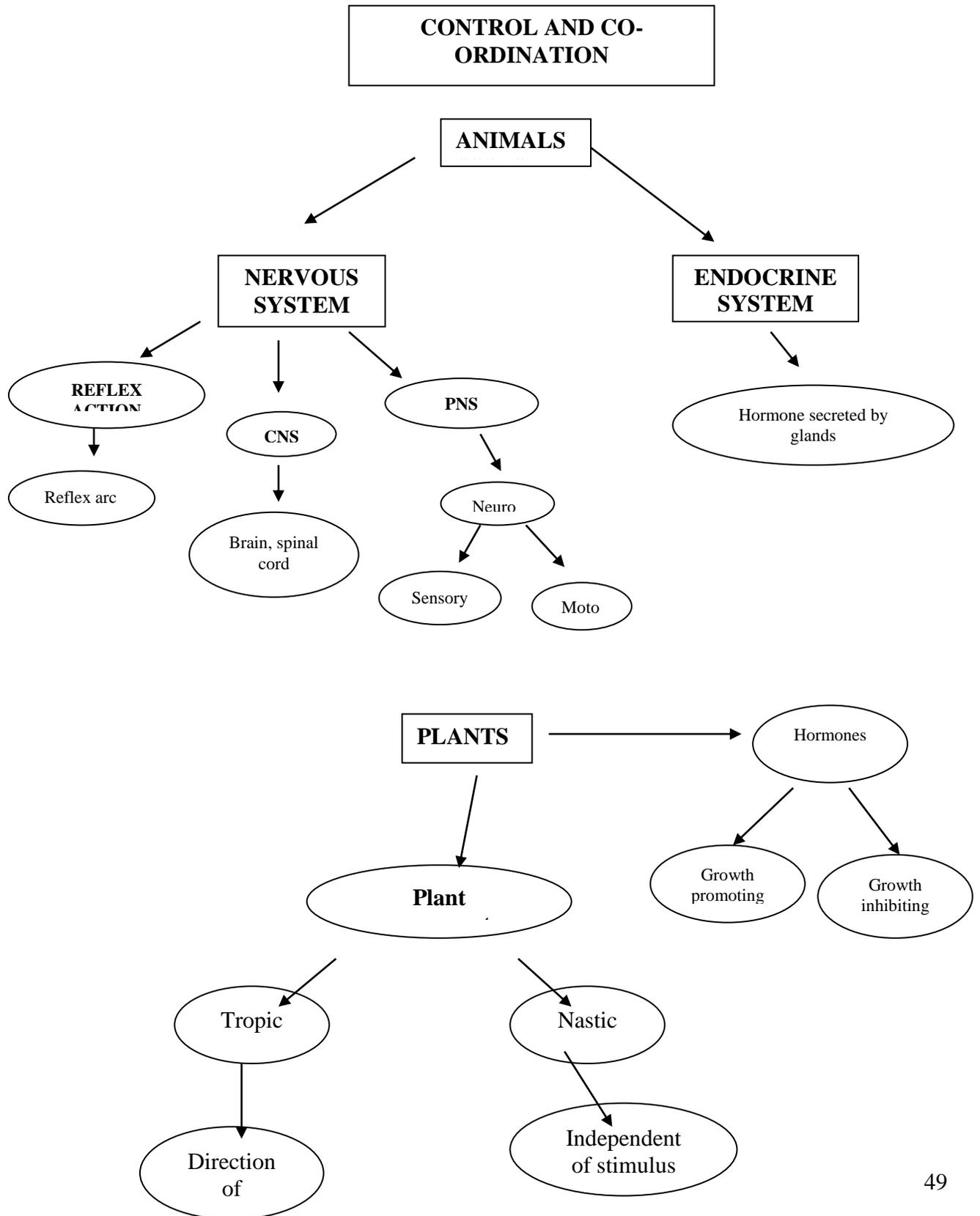
| Endocrine gland | Hormone | Function |
|--------------------|-------------------------------------|--|
| Pituitary gland | Growth hormone | Body growth, development of bones & muscles (If excess- Gigantism) (If less- Dwarfism) |
| Thyroid gland | Thyroxine | Regulates carbohydrate, protein & fat metabolism(If 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
FORMATIVE 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 necessary 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.

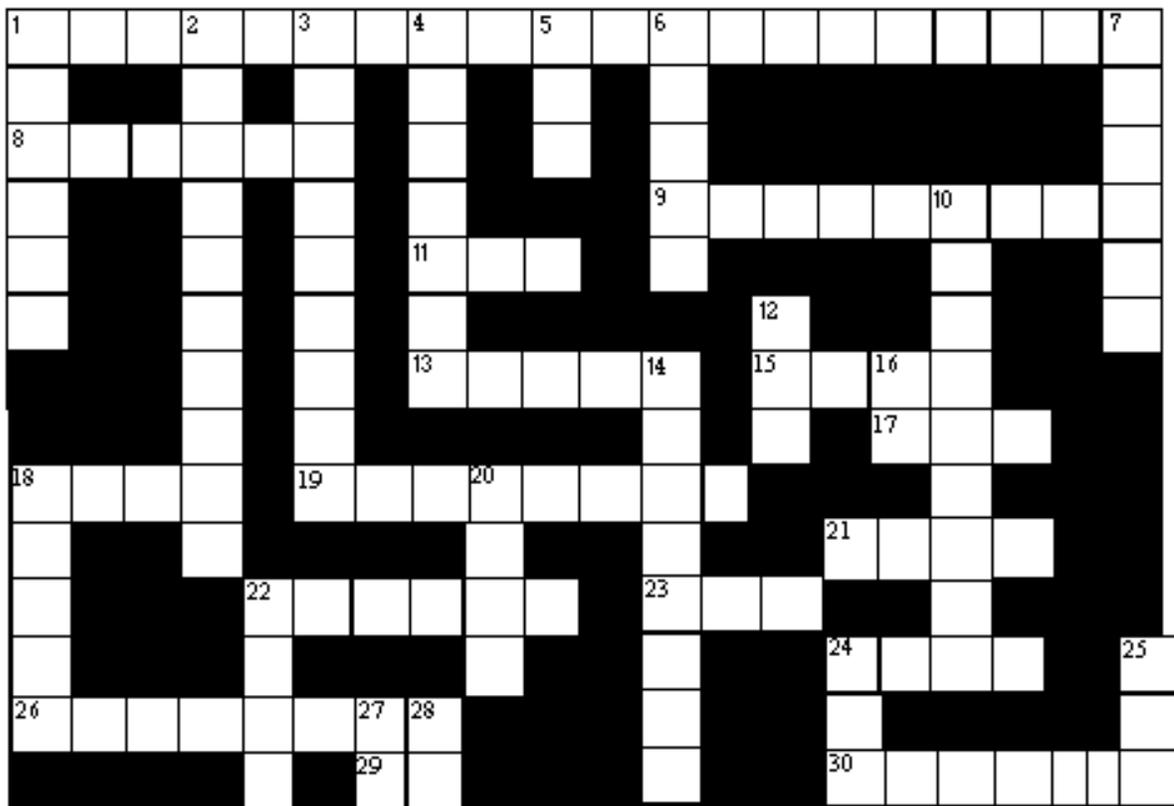
ORAL QUESTIONS

1. What is the basic unit of nervous system?
2. How do neuron conduct message 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. Necessary for hearing
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".

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 passage 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 said to be one ampere.
1 ampere = 1 coulomb/1 second or $1 \text{ A} = 1\text{C}/1\text{s} = 1\text{Cs}^{-1}$
1 milliampere = $1 \text{ mA} = 10^{-3} \text{ A}$
1 microampere = $1 \mu\text{A} = 10^{-6} \text{ A}$
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 said 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. $1 \text{ volt} = 1 \text{ joule}/1 \text{ coulomb}$ or $1 \text{ V} = 1\text{J}/1\text{C}$

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 across its ends, provided the physical conditions like temperature, density etc. remains unchanged.

$$V \propto I \text{ or } V = RI$$

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.

$$\text{Resistance} = \text{Potential difference}/\text{Current} \text{ or } R = V/I$$

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.
 $1 \text{ ohm} = 1 \text{ volt}/1 \text{ ampere}$ or $1\Omega = 1\text{V}/1\text{A}$

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

- i) Directly on its length L i.e. $R \propto L$.
- ii) inversely on its area of cross-section A i.e. $R \propto 1/A$
- iii) on the nature of material of the conductor on.

On combining the above factors, we get

$$R \propto L/A$$

$R = \rho * L/A$ 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).

$$\text{Resistivity, } \rho = RA/L$$

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 same.

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 same 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

$$H = I^2Rt \quad \text{joule} = I^2Rt/4.18 \text{ cal}$$

or

$$H = VIt \quad \text{joule} = VIt/4.18 \text{ cal}$$

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.

$$1 \text{ watt} = 1 \text{ joule/1 second} = 1 \text{ volt} \times 1 \text{ ampere}$$

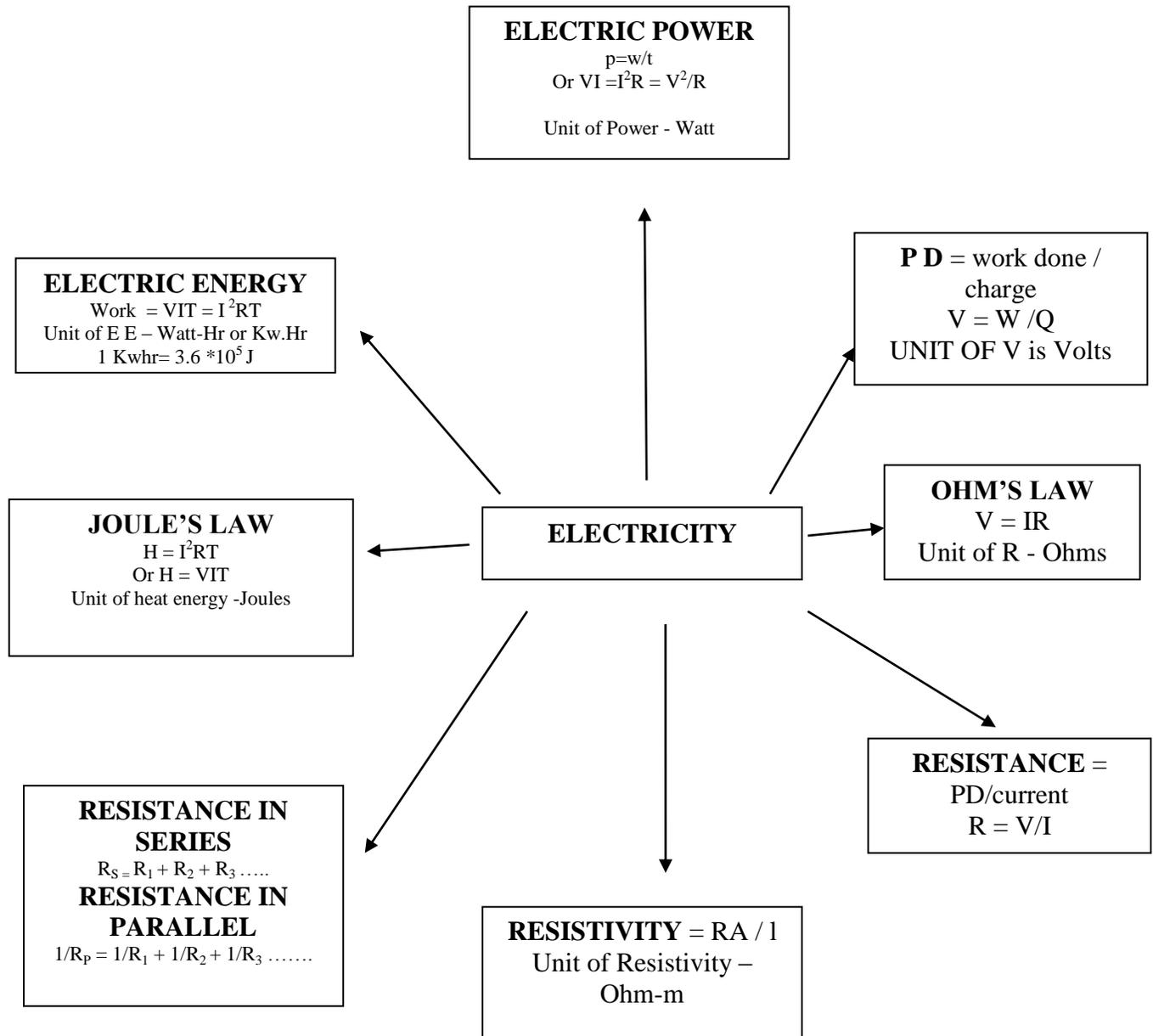
$$\text{or } 1 \text{ W} = 1 \text{ Js}^{-1} = 1 \text{ VA}$$

$$1 \text{ kilowatt} = 1000 \text{ W}$$

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.

$$1 \text{ kilowatt hour (kWh)} = 3.6 \times 10^6 \text{ J}$$

MIND MAP



ELECTRICITY
FORMATIVE 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 advisable to handle electrical appliances with wet hands?
7. Two electric bulbs marked 100W 220V and 200W 200V have tungsten filament of same 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 seriesCalculate 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 same 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 (CONVERSATION 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 or 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 saying that a potential difference between two points is 1 volt?
 - d) What is the relationship between work done, potential difference and charge moved?

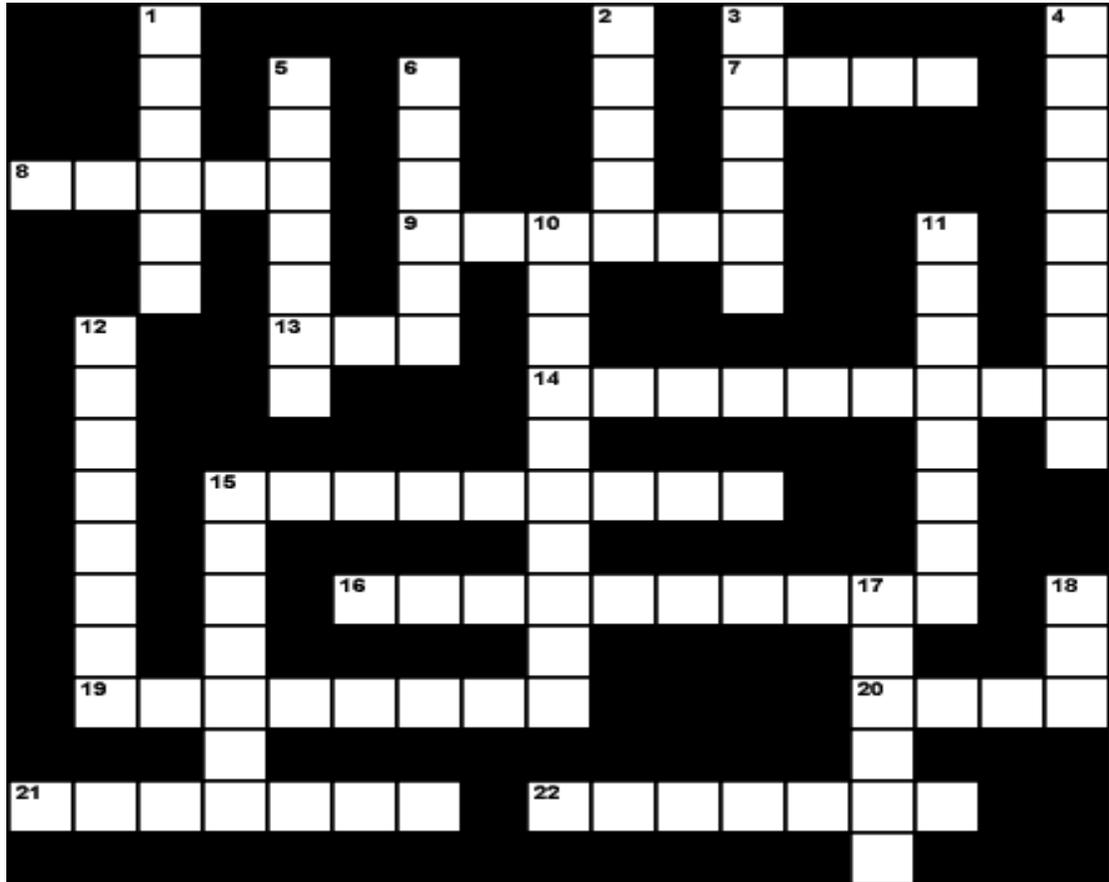
ORAL QUESTIONS

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 said to be connected in series?
5. When are resistors said 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 same 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 same as joule/coulomb.
7. I oppose the flow of charges through any conductor.
8. I am same 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 passage of an electric current
- 19.** Elementary particle consisting of a charge of negative electricity

Down

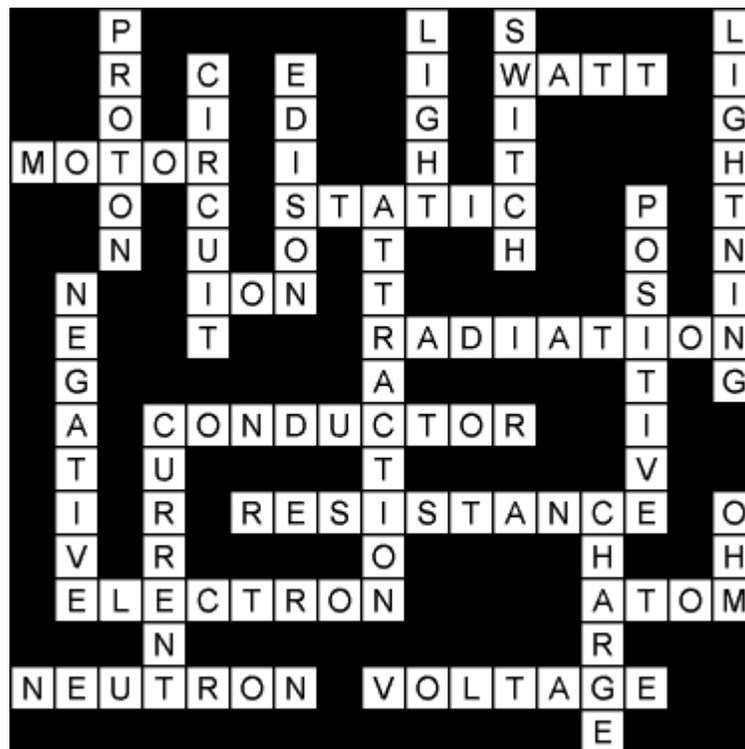
- 1.** Elementary particle that carries a positive charge
- 2.** Electromagnetic radiation in the wavelength range including infrared, visible, ultraviolet, and X-rays
- 3.** Device for making, breaking, or changing the connections in an electrical circuit
- 4.** Flash produced by a discharge of atmospheric 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

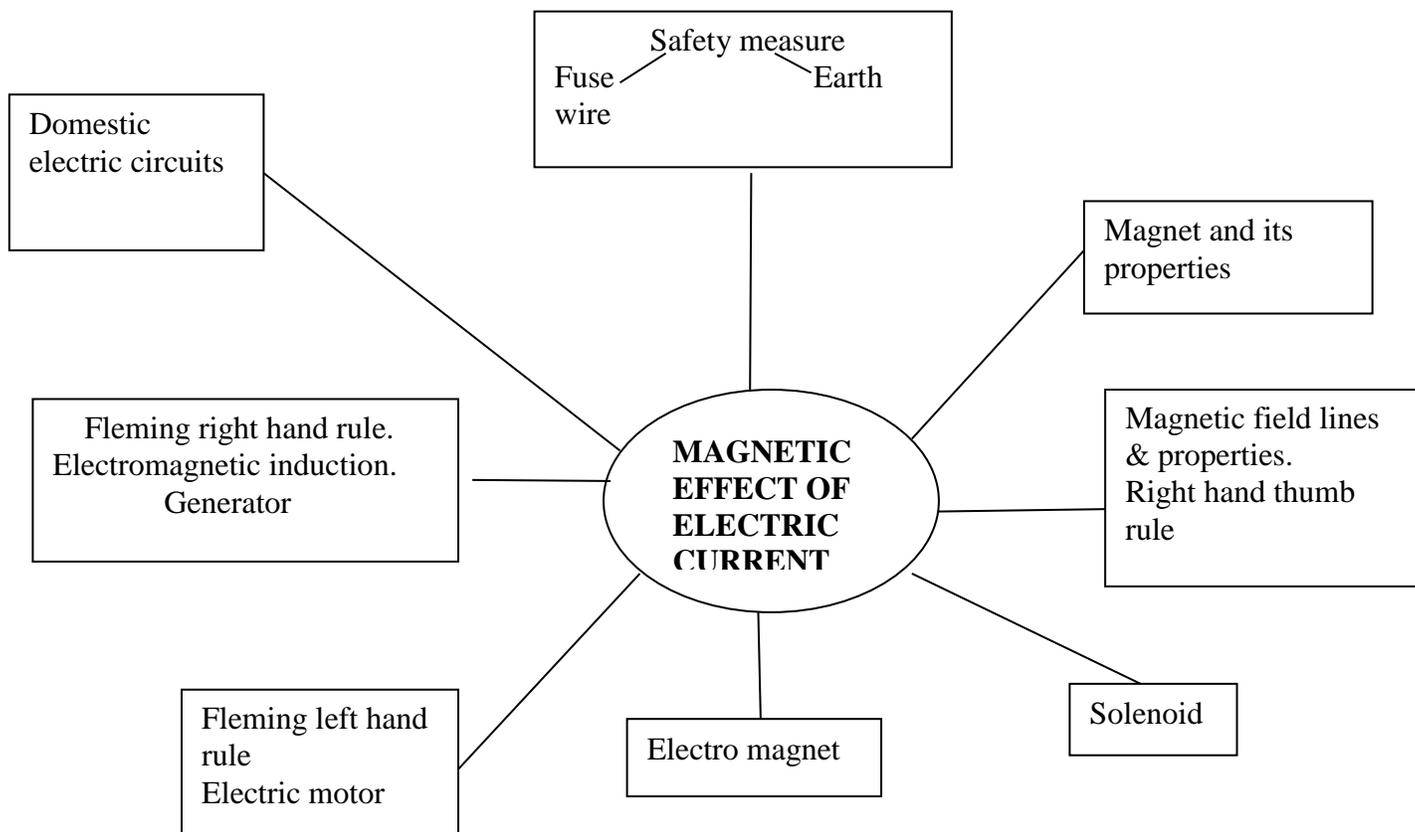
- ❖ Magnet: (i) is an object that attracts objects made of iron, cobalt & nickel.
(ii) Comes to rest in North-South direction, when suspended freely.
- ❖ Magnets are used: (i) In radio & stereo speakers, (ii) In refrigerator doors, (iii) on audio & video cassettes players, (iv) On hard discs & floppies 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 the 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 same 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 the 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 figure 13.13, 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 device 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 safety 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



FORMATIVE 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 be 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 an 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 is 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 differ 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?

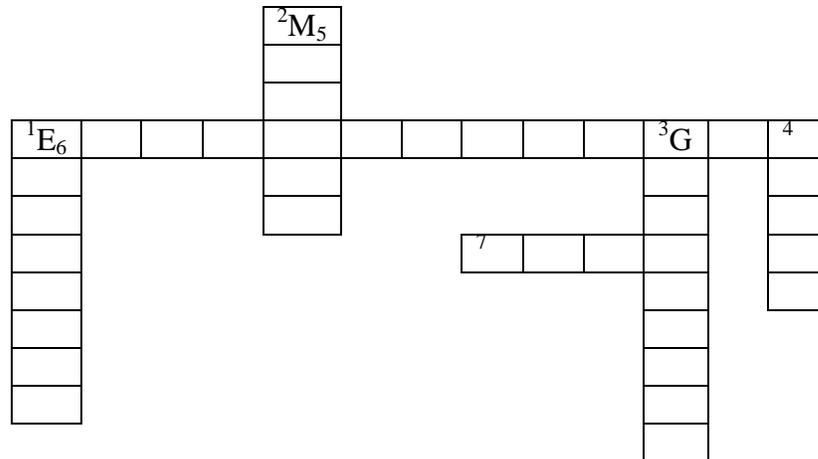
PUZZLE

⇒ **Across**

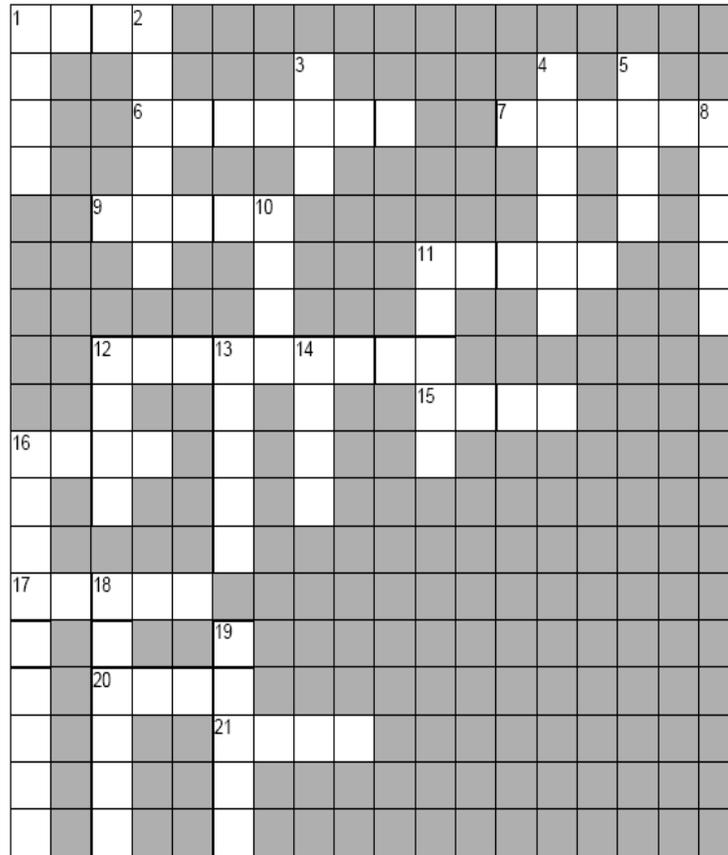
1. A method preventing electric shock due to touching of live wire with the metallic body of an appliance.
2. A device to convert electrical energy into mechanical energy.
3. A device to convert mechanical energy into electrical energy.
4. SI unit of magnetic field.

⇓ **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]

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.
- ❖ Disadvantages of Hydro power plant:
 - (i) Highly expensive to construct.
 - (ii) Dams cannot be constructed on all river sites.
 - (iii) Large areas of 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.

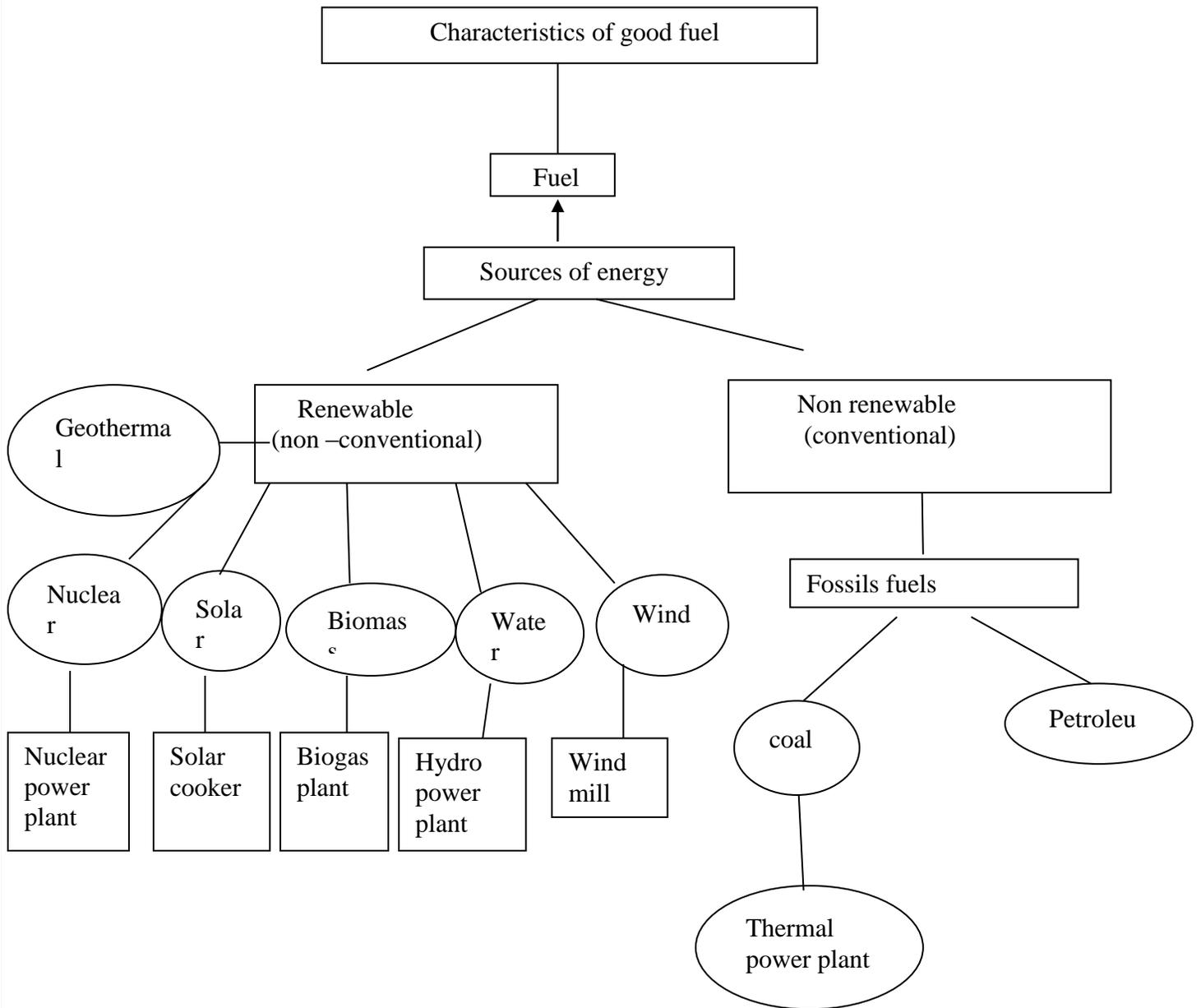
- Kinetic energy of the wind is used in running of wind mills, which are used to lift water, grind grains, etc.
 - Wind mill-(Refer to figure 14.5, page no. 247 of N.C.E.R.T Text book)
 - Advantages: (i) Eco friendly (ii) Renewable
 - Disadvantages: (i) Wind speed not uniform always.
(ii) Needs a large 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.
 - Disadvantages 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°C or more.
(Maximum temperature of 100°C 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
 - Disadvantages 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.
 - Disadvantages 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.
- Disadvantages: 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



FORMATIVE 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 disadvantages 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 sand 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°C - 200°C 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 (CONVERSATION 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 than 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.

ENERGY CROSSWORD PUZZLE-CLUES

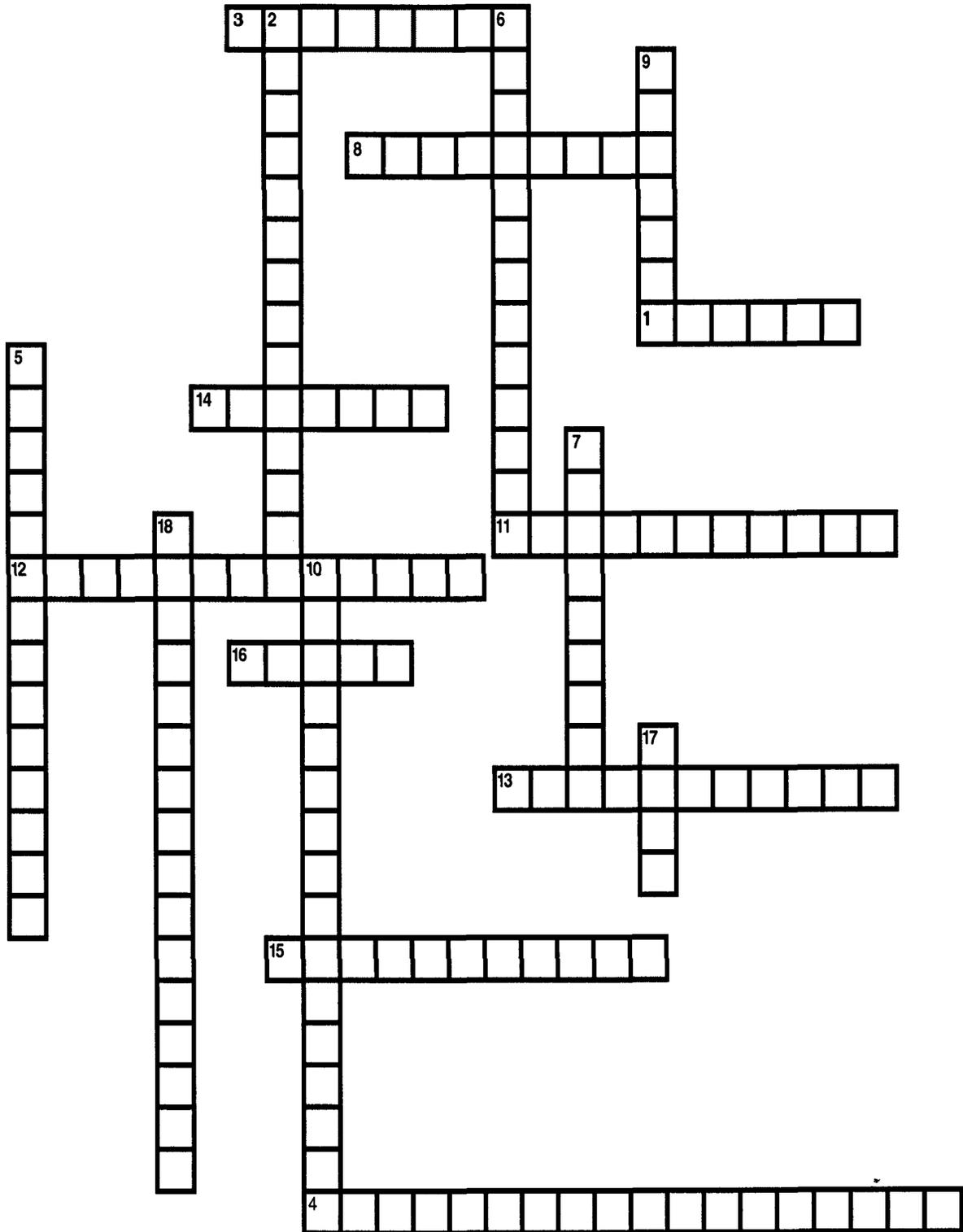
- Down

- **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

SUMMATIVE ASSESSMENT I

TIME: 3-3^{1/2} HOURS

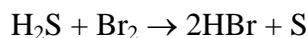
M.M: 80

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:



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



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. Salivary 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



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

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

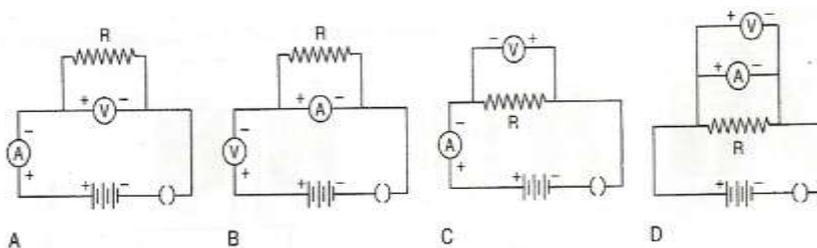
iii) the plain mirror reflector is used in solar cooker.

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

SECTION – B

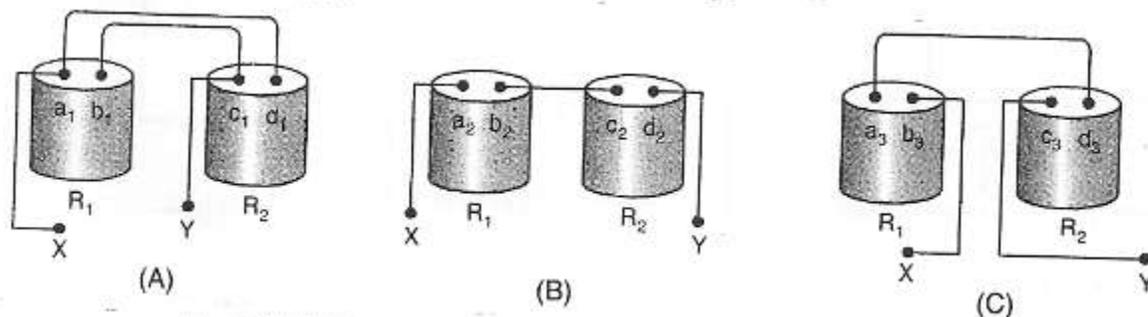
- 25 Absorption of light energy by mesophyll cells of leaf causes.
- | | |
|-----------------------------|--------------------------------|
| a) Oxidation of chlorophyll | b) Excitation of chlorophyll |
| c) Reduction of chlorophyll | d) Evolution of O ₂ |
- 26 Which of the following does not secrete 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 H₂ 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 for studying the dependence of the current on the potential difference across a resistor is



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

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 safranin 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 safranin and mounted in glycerine
- d) Stained in mythlene blue and mounted in water

TERM - II

(Second Term)

Contents:

Nos:

1. Carbon and its compounds
2. Periodic classification of elements
3. How do organisms reproduce
4. Heredity and evolution
5. Light-Reflection and refraction
6. The human eye and the colourful world
7. Management of natural resources
8. Our Environment

Topic 1: Carbon and its compounds

Important terms and conditions

Versatility 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 valence electrons carbon can form an anion C^{-4} by gain of electrons.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:

Saturated hydro carbon:

$(\text{C}_n\text{H}_{2n+2})$

Compounds having single bond

ALKANES

e.g

ethane (C_2H_6)

Unsaturated hydro carbon:

compounds having double and triple bonds.

ALKENES AND ALKYNES.

alkenes(C_nH_{2n})

Ethene C_2H_4

alkynes. ($\text{C}_n\text{H}_{2n+2}$)

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 | Ring or cycle hydro carbon | | Cyclohexane. |
| a | Saturated | Carbon atoms are in form of ring and bonded by single covalent bond. | |
| b | Unsaturated | Carbon atoms are bonded by one or more doubled covalent bond. | Benzene |
| | | | |

Isomerism: The phenomenon of existence of compounds in two or more forms with same 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 ₃ Cl) |
| 2. | oxygen | 1. Alcohol 2. Aldehyde 3. Ketone 4. Carboxylic acid | -OH -CHO >C=O -COOH | Ethanol C ₂ H ₅ OH Methanal HCHO Propanone CH ₃ COCH ₃ Ethanoic acid CH ₃ COOH |

HOMOLOGOUS SERIES: A series of compounds in which the same functional group substitute for hydrogen in a carbon chain, such that successive compounds differ by CH₂ groups e.g CH₄, C₂H₆, C₃H₈ etc.

NOMENCLATURE OF CARBON COMPOUNDS:

Prefix word root+suffix+Functional group.

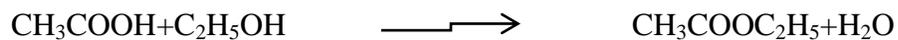
CARBON COMPOUNDS:

ETHANOL –C₂H₅OH common name ethyl alcohol

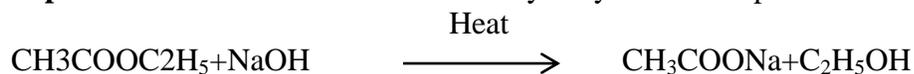
ETHANOIC ACID- CH₃COOH.common name acetic acid.

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

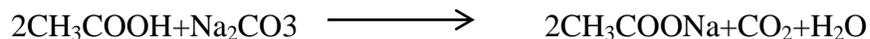




Saponification reaction : Alkaline hydrolysis of ester produces soaps.



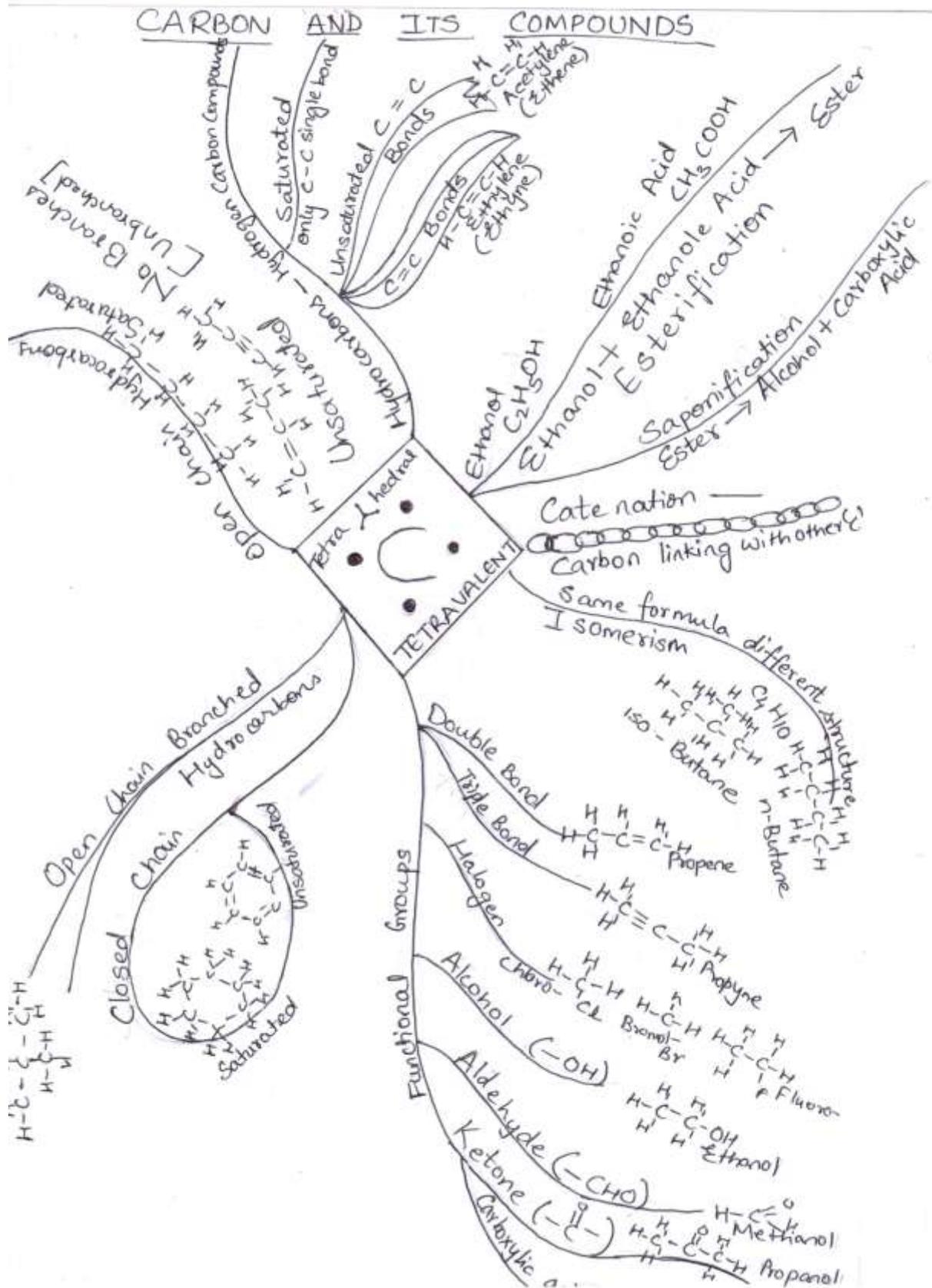
Reaction with carbonates and hydrogen carbonates: reaction of ethanoic acid with carbonates or bicarbonate evolves carbon dioxide gas.



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

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

MIND MAP



Topic 1: Carbon and its compounds

F.A-III

PAPER PEN TEST

TIME: 40 Min

Max marks:40.

1. Name the compound form heating ethanol at 443 K with excess of conc.H₂SO₄. 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 (C₂H₆) 2
9. Write the IUPAC name of the next homologous of CH₃OHCH₂CH₃. 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=O 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 saponification 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 permanganate disappears, if it is added to warm solution of ethanol.
2. An organic compound with molecular formula C₂H₄O₂ 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

F.A-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. NaCl

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 conc.,H₂SO₄,its acts as.....and the process is called.....

a)Oxidizing agent, saponification. 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.C₂H₄

b. C₂H₆

c.C₃H₈

d.C₄H₁₀

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 series 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 bonds in ammonia.
- 15.Type of reactions shown by alkanes.

Activity :

- 1.To Study the saponification 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 . It was compared to music notation sa,re ,ga ,ma, pa ,da ,ni ,sa,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 same number of valance electron ,valency and thus identical chemical properties .

PERIODS

1ST PERIOD – 2 elements 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 shells present in the element indicates the period to which it belongs .

VALENCY :

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

ATOMIC SIZE / ATOMIC RADII:

It is defined as the distance from the centre of the nucleus to the outermost shell of an atom . It is generally expressed in picometres (pm) .

On moving down the group the atomic radii increase.

Because on moving down the group a new energy shell is added which increases the distance between the outermost electron and the nucleus . Although the nuclear charge also increases , but it is compensated by the additional shell being added thus , increasing the size of the atom .

Across the period the atomic radii decrease. Due to the increase in nuclear charge , the pull on the electrons increases and hence, they are pulled closer to the nucleus thus, decreasing the atomic size .
Oxides and their nature. Metals react with oxygen to form oxides by loss of electrons. These oxides on dissolution in water form bases.

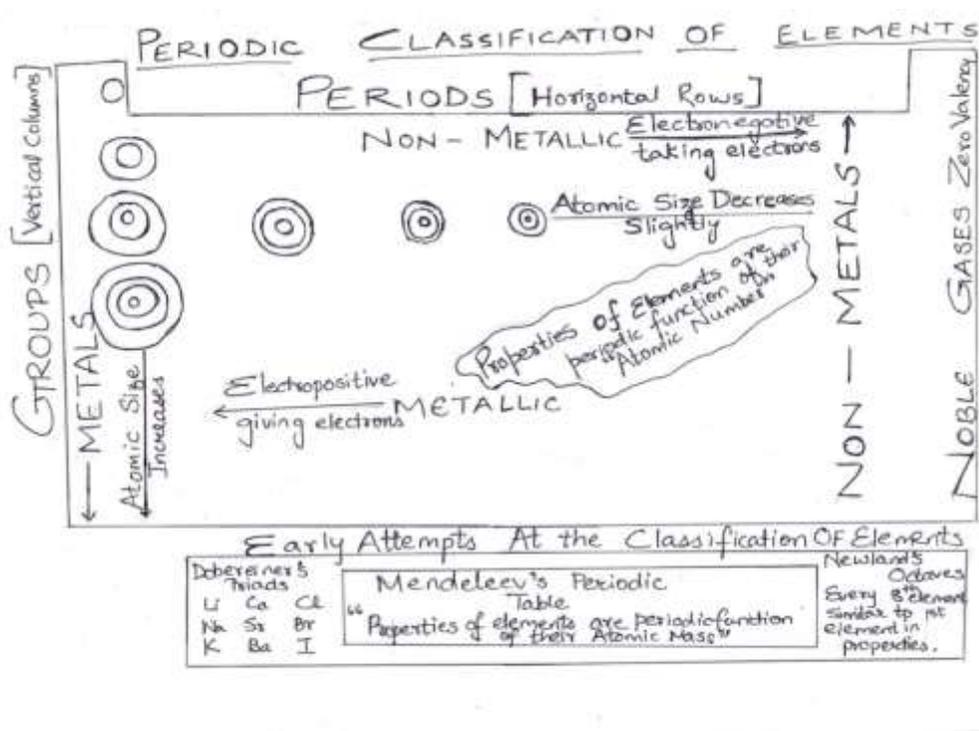
REACTIVITY OF ELEMENTS.

Down the group reactivity of metals increases as the tendency to lose electrons 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 electrons decreases.

On moving across the period the reactivity first increases due to the decrease in the metallic character and increase in nonmetallic character.

MIND MAP



FORMATIVE ASSESSMENT III

TIME: 1 HRS

M.M:30

- Q.1 what is the position of hydrogen in the modern periodic table? (1)
- Q.2 where are the isotopes of the same elements having different atomic masses placed in the periodic table? (1)
- Q.3 An element M is in 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.5 what is the difference in number of shells 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.7 Give reason as to why the atomic radii of elements increase in a group while moving from top to bottom? (2)
- Q.8 elements in a group of the 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 the 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 same 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?

FORMATIVE 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.

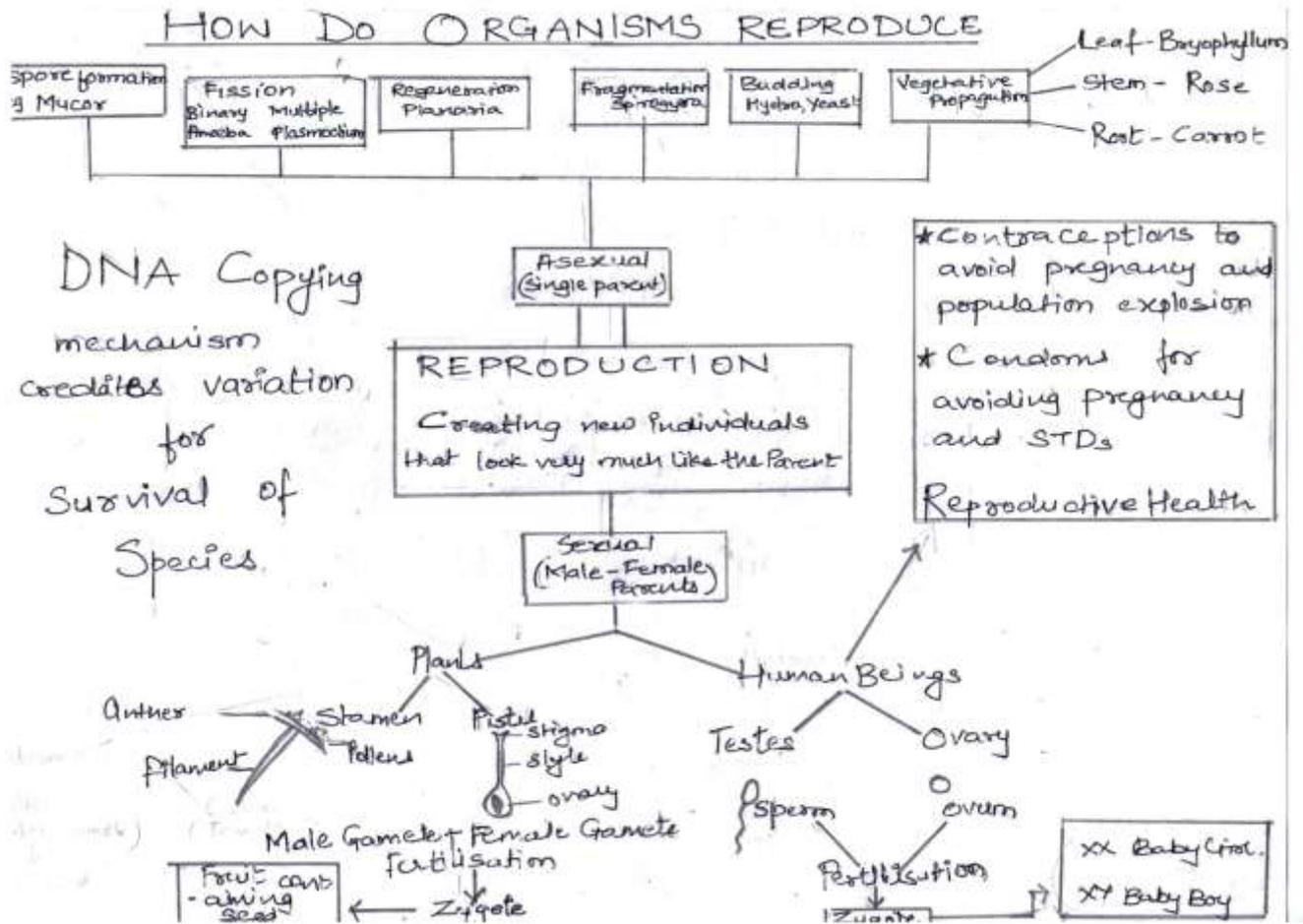
2. Make an outline sketch of the Modern Periodic Table.

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 gonorrhoea, syphilis & HIV-AIDS.
- 13) Contraceptive methods: to avoid pregnancy-
 - a) barrier method
 - b) chemical methods
 - c) surgical methods

MIND MAP



FORMATIVE 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 same 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. Separating 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 necessary to learn about reproductive health from class VII?

TOPIC 4: HEREDITY AND EVOLUTION

POINTS TO REMEMBER:

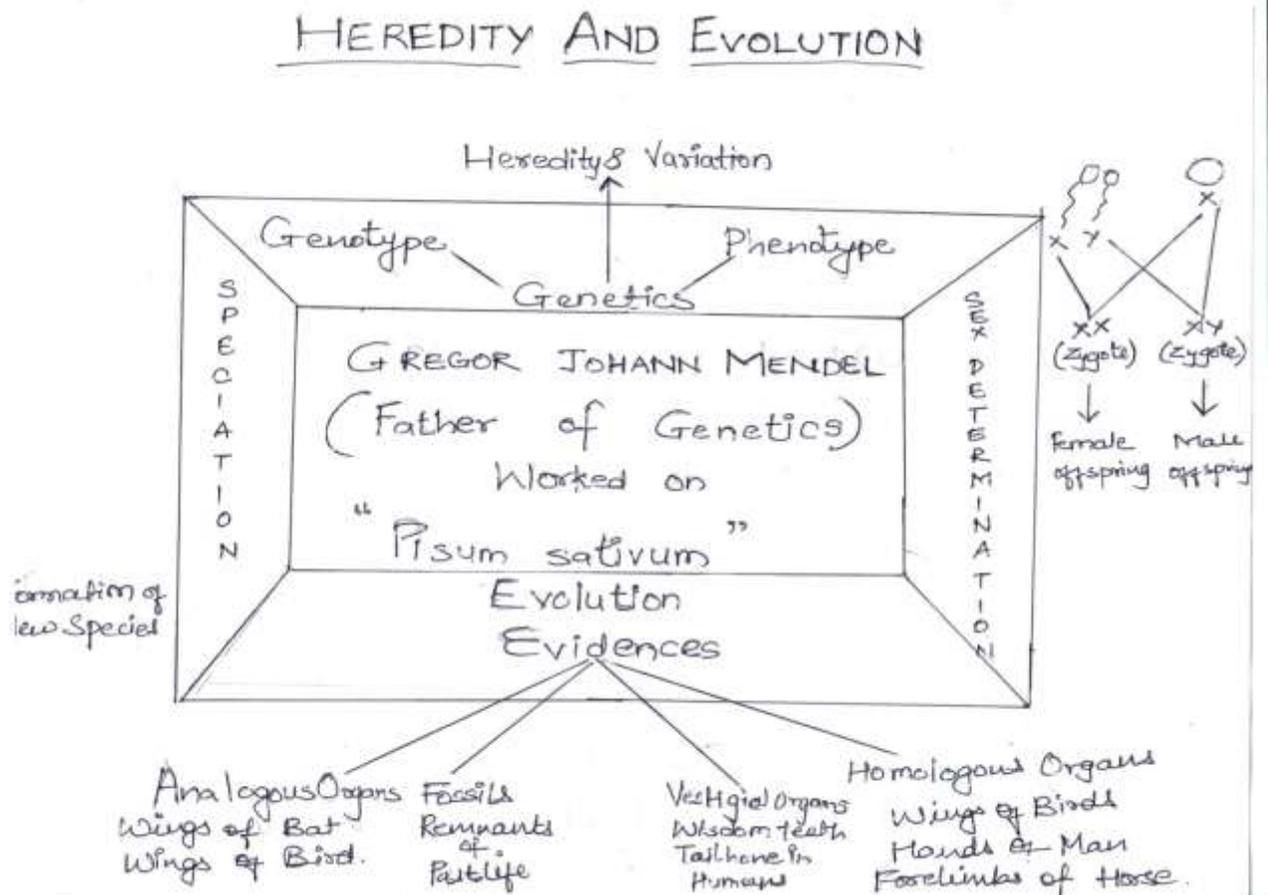
1. **HEREDITY**: Transmission of features or characters from one generation to another or from parents to offspring through their genes

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 sativum*).
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



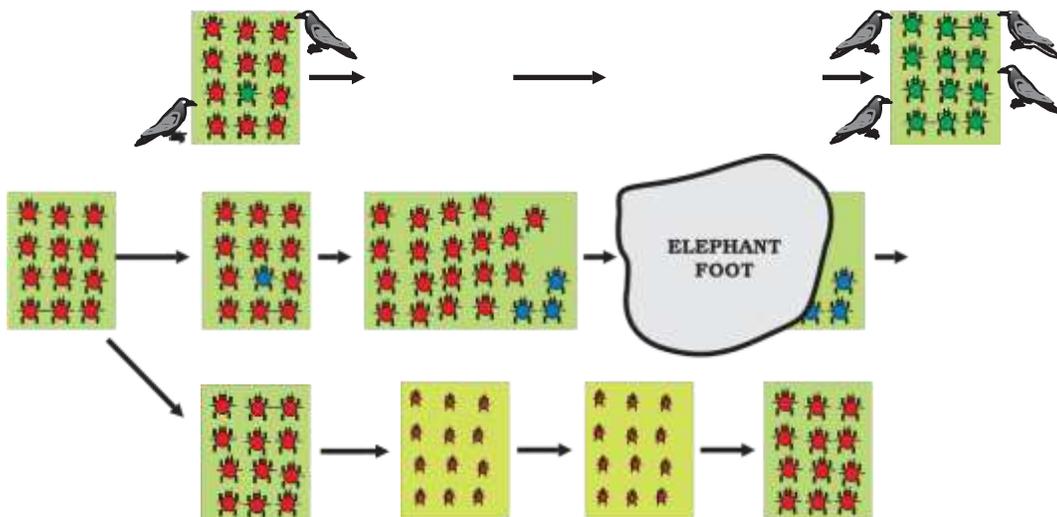
FORMATIVE ASSESSMENT –III

TICK THE CORRECT OPTION:

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

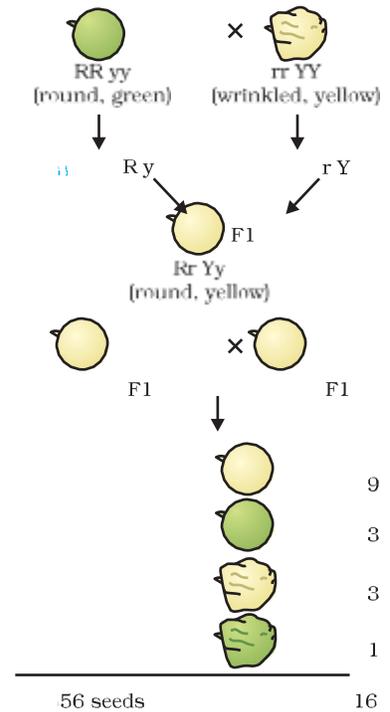
HOTS

- If a trait exists in 10% of a population of an asexually reproducing species and a trait B in 60% of the same population which trait is likely to have arisen earlier?
- 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.
- Explain how advantages variations like long neck help an organism like Giraffe to survive better?
- Which of the following is the clearly acquired trait in human beings?
a.Intelligence b.Height C.Swimming d. Skin colour.
- Why are human beings, who look different from each other size and colour belongs to the same species?
- Acquired characters are not inherited .Give reasons.
- All the human races like Africans, Asians ,European and others might have from common ancestors provide few evidence in support of the view.
- 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 ratio 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.

FORMATIVE 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. Save Tiger..... Children collect information about the Tigers from various national Parks and Wild life sanctuaries. 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 Veterinary college.
- 4. Visit to an agricultural research Institute to understand the various techniques involved in Hybridisation.
- 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 sensation 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 $3 \times 10^8 \text{ ms}^{-1}$ 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 same 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 same medium, it is called reflection.

5) Image: the point of convergence or the point from 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 incident ray the reflected ray and the normal at the point of incidence, all lie in the same 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 converge 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 path after reflection.(as it is normal at the point of incidence)
- 4) The rays of light falling at the pole get reflected at the same angle on the other side of principle axis.(Laws of reflection)

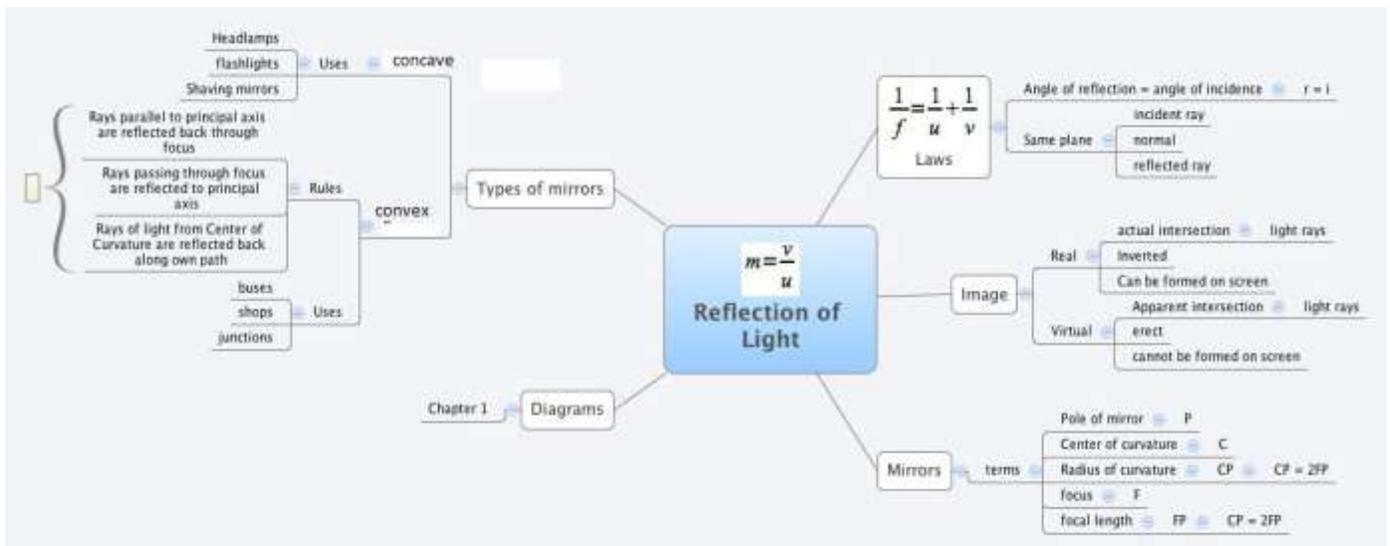
13) Relation between radius of curvature and focal length It is two times the focal length i.e. $R=2f$.

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 $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$

16) Magnification of a lens: $M = \frac{\text{size of image } (h_1)}{\text{size of object } (h_0)}$ also $m = \frac{(h_1)}{(h_0)} = \frac{v}{u}$.

MIND MAP



FORMATIVE ASSESSMENT –III (Pen Paper Test)

- 1) If the speed of light in a medium is 2×10^8 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.

FORMATIVE 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 Lemon 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 $\frac{1}{2}$ 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?

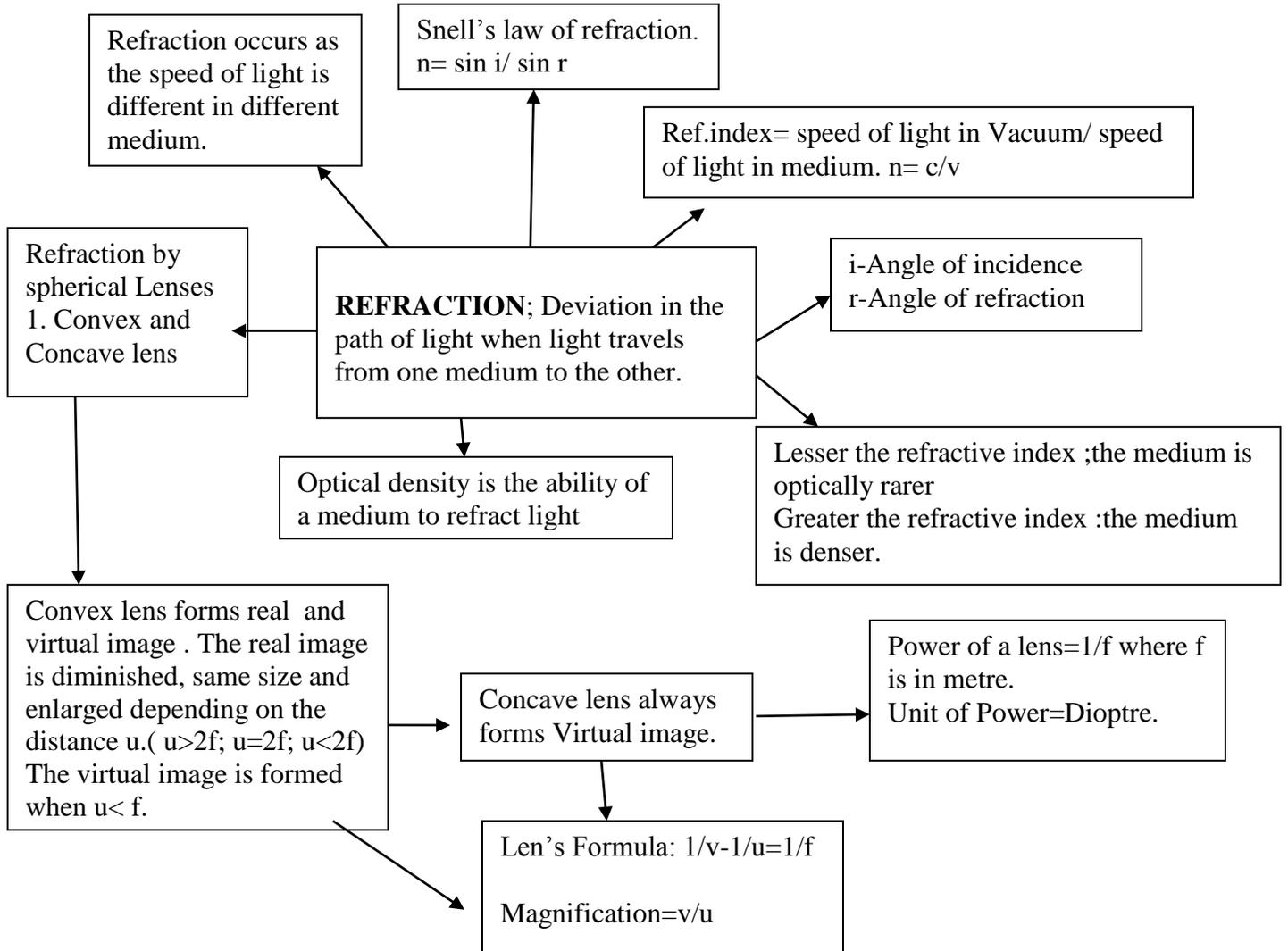
Home assignment:

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



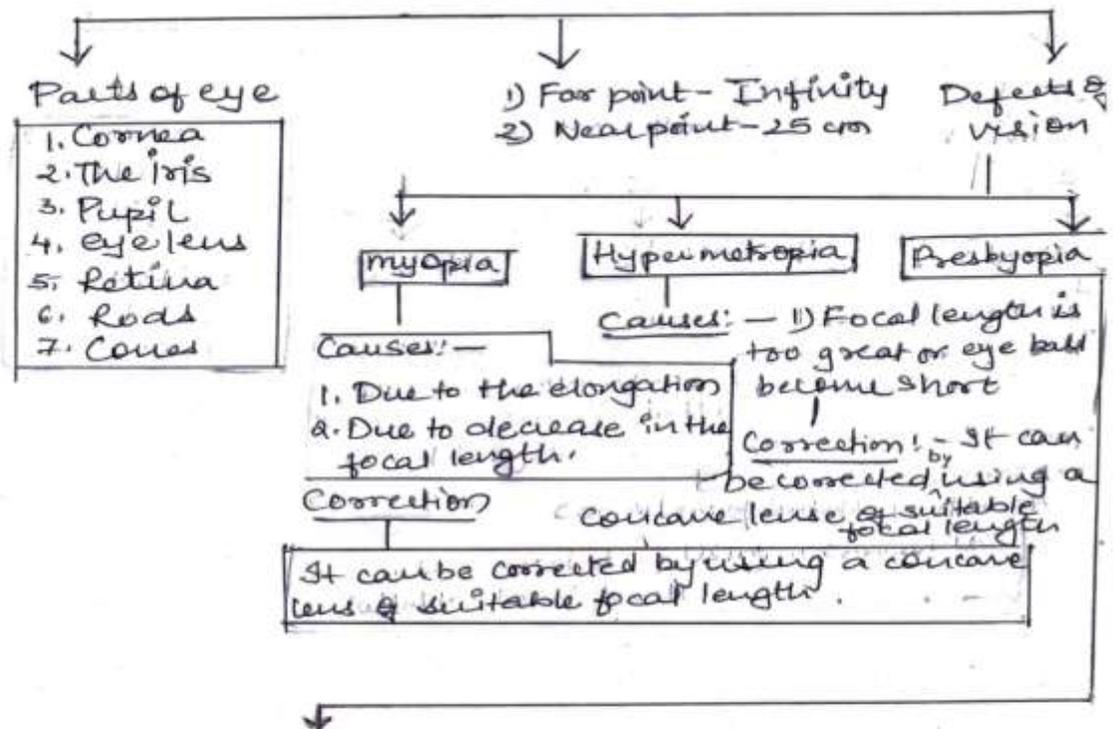
Topic 6 THE HUMAN EYE AND THE COLOURFUL WORLD

MIND MAP

The Human Eye And The Colourful World

Human eye

The human eye is one of the most valuable and sensitive sense organ.



Causes :- The power of accommodation of the eye decreases with ageing due to weakening of ciliary muscles.

Correction :- The defect can be corrected by using bi-focal lenses of suitable focal lengths. Such persons may suffer from myopia and hypermetropia.

FORMATIVE 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 same 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.

2. Can 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 spectrum on passing through a hollow prism?

ANS: No, this is because dispersion of light cannot occur through a hollow prism containing air.

FORMATIVE 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 short focal length or a lens of large length?
- 3) What does $m = +1$ stand for?
- 4) What is the power of a lens if its focal length 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 undeviated?
- 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 save 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.

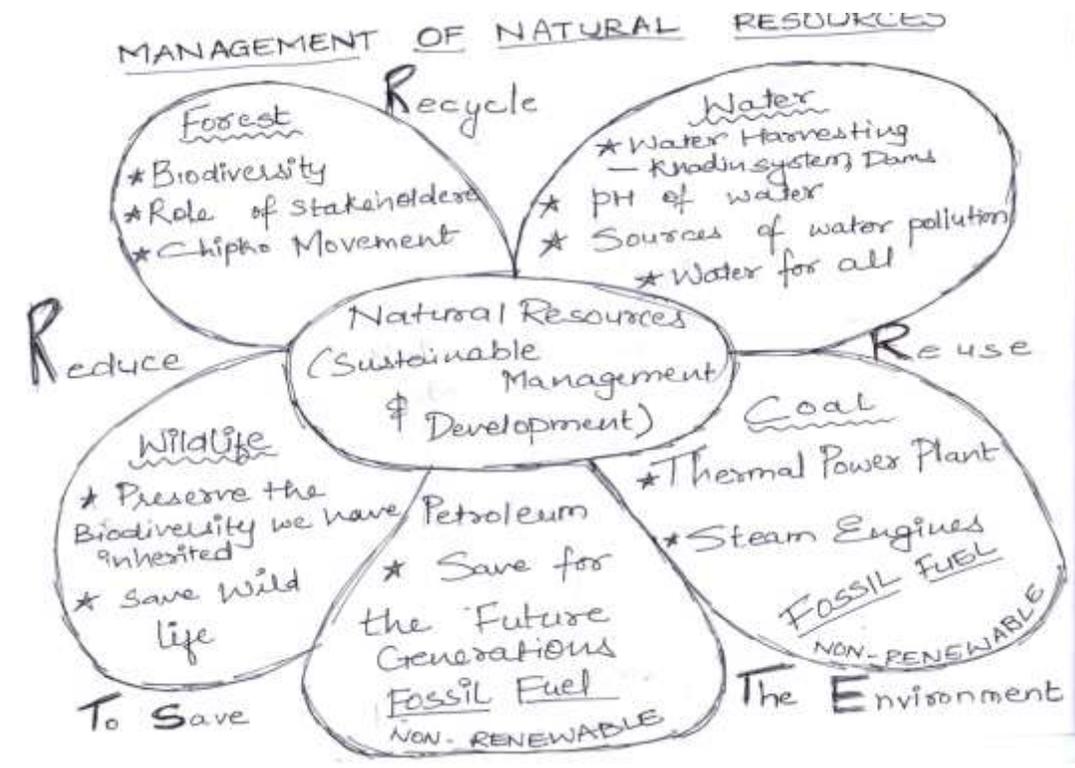
13) Uses of Fossil Fuels:

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 save the reserves of fossil fuels .biogas can also be used for various purposes.

MIND MAP



FORMATIVE 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 conducive 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 save 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.

FORMATIVE ASSESSMENT –IV

QUIZ

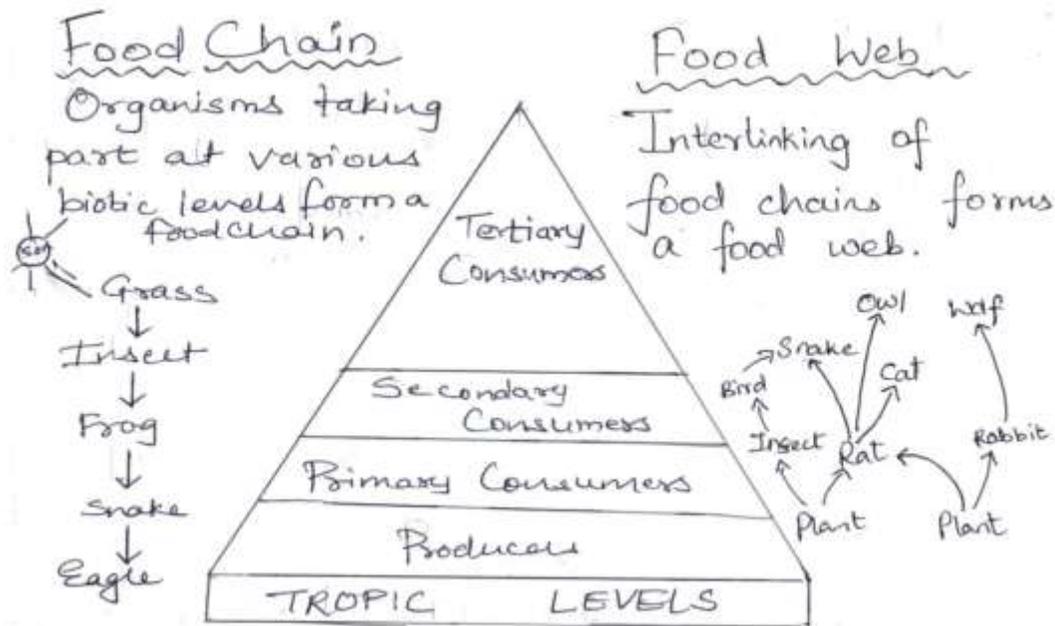
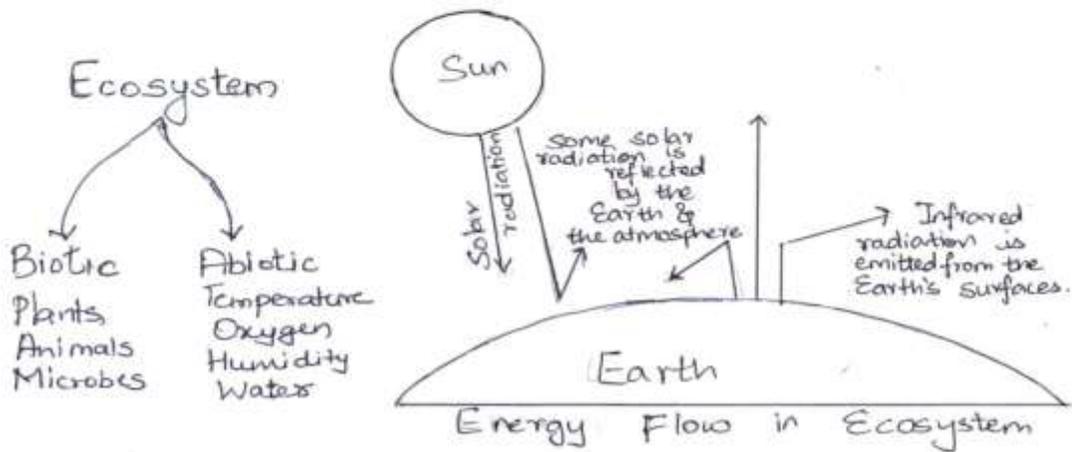
1. Chipko Andolan originated in
a. Kerala b. Rajasthan
c. Uttarakhand d. Karnataka
2. Kulhs are irrigation Canals of
a. Rajasthan b. Karnataka
c. Himachal Pradesh d. Assam
3. Which of the following is green house gas?
a. Sulphurdioxide b. Carbon monoxide
c. Carbondioxide d. Nitrogen dioxide
4. Which 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

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 saprophytes.
e. g. Paper.
7. **NONBIODEGRABLE**- Substances that are not broken down by the action of bacteria or saprophytes. e.g. Plastic.
8. **FOOD CHAIN** – The process of one organism eating the other.

GRASS → GRASSHOPPER → FROG → SNAKE

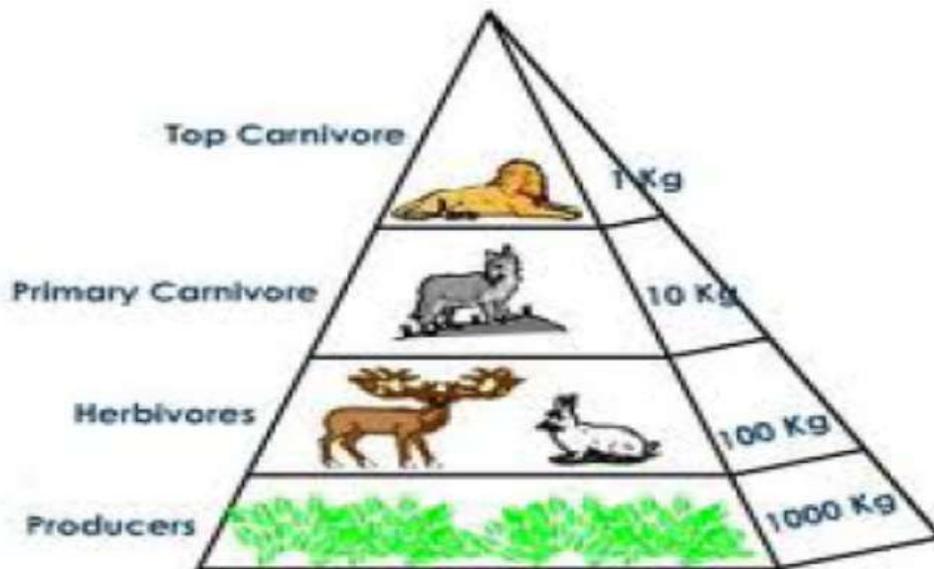
9. **FOODWEB** --- It is a network of food links between populations in a community.
10. **10% LAW OF ENERGY FLOW** – The energy available at any trophic level in a food chain is 10% of the previous one.
11. **BIOLOGICAL MAGNIFICATION** – Progressive accumulation of nonbiodegradable waste at various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

OUR ENVIRONMENT



HIGHER ORDER THINKING SKILLS (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 carnivore level?
7. Why do most food chains have 3-5 steps only?
8. Select the biodegradable items from the list given below-
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 save?
Tiger?



FORMATIVE ASSESSEMENT - III

Very short answer questions:

NOTE: Each question carries one mark.

TICK THE CORRECT OPTIONS:-

1. Ozone layer is destroyed by
 - a) SO₂
 - b) Smog
 - c) CFC
 - d) CO₂
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) CO₂

SHORT ANSWER QUESTIONS:

EACH QUESTION CARRIES TWO MARKS:

- 1) Classify the following 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 disposal of wastes.

FORMATIVE 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 disposal
 - **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 passage on ‘Autobiography of plastics.

SUMMATIVE 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 in 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 same 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 F₁ generation but B re-emerge in F₂ 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 CH₃COOH 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 It 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 saturated and other unsaturated compounds?
 (c) Which of these is more reactive?
- Q.17 Write 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.19 The 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 18th 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 same slot because their chemical properties are the same ? 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 of solution of $Al_2(SO_4)_3$ in water was filled in 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) saturated 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 same 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 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° , 45° , 60° 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 same say 20cm. If you face the mirror to distant object, then the size of the image will be

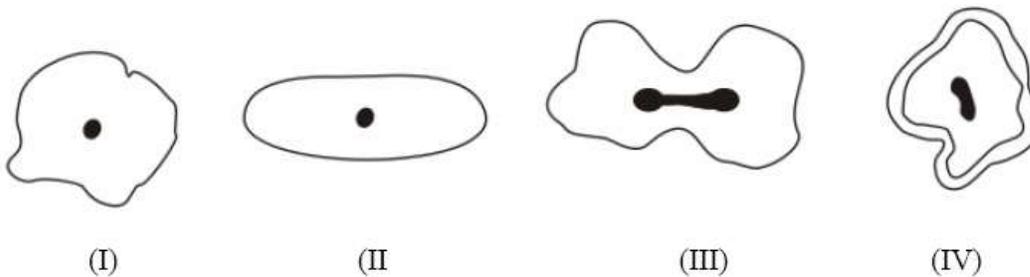
- (a) same in both the mirrors.
- (b) smaller in concave mirror
- (c) bigger in convex mirror
- (d) bigger in concave mirror

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?



- (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

