

KENDRIYA VIDYALAYA SANGATHAN



तत् त्वं पूषन् अपावृणु
केन्द्रीय विद्यालय संगठन

**SUPPORT MATERIAL FOR CLASS X
SUBJECT - SCIENCE**

[SESSION-2014-2015]

PATNA REGION

KENDRIYA VIDYALAYA SANGATHAN

Patna Region



**STUDY MATERIAL
2014-15**

**CLASS X
SCIENCE**

PREFACE

Kendriya Vidyalaya is a pioneer organization which caters to the all round round development of the students. Time to time various strategies have been adopted to adorn the students with academic excellence. Keeping in view of the implementation of CCE it is desired to prepare study/ support material for Class IX to guide the students in the right direction and to equip the students to face the challenges with ease.

This support material is one such effort by Kendriya Vidyalaya Sangathan, an empirical endeavor to help students learn more effectively and efficiently. It is designed to give proper platform to students for better practice and understanding of the chapters. This can suitably be used during revision. Ample opportunity has been provided to students through master cards and question banks to expose them to the CBSE pattern. It is also suggested to students to keep in consideration the time-management aspect as well.

I extend my heartiest gratitude to the Kendriya Vidyalaya Sangathan authorities for providing the support material to the students prepared by various Regions. The same has been reviewed by the Regional Subject Committee of Patna Region who have worked arduously to bring out the best for the students. I also convey my regards to the staff of Regional Office, Patna for their genuine cooperation.

In the end, I earnestly hop that this material will not only improve the academic result of the students but also inculcate learning habit in them.

M.S. Chauhan

Deputy Commissioner

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SUPPORT MATERIAL
CLASS-X (SCIENCE)
FIRST TERM
2014-15
HOW TO USE SUPPORT MATERIAL

1. This support material is not the substitute of NCERT Text book.
2. At first go through the text book chapter wise to develop a basic concept of the various topics of the chapter.
3. Study support material topic wise relating it with the text book to develop lateral thinking.
4. Give more attention on the table, charts and diagrams given in the study material.
5. Refresh your concept with mind map given for every chapter.
6. First practice the solve question paper of support material.
7. Try to find solutions of unsolved questions given for practice.
8. Practice the CBSE sample papers to clear your concept more and more to the topic concerned.
9. Make a group of 4 to 5 student to solve HOT questions and Value based questions.
10. In case of any difficulty in understanding the topic take the help of concern subject teacher.

COURSE STRUCTURE

CLASS X

First Term	Marks : 90
Units	Marks
I. Chemical Substances	33
II. World of Living	21
III. Effects of Current	29
IV. Natural Resources	07
Total	90

Theme : Materials

(30 Periods)

Unit : Chemical Substances - Nature and Behaviour

Chemical reactions : Chemical equation, Balanced chemical equation, implications of a balanced chemical equation, types of chemical reactions : combination, decomposition, displacement, double displacement, precipitation, neutralization, oxidation and reduction.

Acids, bases and salts : Their definitions in terms of furnishing of H^+ and OH^- ions, General properties, examples and uses, concept of pH scale (Definition relating to logarithm not required), importance of pH in everyday life; preparation and uses of sodium hydroxide, Bleaching powder, Baking soda, Washing soda and Plaster of Paris.

Metals and non metals : Properties of metals and non-metals, reactivity series, formation and properties of ionic compounds, basic metallurgical processes, corrosion and its prevention.

Theme : The World of The Living

(20 Periods)

Unit : World of Living

Life processes : "living being". Basic concept of nutrition, respiration, transport and excretion in plants and animals.

Control and co-ordination in animals and plants : Tropic movements in plants; Introduction to plant hormones; control and co-ordination in animals : nervous system; voluntary, involuntary and reflex action, chemical co-ordination: animal hormones.

Theme : How things work.

(32 Periods)

Unit : Effects of Current

Electric current, potential difference and electric current. Ohm's law; Resistance, Resistivity, Factors on which the resistance of a conductor depends. Series combination of resistors, parallel combination of resistors and its applications in daily life. Heating effect of electric current and its applications in daily life. Electric power, Inter relation between P, V, I and R.

Magnetic effects of current : Magnetic field, field lines, field due to a current carrying conductor, field due to current carrying coil or solenoid; Force on current carrying conductor, Fleming's left hand rule. Electromagnetic induction. Induced potential difference, Induced current. Fleming's Right Hand Rule, Direct current. Alternating current : frequency of AC. Advantage of AC over DC. Domestic electric circuits.

Theme : Natural Resources

(08 periods)

Sources of energy : Different forms of energy, conventional and non-conventional sources of energy: fossil fuels, solar energy; biogas; wind, water and tidal energy; nuclear energy. Renewable versus non-renewable sources.

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SECOND TERM

CLASS X

Second Term		Marks : 90
Units		Marks
I.	Chemical Substances -Nature and Behaviour	23
II.	World of Living	30
III.	Natural Phenomena	29
IV	Natural Resources	08
Total		90

Theme : Materials

(25 Periods)

Unit : Chemical Substances - Nature and Behaviour

Carbon compounds : Covalent bonding in carbon compounds. Versatile nature of carbon. Homologous series Nomenclature of carbon compounds containing functional groups (halogens, alcohol, ketones, aldehydes, alkanes and alkynes), difference between saturated hydrocarbons and unsaturated hydrocarbons. Chemical properties of carbon compounds (combustion, oxidation, addition and substitution reaction). Ethanol and Ethanoic acid (only properties and uses), soaps and detergents.

Periodic classification of elements : Need for classification, Modern periodic table, gradation in properties, valency, atomic number, metallic and non-metallic properties.

Theme : The World of The Living

(30 Periods)

Unit : World of Living

Reproduction : Reproduction in animal and plants (asexual and sexual) reproductive health-need for and methods of family planning, safe sex vs HIV/AIDS. Child bearing and women's health.

Heridity and evolution : Heredity; Mendel's contribution- Laws for inheritance of traits: Sex determination: brief introduction; Basic concepts of evolution.

Theme : Natural Phenomena

(23 Periods)

Unit : Reflection of light at curved surfaces, Images formed by spherical mirrors, centre of curvature, principal axis, principal focus, focal length, mirror formula (Derivation not required), magnification.

Refraction; laws of refraction, refractive index.

Refraction of light by spherical lens, Image formed by spherical lenses, Lens formula (Derivation not required), Magnification. Power of a lens; Functioning of a lens in human eye, defects of vision and their corrections, applications of spherical mirrors and lenses.

Refraction of light through a prism, dispersion of light, scattering of light, applications in daily life.

Theme : Natural Resources

(12 Periods)

Unit : Conservation of natural resources

Management of natural resources. Conservation and judicious use of natural resources. Forest and wild life, coal and petroleum conservation. Examples of People's participation for conservation of natural resources.

The Regional environment : Big dams : advantages and limitations; alternatives if any. Water harvesting. Sustainability of natural resources.

Our environment : Eco-system, Environmental problems, Ozone depletion, waste production and their solutions. Biodegradable and non-biodegradable, substances.

TERM I

CHAPTER- 1

CHEMICAL REACTIONS AND EQUATIONS

GIST OF THE LESSON

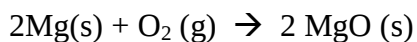
1)Chemical reaction— Chemical changes or chemical reactions are the changes in which one or more new substances are formed.

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

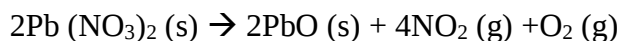
3)Balanced Chemical equations – The chemical equation in which the no. of atoms of different elements is same on both sides of the arrow is called balanced chemical equation.

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,

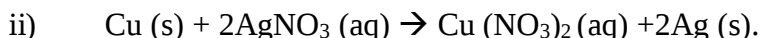
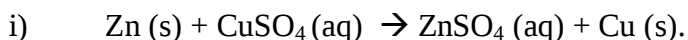


The decomposition of a substance by passing electric current through it is known as electrolysis (Electrical Decomposition).

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,

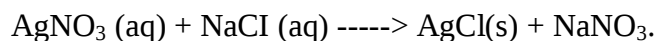


d) Double Displacement Reactions - The chemical reactions in which compounds react to form two different compounds by mutual exchange of ions are called double displacement reactions.

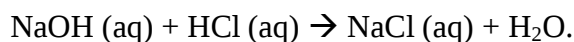
These reactions take place in solution two common types of this reaction are precipitation reactions and neutralization reactions

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.

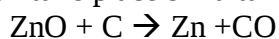


- e) **Redox reaction:** Chemical reaction which shows both oxidation and reduction reaction.

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

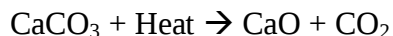
C oxidize to CO -----oxidation

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.



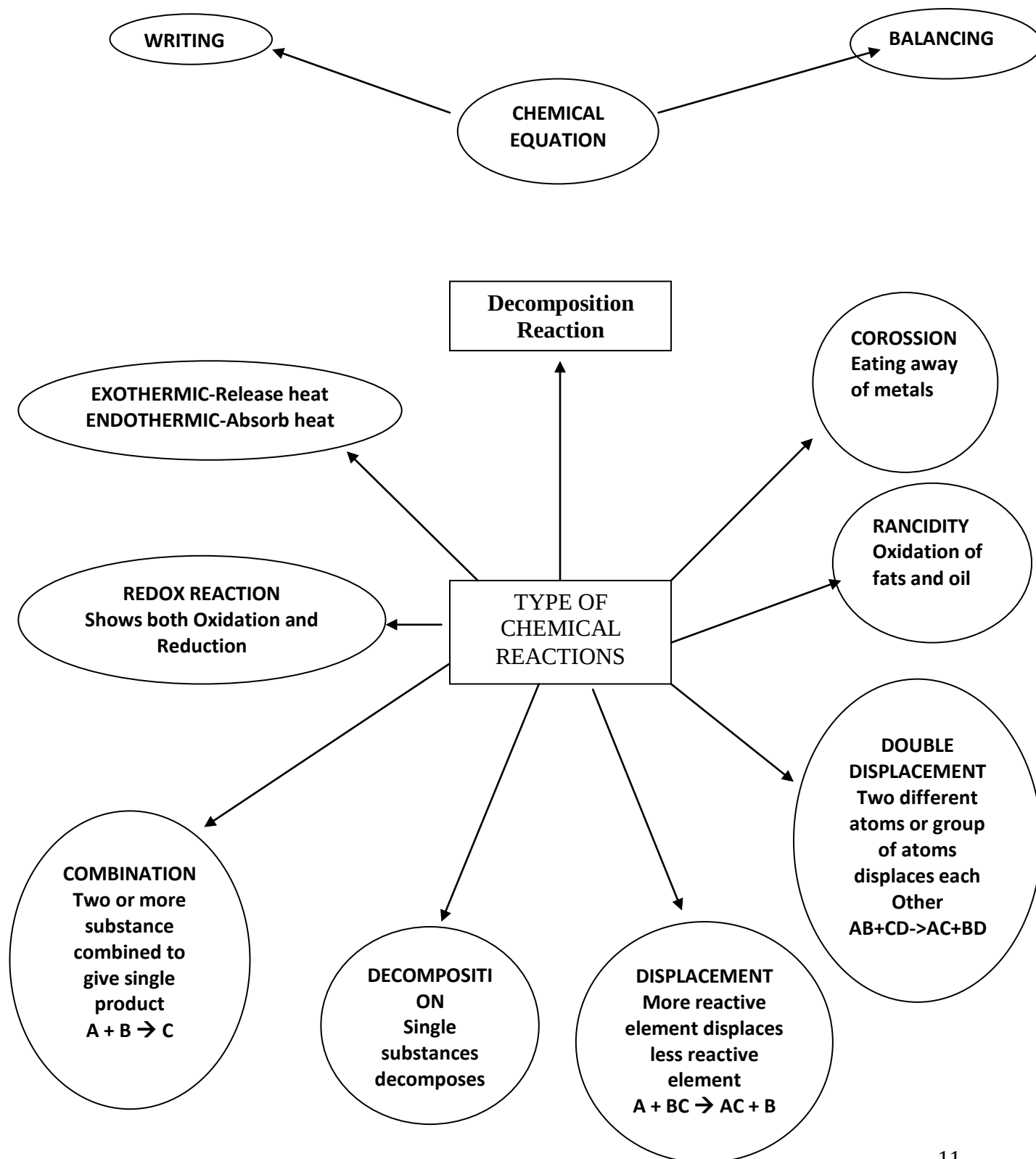
5 Corrosion – The process of slow conversion of metals into their undesirable compounds due to their reaction with oxygen, water, acids, gases etc. present in the atmosphere is called corrosion.

Rusting – Iron when reacts with oxygen and moisture forms red substance called rust. Chemical composition of rust is $\text{Fe}_2\text{O}_3 \cdot x\text{H}_2\text{O}$. Its chemical name is Hydrated Iron (III) oxide.

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

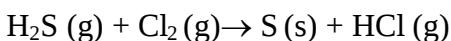
MARKS-30

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.

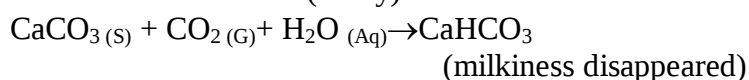
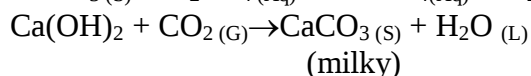
14.

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

HOTS QUESTIONS (SOLVED)

Q.1. A water insoluble substance 'X' on reacting with dilute H_2SO_4 released a colourless and odourless gas accompanied by brisk effervescence. When the gas was passed through water, the solution obtained turned blue litmus red. On bubbling the gas through lime water, it initially became milky and 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 CaCO_3 .



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?

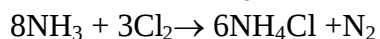
Ans. Red litmus paper turned blue.

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 litre of gas?
- Q. 9 Why respiration is considered an exothermic reaction? Explain.
- Q. 10 Why photosynthesis is considered an endothermic reaction? Explain.
- Q. 11 Why decomposition reactions are called opposite of combination reactions? Write equations for these reactions.
- Q. 12 A shiny brown coloured 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 stone?
7. When a more reactive metal displaces a less reactive metal in solution, what is the reaction called?
8. What sign (+ or -) is given to exothermic reaction?
9. Which of the two is a redox reaction?
 - a) Displacement
 - b) Double displacement
10. What is one important similarity between rusting and burning?

QUIZ - WHO AM I

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

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.
$$Zn + H_2SO_4 \rightarrow ZnSO_4 + H_2$$
- ii) Acids react with metal carbonate and metal hydrogen carbonate to give carbon dioxide.
$$NaHCO_3 + HCl \rightarrow NaCl + H_2O + CO_2$$
- iii) Acids react with bases to give salt and water. This reaction is called as neutralization reaction.
$$NaOH + HCl \rightarrow NaCl + H_2O$$
- iv) Acids react with metals oxides to give salt and water.
$$CuO + H_2SO_4 \rightarrow CuSO_4 + H_2O$$

6) Chemical properties of Bases:

- i) **Reaction with Metals** - Certain reactive metals such as Zinc, Aluminium, and Tin react with alkali solutions on heating and hydrogen gas is evolved.
$$2NaOH + Zn \rightarrow Na_2ZnO_2 + H_2$$
- ii) **Reaction with acids** -Bases react with acids to form salt and water.
$$KOH + HCl \rightarrow KCl + H_2O$$

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



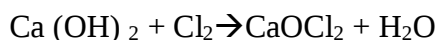
This process is known as chlor-alkali process.

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 weak alkaline due to hydrolysis.

Uses:

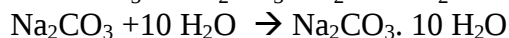
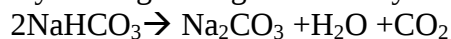
1. It is used in soda – acid fire extinguisher.
2. It acts as mild antiseptic and antacid.

3. It is used as a component of baking powder. In addition to sodium hydrogen carbonate baking soda contains tartaric acid.

e) Washing Soda ($\text{Na}_2\text{CO}_3 \cdot 10 \text{H}_2\text{O}$)

Chemical name is sodium carbonate decahydrate.

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



Uses:

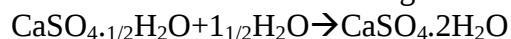
1. It is used for removing permanent hardness of water.
2. It is used in glass, soap and paper industries.
3. It can be used as a cleaning agent for domestic purposes.

f) Plaster of Paris ($\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$)

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



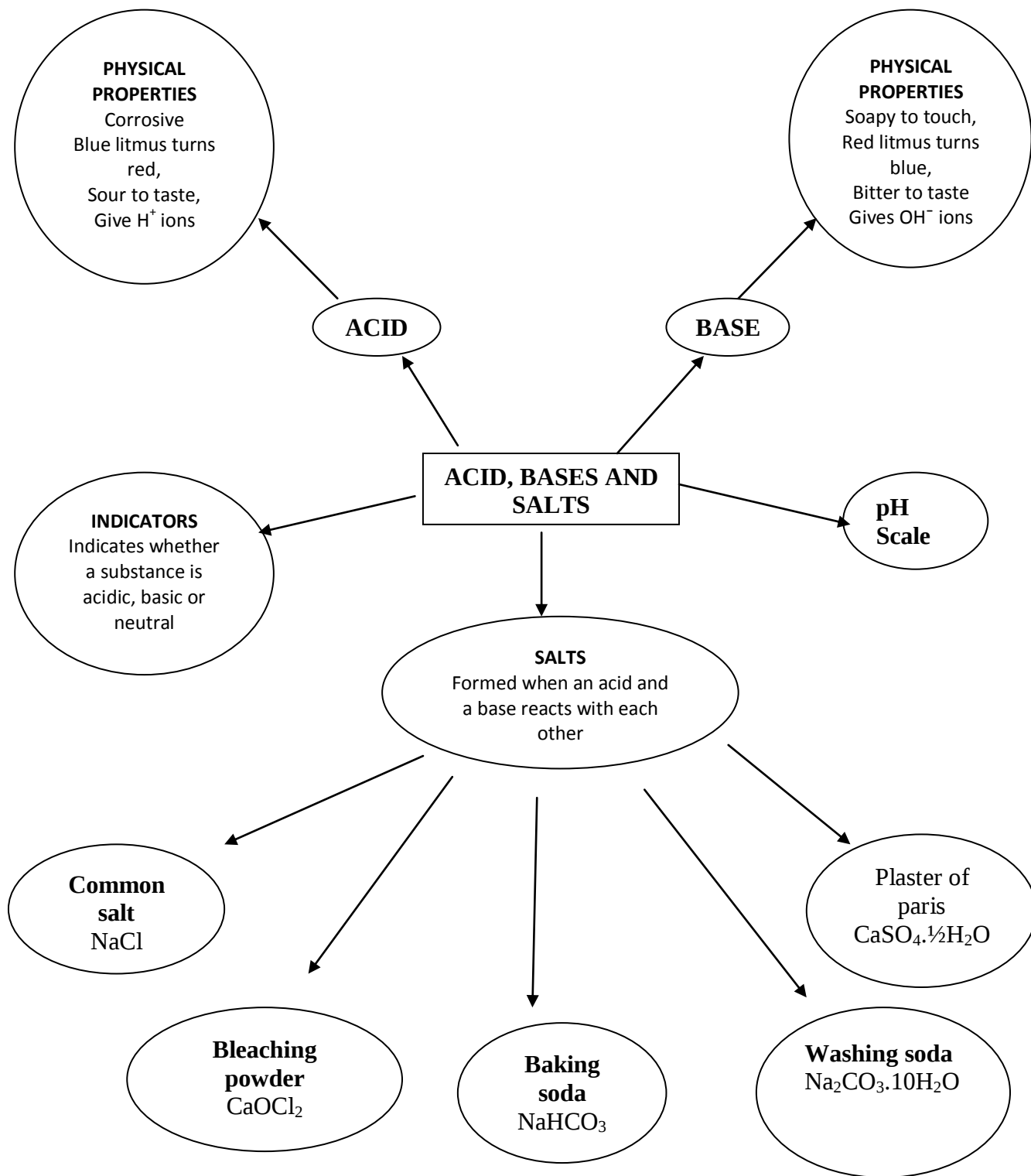
On treatment with water it is again converted into gypsum and sets as a hard mass.



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

- 1) Name the gas formed when sodium hydroxide reacts with zinc.
- 2) Write the chemical name of baking soda.
- 3) What happens when gypsum is heated at 373K?
- 4) Which has a higher pH value 1M HCl or 1M NaOH solution?
- 5) Hydrogen ion concentration of an acid is 1×10^{-2} mol/l. what is its pH?
- 6) What is meant by 'Water of Crystallisation' of a substance? Describe an activity to show that.
- 7) Why does tooth decay start when the pH of mouth is lower than 5.5?
- 8) What is baking powder? How does it make the cake soft and spongy?
- 9) Give Arrhenius definition of an acid and a base. Choose strong acid and strong base from the following:
 CH_3COOH , NH_4OH , KOH , HCl
- 10) What happens when nitric acid is added to egg shell? Give the chemical equation.
- 11) 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?
- 12) 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 ₂ O
	+ CH ₃ COOH	(C) + H ₂ O

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

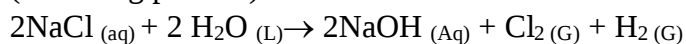
14)

- Define strong acid and weak acid.
- 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?

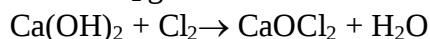
HOTS QUESTIONS

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' $\Rightarrow$ Cl₂ gas

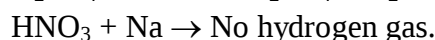
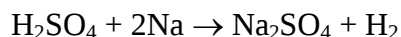
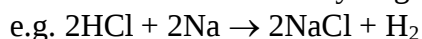


Q.2. Dry hydrogen chloride gas does not turn blue litmus, whereas hydrochloric acid does. Why?

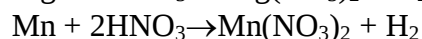
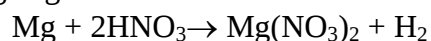
Ans. In the dry state, hydrogen chloride (HCl) does not release H⁺ ions. Therefore, it cannot behave as an acid. When dissolved in water, it forms hydrochloric acid. It dissociates to give H⁺ ions in solution and behaves as an acid.

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

Ans. Acid + Metal $\rightarrow$ Salt + 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 (ii) As 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.
6. I am an oxide capable of showing properties for both acids and bases.
7. I am a covalent compound and conducts electricity in aqueous medium.
8. I am a salt of potassium hydroxide and nitric acid.
9. I am the term used when a solid becomes liquid when exposed to moist air.
10. I am derived from tomato and turn blue litmus into red.

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	Lustre	Possessing shining or lustre.	Do not have lustre except iodine.
7	Sonorous sound	Give sonorous sound when struck.	Does not give sonorous sound.
8	Hardness	Generally hard except Na, K	Solid non-metals are generally soft except diamond.

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

1	Reaction with Oxygen	Metal + Oxygen → Metal oxide $4\text{Na(s)} + \text{O}_2\text{(g)} \rightarrow 2\text{Na}_2\text{O(s)}$ $4\text{Al(s)} + 3\text{O}_2\text{(g)} \rightarrow 2\text{Al}_2\text{O}_3$ 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 $\text{Na}_2\text{O(s)} + \text{H}_2\text{O(l)} \rightarrow 2\text{NaOH(aq)}$	Non-metal + Oxygen → Non-metal oxide $\text{C} + \text{O}_2 \rightarrow \text{CO}_2$ $\text{S} + \text{O}_2 \rightarrow \text{SO}_2$ 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 $\text{SO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{SO}_3$
2	Reaction with water	Metals react with water to form metal oxides or metal hydroxide and H₂ gas is released. $2\text{Na(s)} + 2\text{H}_2\text{O(l)} \rightarrow 2\text{NaOH} + \text{H}_2\text{(g)}$ + heat	Non-metals do not react with water, steam to evolve hydrogen gas. Because Non-metals cannot give electrons to hydrogen in water so that it can be released as H₂ gas.
3	Reaction with dilute Acids	Metal + Acid → Metal salt + Hydrogen HCl $\text{Mg(s)} + 2\text{HCl(aq)} \rightarrow \text{MgCl}_2\text{(aq)} + \text{H}_2\text{(g)}$ H₂SO₄ $2\text{Na(s)} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4\text{(aq)} + \text{H}_2\text{(g)}$ HNO₃ Metal + HNO₃ → H₂ gas is not displaced. Reason- HNO₃ is strong oxidizing agent.	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. $\text{Mn} + 2\text{HNO}_3 \rightarrow \text{Mn(NO}_3)_2 + \text{H}_2$ H₂ gas from HNO₃
4	Reaction with salt solutions	When metals react with salt solution, more reactive metal will displace a less reactive metal from its salt solution. $\text{CuSO}_4\text{(aq)} + \text{Zn(s)} \rightarrow \text{ZnSO}_4\text{(aq)} + \text{Cu(s)}$	When non-metals react with salt solution, more reactive non-metal will displace a less reactive non-metal from its salt solution. $2\text{NaBr(aq)} + \text{Cl}_2\text{(g)} \rightarrow$

			$2\text{NaCl(aq)} + \text{Br}_2\text{(aq)}$
5	Reaction with Chlorine	Metal + Chlorine $\rightarrow$ Metal Chloride ionic bond is formed. Therefore Ionic compound is obtained. $2\text{Na} + \text{Cl}_2 \rightarrow 2\text{NaCl}$	Non-metal + Chlorine $\rightarrow$ 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. $2\text{Na(s)} + \text{H}_2\text{(g)} \rightarrow 2\text{NaH(s)}$	Non-metals react with hydrogen to form hydrides $\text{H}_2\text{(g)} + \text{S(l)} \rightarrow \text{H}_2\text{S(g)}$

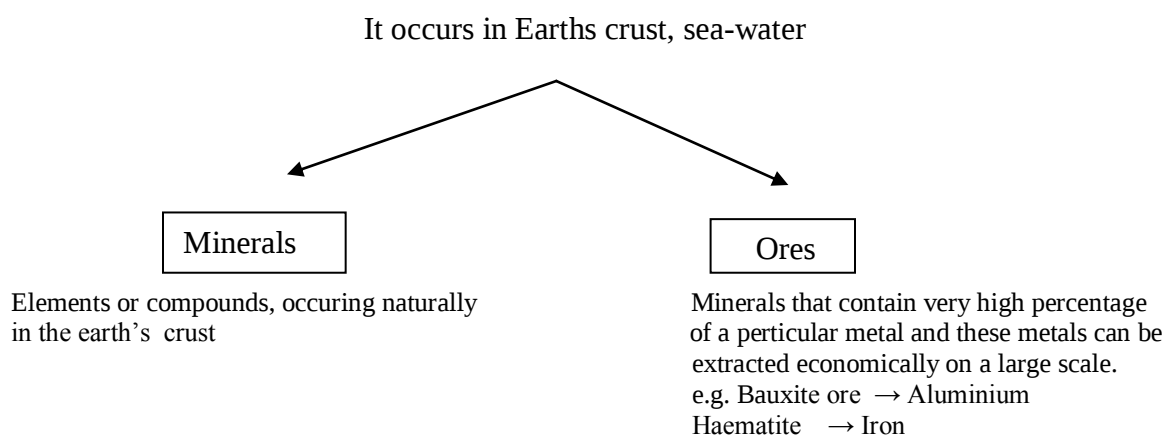
Properties of ionic compounds

- Physical nature:** solid and hard due to strong force of attraction. (generally brittle)
- 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.
- Solubility:** soluble in water and insoluble in kerosene and petrol.
- Conduction of electricity:** ionic compounds in solid state-----does not conduct electricity.

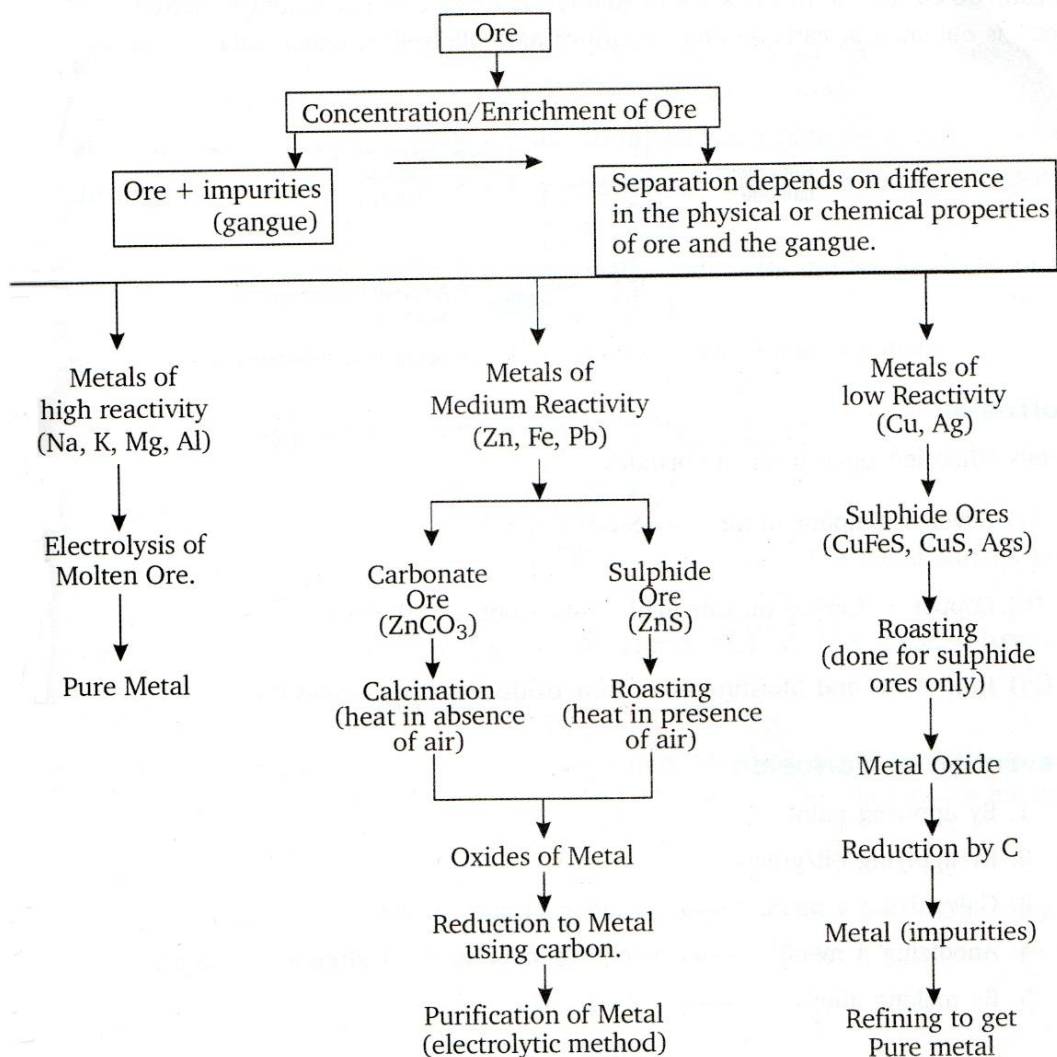
Reason—Ions can not move due to rigid solid structure. Ionic compounds conduct electricity in molten state or aqueous solutions.

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

Occurrence of metals.



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

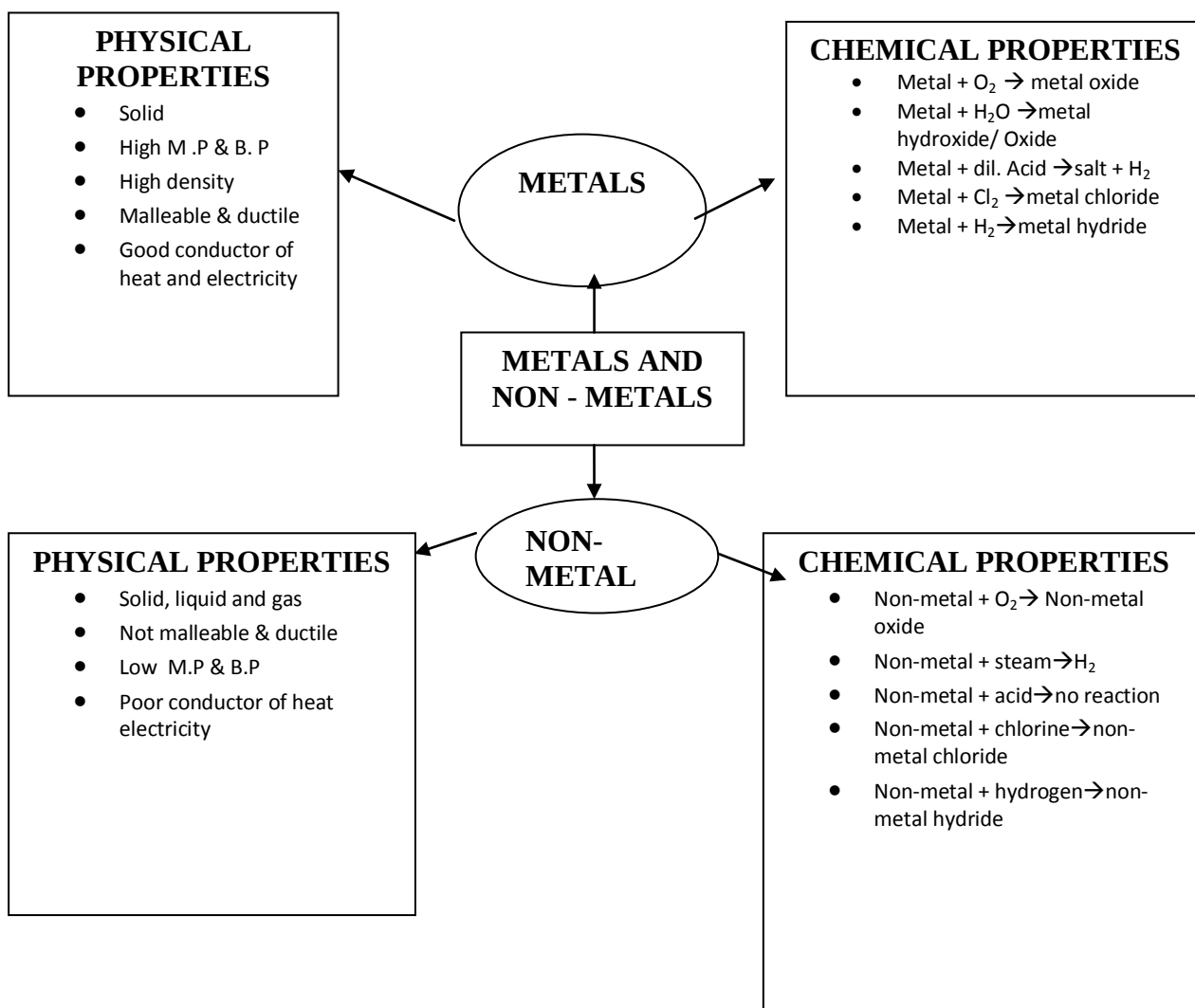


Calcination	Roasting
It is done for carbonate ores. Heating of ores in absence of oxygen. CO ₂ gas is released and Metal oxide is obtained	It is done for sulphide ores. Heating of S. ore in presence of oxygen. SO ₂ gas is released and Metal oxide is obtained.
$\text{ZnCO}_2(\text{s}) \xrightarrow{\text{heat}}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

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

Ans. a) The oxides which are acidic as well as basic in nature are called amphoteric oxides. ZnO and Al_2O_3 are amphoteric oxides.

b) Non metals can not loose electrons so that H^+ ions become hydrogen gas.

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

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

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

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

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

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

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

Q.7. Name the property of metal used in the following cases- (i) Aluminium foil (ii) 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 element 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.

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CHAPTER 6 -LIFE PROCESSES

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 algae(Cyanobacteria).

- Process – Photosynthesis(Photo=light; Synthesis= to combine)
- Raw materials- (i) Carbon dioxide (ii)Water
- Equation-
$$6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Chlorophyll}]{\text{sunlight}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$$
 (Glucose)
- 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. Cuscuta-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, Paramecium. 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) Absorption : absorption of digested food nutrients like amino acids, glucose, fatty acid and glycerol.
- (iv) Assimilation: Utilization of digested food from the body.
- (v) 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 acidic for activation of pepsin (c) Regulate the cardiac sphincter of stomach 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 alkaline for the activation of trypsin. (b) Breaks down large fat molecules into smaller globules so that enzymes can act upon them(emulsification) 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-
 - (vi) Small intestine- To increase the surface area for the absorption of food.
 - (vii) Large intestine- For absorption of water.

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

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

Aerobic respiration	Anaerobic respiration
1. Takes place in presence of Oxygen. 2. End products- Carbon dioxide & Water 3. More energy is released. 4. Takes place in Cytoplasm & Mitochondria 5. Complete oxidation of glucose takes place. 6. It occurs in most organisms. 7. Equation- $\text{Glucose} \rightarrow \text{Pyruvate} \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Energy (38 ATP)}$	1. Takes place in absence of Oxygen. 2. End products- Ethanol & Carbon dioxide or Lactic acid. 3. Less energy is released. 4. Takes place in only in Cytoplasm. 5. Incomplete oxidation of glucose takes place. 6. It occurs in certain bacteria, yeast & certain tissues of higher organisms. E.g. In humans during vigorous exercise, when the demand for Oxygen is more than the supply, muscle cells respire anaerobically for some time. 7. Equation- <u>In Yeast-</u> (Alcoholic fermentation) $\text{Glucose} \rightarrow \text{Pyruvate} \rightarrow \text{Ethanol} + \text{CO}_2 + \text{Energy}$ <u>In muscle cells -</u> (lactic acid fermentation) $\text{Glucose} \rightarrow \text{Pyruvate (3 Carbon molecule)} \rightarrow \text{Lactic acid} + \text{Energy}$

- Some common features of Respiratory organs-
 - (i) Large surface area- for greater rate of diffusion of respiratory gases.
 - (ii) Thin permeable walls – to ensure easy diffusion & exchange of gases.
 - (iii) Extensive blood supply- Respiratory organs are richly supplied with blood vessels for quick transport of gases.
- Gaseous exchange in plants-
 - Process – Diffusion

- Direction of diffusion depends on- (i) Environmental conditions
(ii) Requirement of the plant.
- Day time- Carbon dioxide given out during respiration is used for photosynthesis. Therefore only Oxygen is released, which is a major activity during the day.
- Night time – Only respiration takes place. Therefore only Carbon dioxide is released, which is a major activity during the night.
- Gaseous exchange in animals-
 - Terrestrial animals- take Oxygen from the atmosphere.
 - Aquatic animals- take Oxygen dissolved in water. (Oxygen content is low in water, therefore they breathe faster).
- Human Respiratory system-
 External nostrils → 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 dissolved 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. 2. Deep seated. 3. Carry blood away from the heart. 4. Carry Oxygenated blood. 5. Valves absent.	1. Thin walled. 2. Superficial. 3. Carry blood to the heart. 4. Carry Deoxygenated blood. 5. Valves present

Circulatory system	Heart	2 Upper Chambers(atria)		
		2 Lower Chambers(ventricles)		
	Blood	Fluid part (Plasma)	Plasma transports food, Oxygen, Carbon dioxide, Nitrogenous wastes, etc.	
			RBC	Contain haemoglobin & Transport Oxygen
		Cellular part	WBC	Fight against diseases
			Platelets	Blood clotting
	Blood Vessels		Arteries	Carry blood from heart to body parts
		Veins	Collect blood from body parts and carry to heart	
		Capillaries		

- 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.(Bicuspid or mitral valve)

(iii) Left Ventricle contracts and the blood is pumped into the largest artery 'Aorta' and is carried to all parts of the body.

Right side- (i) Right atrium relaxes & the deoxygenated blood from the body enters it through superior and inferior Vena cava.

(ii) Right atrium contracts & the blood enters the right Ventricle through

the valve(Tricuspid Valve)

(iii) Right Ventricle contracts and the blood is pumped into the

Pulmonary

artery and is carried to lungs.

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

- Amphibians & reptiles- have 3 chambered heart where little mixing of Oxygenated blood & Deoxygenated blood takes place. Therefore their body temperature varies with the temperature of the environment. (cold blooded animals)
- Transportation in plants-
 - Plants need less energy needs- because they do not move and therefore have a slow transport system
 - Transport of water-
 - (i) Takes place by xylem tissue present in roots, stem, leaves and is therefore interconnected.
 - (ii) Root cells take up ions from the soil, which creates a concentration difference between root and soil. Column of water therefore rises upwards.
 - In very tall plants- transpiration creates a suction pressure, which pulls the water upwards.
 - Importance of transpiration-
 - (i) Helps in upward movement of water in plants.
 - (ii) It regulates the temperature in plants.
 - Transport of food-
 - (i) Takes place by phloem tissue.
 - (ii) Movement of prepared food in plants is called translocation.
- ❖ Excretion- The biological process of removal of harmful metabolic wastes in living organisms.
- ❖ Excretion in human beings-

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

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

Note-Vital functions of kidneys- (a) Filtration & removal of Nitrogenous wastes (Urea ,Uric acid)

- (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. Descried the functioning of nephrons.
- 14.

- a. Draw a diagram of human alimentary canal.
- b. Label the following – oesophagus, liver, gall bladder, and duodenum.
- c. What is the function of liver in human body?

HOTS QUESTIONS (SOLVED / UNSOLVED)

Q1. Why is it 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 passes through alimentary canal?
3. What regulate the exit of food from the stomach into small intestine?
4. In which part of the alimentary canal food is completely digested absorbed?
5. In which cell organelle breakdown of pyruvate takes place using oxygen?
6. Which structures stop backward flow of blood in atria and ventricles?
7. The filtered urine is collected in which part of nephron?
8. Which part of the plant excretes some waste substances into the soil?
9. Name the process used to remove urea from the blood.
10. The process by which evaporation of water from the plants mainly through the stomata.

QUIZ

1. Digestion of starch in humans takes from which organ?
2. Absorption of energy takes place in sunlight by the pigment.
3. Is chloroplast is non – lining structure?
4. What is the function of amylase?
5. Name the organ responsible for respiration in fish.
6. Which is more harmful urea or ammonia?
7. Which contains less nitrogenous wastes, the renal vein or renal artery?

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 (iv) Nerve ending
- ❖ 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)
 - (i) Brain
 - (ii) Spinal Cord
- (2) Peripheral Nervous system (PNS)

(i) Autonomic Nervous system (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

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

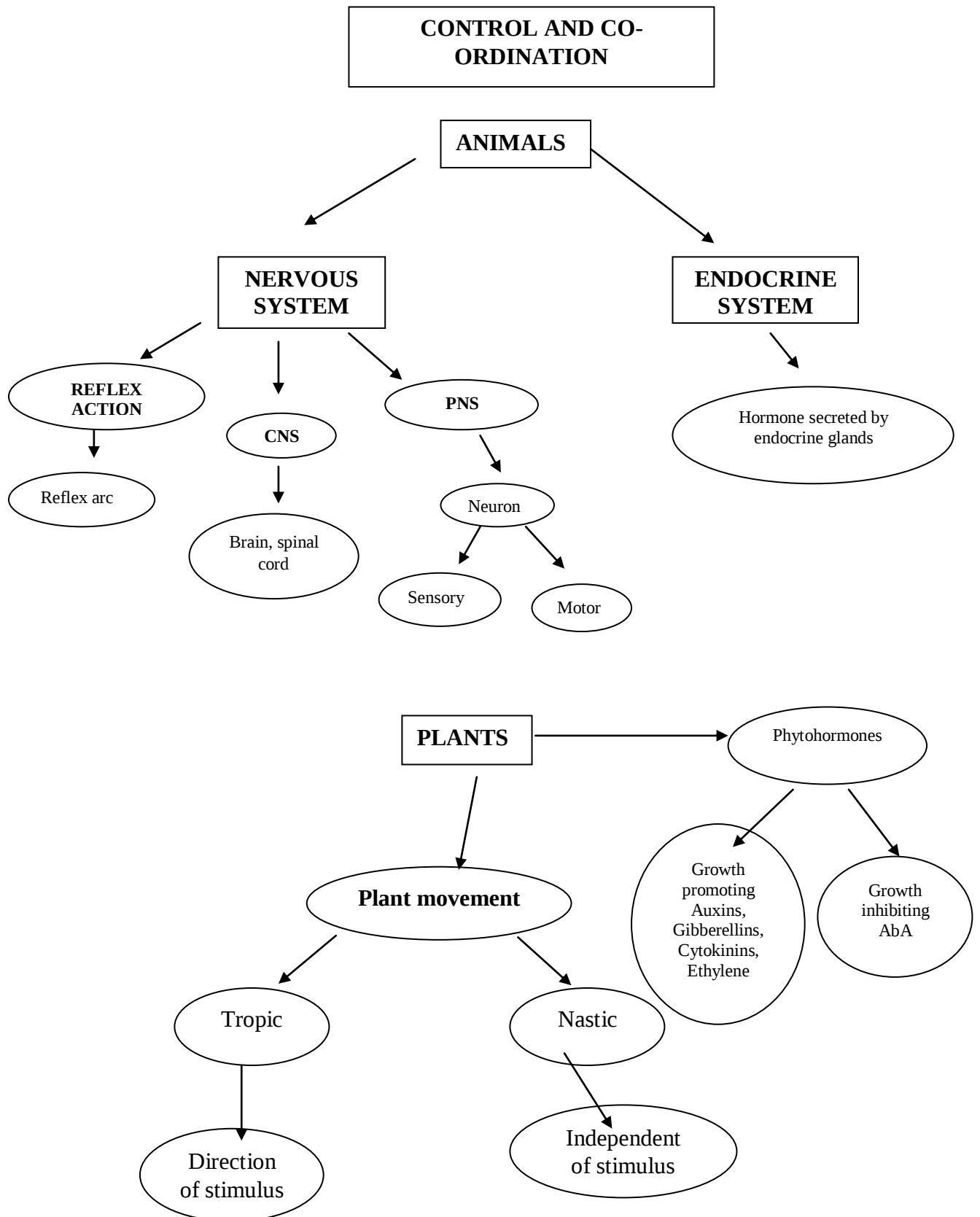
Gland	Endocrine function	Exocrine function
Pancreas	Produces insulin & Glucagon hormone.	Produces digestive enzyme. (pancreatic amylase , lipase, trypsin)
Testes	Produces hormone Testosterone	Produces male gametes (reproductive cells)
Ovaries	Produces hormone Oestrogen	Produces female gametes (reproductive 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(Mimosa pudica)
- ❖ 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

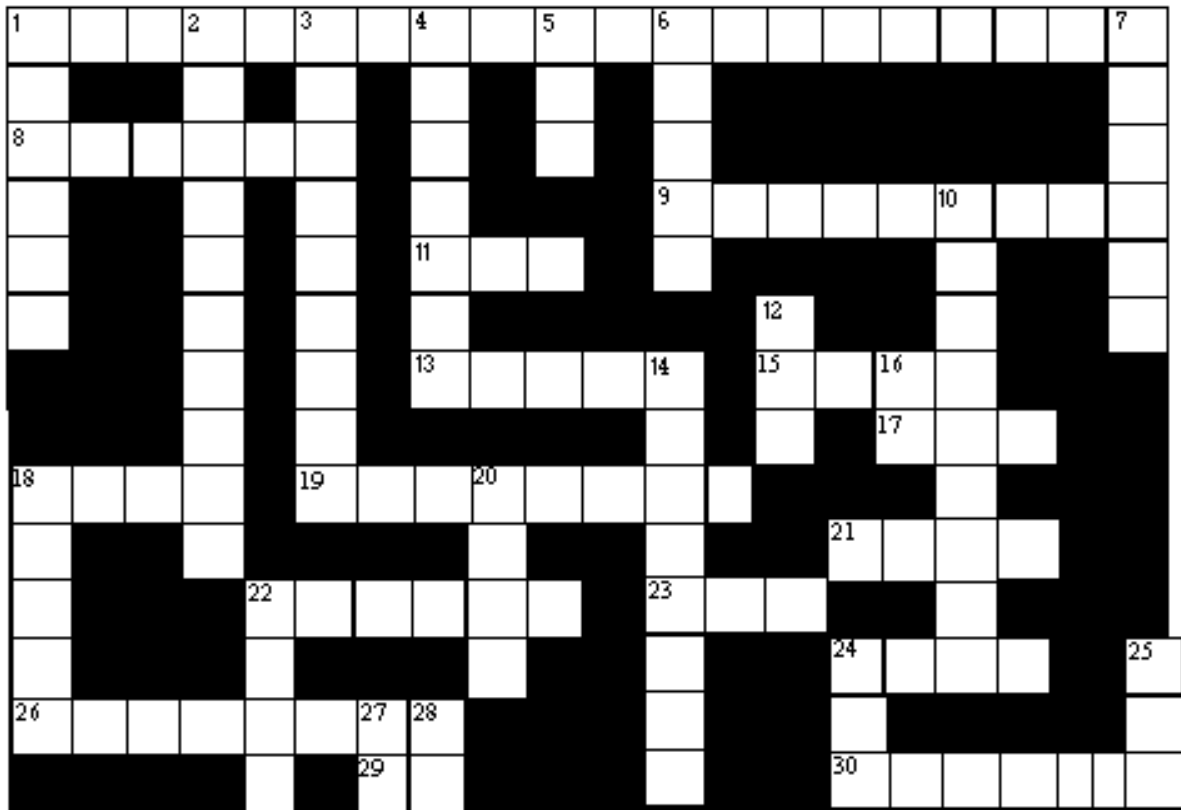
1. What is the basic unit of nervous system?
2. How do neuron conduct message from brain to other parts?
3. What do you mean by CNS?
4. What are its main parts?
5. Which part controls reflex action?
6. What are endocrine glands?
7. What is the secretion of endocrine gland called?

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

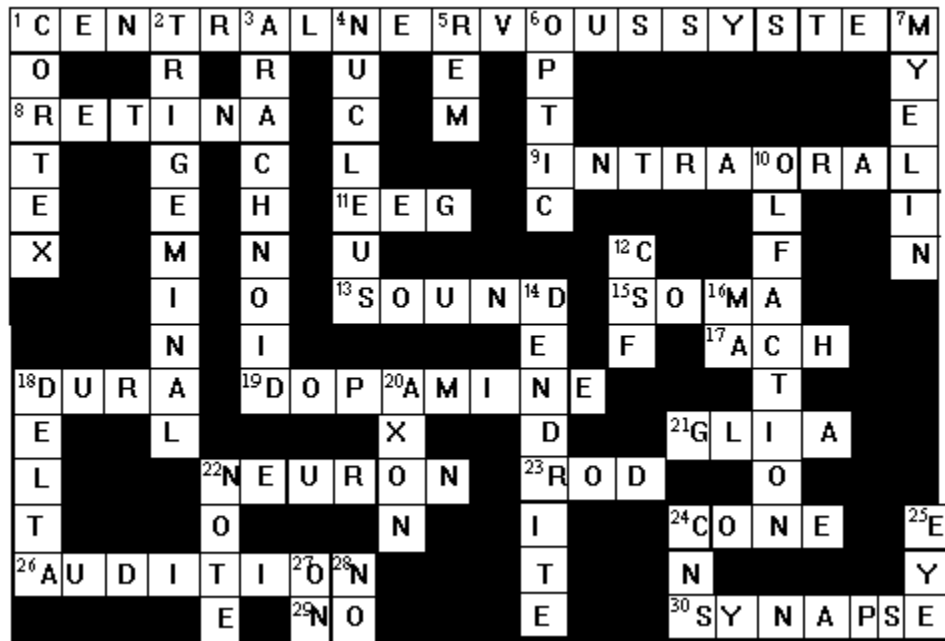
ACROSS

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".

ANSWERS: CROSS WORD PUZZLE: NERVOUS SYSTEM



ELECTRICITY

GIST OF THE LESSON

1. **Positive and negative charges:** The charge acquired by a glass rod when rubbed with silk is called positive charge and the charge acquired by an ebonite rod when rubbed with wool is called negative charge.
2. **Coulomb:** It is the S.I. unit of charge. One coulomb is defined as that amount of charge which repels an equal and similar charge with a force of 9×10^9 N when placed in vacuum at a distance of 1 meter from it. Charge on an electron = -1.6×10^{-19} coulomb.
3. **Static and current electricities:** Static electricity deals with the electric charges at rest while the current electricity deals with the electric charges in motion.
4. **Conductor:** A substance which allows 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.
 $1 \text{ ampere} = 1 \text{ coulomb/1 second}$ or $1 \text{ A} = 1 \text{ C/1s} = 1 \text{ Cs}^{-1}$
 $1 \text{ milliampere} = 1 \text{ mA} = 10^{-3} \text{ A}$
 $1 \text{ microampere} = 1 \mu\text{A} = 10^{-6} \text{ A}$
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 point to another.

$$\text{Potential difference} = \text{Work done/Charge} \quad \text{or} \quad V = W/Q$$

Volt is the S. I. Unit of P.D.

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

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

15. Ammeter: It is a 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. remain unchanged.

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

The proportionality constant R is called resistance of conductor.

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

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

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

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

$$R \propto L/A$$

$R = \rho \cdot L/A$ The proportionality constant ρ is called resistivity of conductor.

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

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

23. Laws of resistances in series:

- i) Current through each resistance is 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
 $H = I^2Rt$ joule = $I^2Rt/4.18$ cal

or

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

Applications-Electric toaster, Electric heater, Fuse wire etc.

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.

$$P = W/t = VI = I^2R = V^2/R = \frac{QV}{t}$$

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.

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

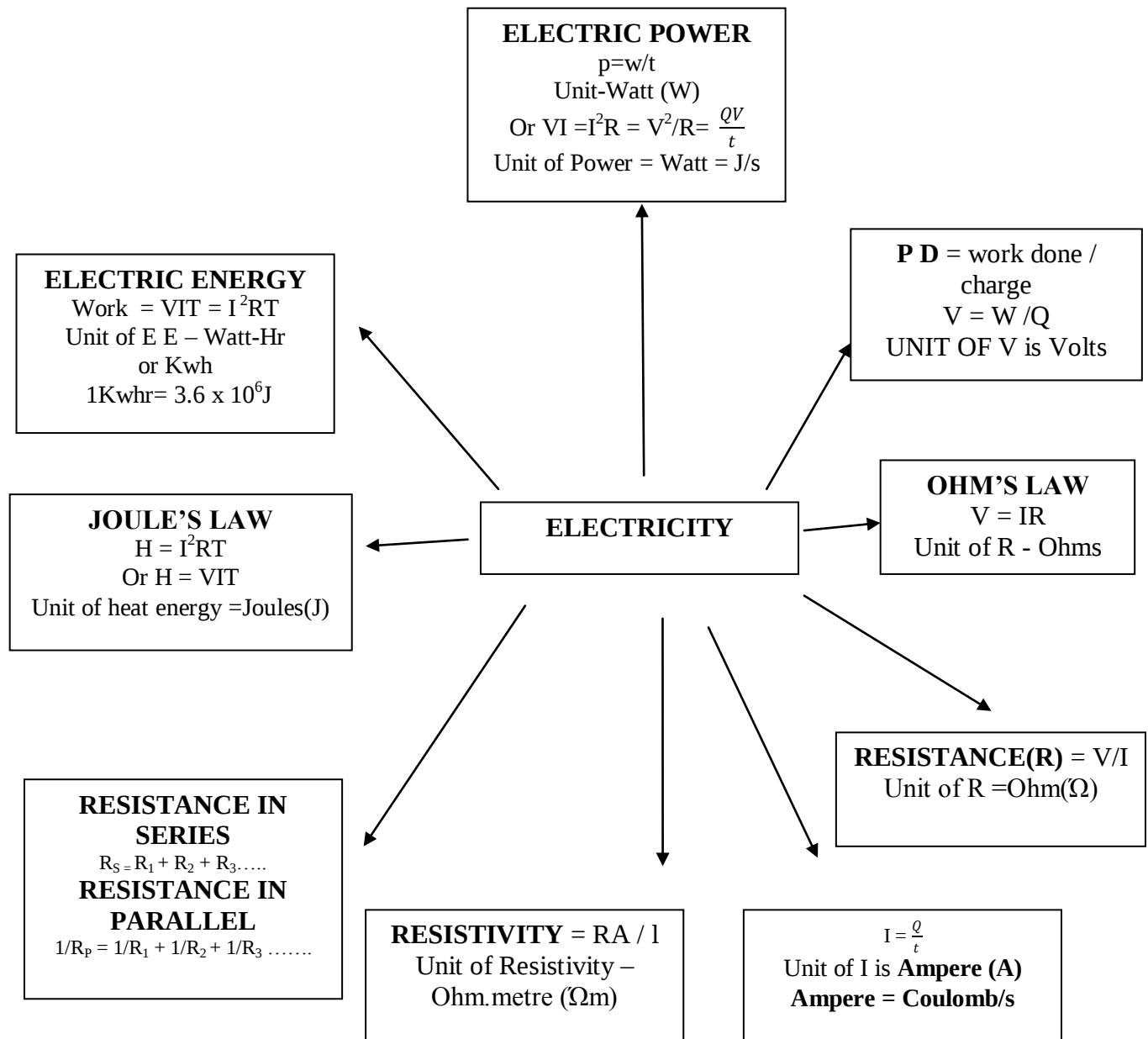
$$\text{or } 1 \text{ W} = 1 \text{ Js}^{-1} = 1 \text{ VA}$$

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

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 alternating 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?

CHAPTER-13
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.
(iii) Like poles repel each other while unlike poles attract.
- ❖ 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.
 - (iii) Closeness of field lines indicates strength of magnetic field.
- ❖ 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 becomes straight line at the centre of the 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.

(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

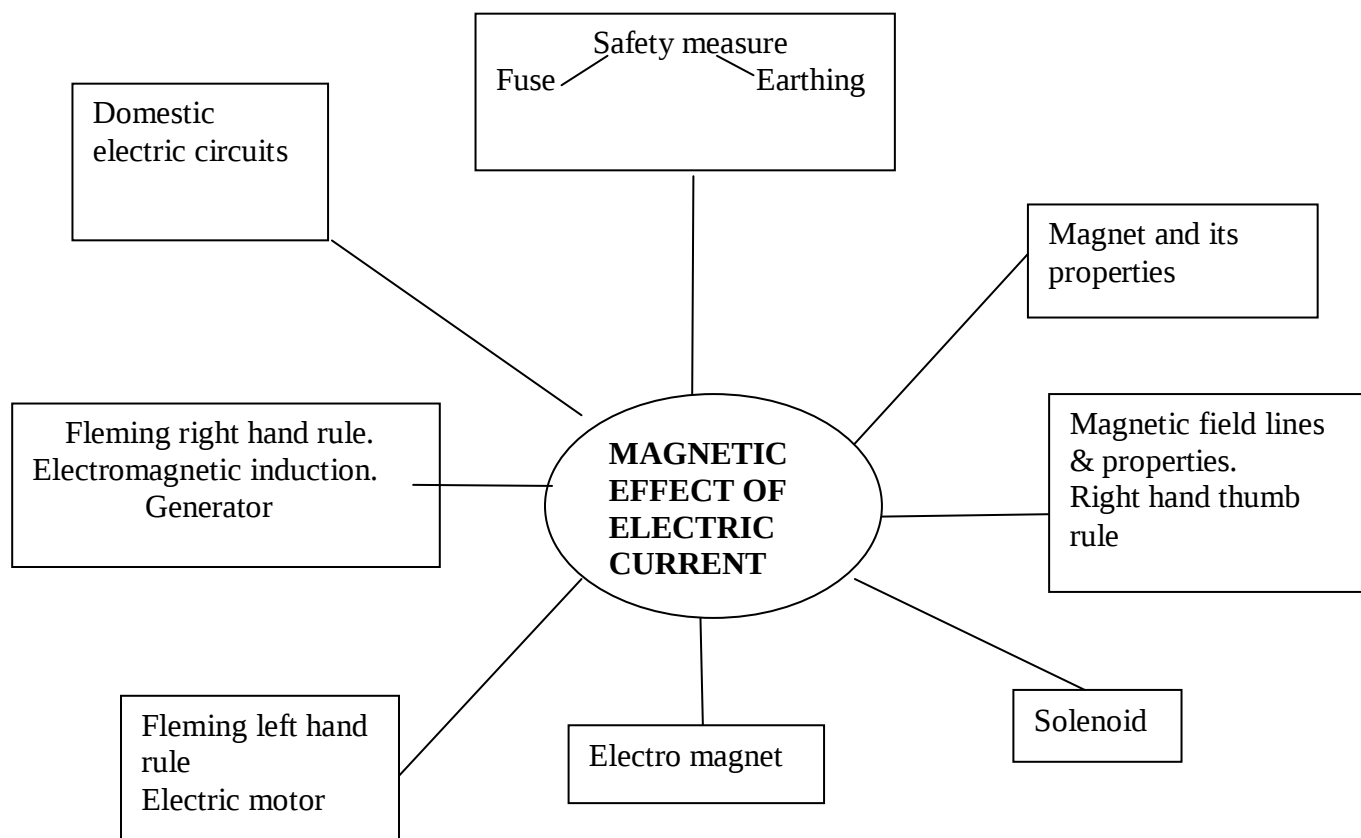
❖ **Important diagrams-**

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 deflected.

3. State Fleming's left hand rule.
4. What is the importance of earth wire?
5. Should a copper wire be used as a fuse wire? If not, why?
6. Give two points of difference between and electromagnet and permanent magnet.
7. Draw the lines of force indicating field direction of the magnetic field through and around
 - i) Single loop of wire carrying electric current.
 - ii) A solenoid carrying electric current.
8. What 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 different from those of weak field?
4.
 - a) What is a solenoid?
 - b) Is the magnetic field of a solenoid similar to that of a bar magnet?
 - c) State the two factors by which the strength of magnetic field inside a solenoid can be increased.
 - d) How will you determine the direction of the magnetic field due to a current – carrying solenoid?
5.
 - a) What is an electromagnet?
 - b) What is the effect of placing an iron core in a solenoid?
 - c) What type of core should be used inside a solenoid to make an electromagnet?
 - d) Give two advantages of electromagnets.

ORAL QUESTIONS

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

2. How can you locate a current – carrying wire concealed in a wall?
3. A freely suspended magnet always points along north – south direction. Why?
4. What type of core should be used inside a solenoid to make an electromagnet?
5. Name the SI unit of magnetic field.
6. What is the principle of an electric motor?
7. A generator converts energy from one form to another. What is this energy conversion?
8. Which wire (live, neutral or earth) goes through the switch?
9. Are different appliances connected in series or parallel in a house?
10. What is the colour convention for live, neutral and earth wires?

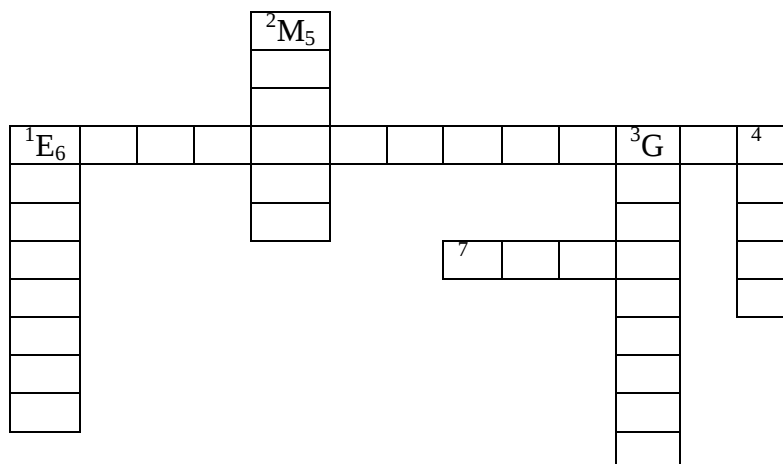
PUZZLE

⇒Across

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

⇓Down

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



CHAPTER-14
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 through EMI(Electromagnetic Induction)
- ❖ 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.

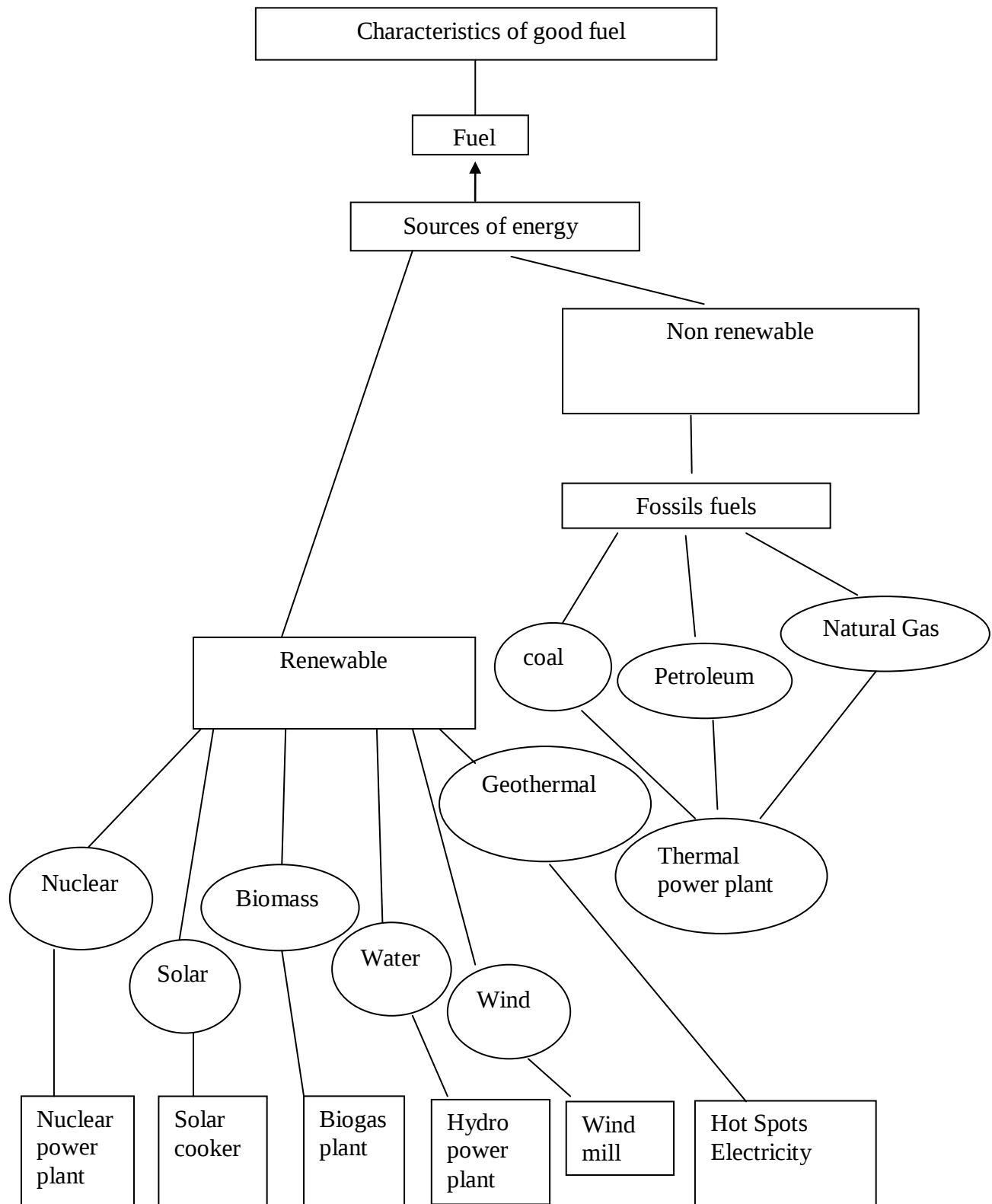
- Bio gas plants: Animal dung, sewage, crop residues, vegetable wastes, poultry droppings, etc. are used to produce Bio gas in Bio gas plants.
 - Uses : Bio gas is used for cooking and lighting.
 - (Refer to figure 14.4, page no. 247 of N.C.E.R.T Text book)
- (2) Wind energy:
- It can be converted into 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) Output is less as compared to investment
- (3) Solar energy:
- Solar radiations can be converted into 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 greenhouse 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) Solar radiations are not uniform over earth's surface.
 - (ii) Cannot be used at night or on cloudy days.
 - (iii) 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 fresh wood 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 plant.

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

SUMMATIVE ASSESSMENT I

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

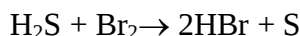
M.M: 90

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 34 in Section A are one mark question. These are to be answered in one word or one sentence.
6. Question numbers 4 to 7 are two marks questions, to be answered in about 30 words.
7. Question numbers 8 to 19 are three marks questions, to be answered in about 50 words.
8. Question numbers 20 to 24 are five marks questions, to be answered in about 70 words.
9. Question numbers 25 to 42 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:



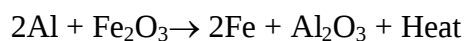
2. Why are titanium and chromium classified as strategic element?
3. Which has a higher resistance: a 50W lamp or 25W lamp bulb and how many times?
4. A drop of litmus solution is added to each of the four solutions give below. State the colour of litmus solution observed in each.

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 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 every day. 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. What happens at the synapse?

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 demand 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.

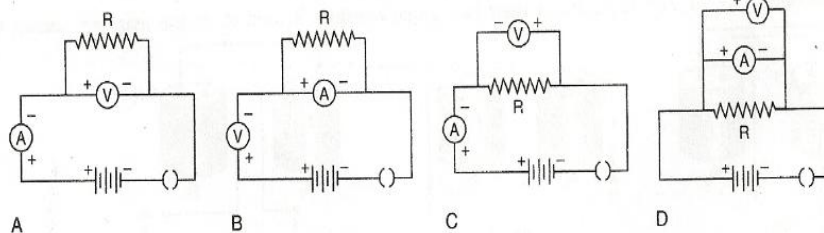
- a. State reasons for the following.
 - i. Metals are good conductor of heat.

- 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
 - iv. $\text{CaO} + \text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2$
 - v. $\text{NaOH} + \text{H}_2\text{SO}_4 \rightarrow \text{Na}_2\text{SO}_4 + \text{H}_2\text{O}$
- 24. a. Explain why
 - i) solar cooker is painted black from inside.
 - ii) the solar cooker box is covered with a glass sheet.
 - iii) the plain mirror reflector is used in solar cooker.
- b. Draw a neat and well labelled diagram of solar cooker

SECTION – B

- 25 Absorption of light energy by mesophyll cells of leaf causes.
 - a) Oxidation of chlorophyll
 - b) Excitation of chlorophyll
 - c) Reduction of chlorophyll
 - d) Evolution of O_2
- 26 Which of the following does not secrete any hormone?
 - a) Testis
 - b) Spleen
 - c) Ovary
 - d) Pancreas
- 27 Which part of sunlight is used in making solar cell?
 - a) Infrared radiation
 - b) Ultraviolet radiation
 - c) Visible radiation
 - d) All of these
- 28 Which one of the following reaction can be a non – redox reaction?
 - a) Combination
 - b) Decomposition
 - c) Displacement
 - d) Double displacement.
- 29 Which of the following metal does not react with dilute sulphuric acid to liberate H_2 gas?

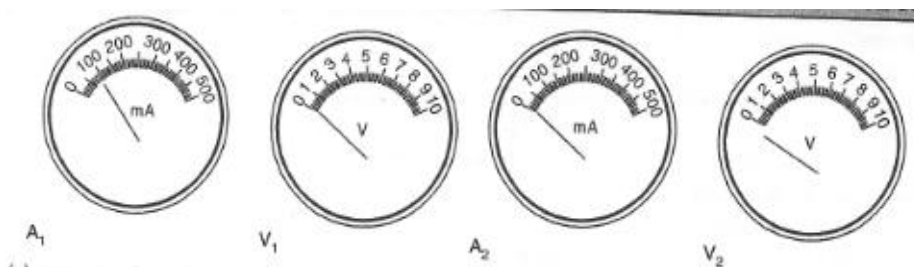
- a) Calcium
b) Sodium
c) Iron
d) Silver
- 30 Sodium carbonate is not used as:
a) Ingredient in antacids
b) As a cleaning agent
c) For removing permanent hardness of water
d) For manufacturing of glass
- 31 Which one of the following compounds is not an ionic compound?
a) Sodium chloride
b) Calcium chloride
c) Carbon tetrachloride
d) Magnesium chloride
- 32 Which among the following reactions are endothermic in nature?
(i) Decomposition of lead nitrate
(ii) Burning of methane
(iii) Dilution of sulphuric acid
(iv) Dissolution of ammonium chloride in water.
a) i. and ii.
b) ii. and iii.
c) iii. and iv
d) i. and iv
- 33 Seeds which are kept in the conical flask during the experiment that CO_2 is released during respiration must be.
a) Dry
b) Wet
c) Germinated
d) Boiled
- 34 The end products of aerobic respiration are
a) CO_2 energy and hydrogen
b) CO_2 and water
c) CO_2 , H_2O and ATP
d) ADP and CO_2
- 35 The correct set up of for studying the dependence of the current on the potential difference across a resistor is



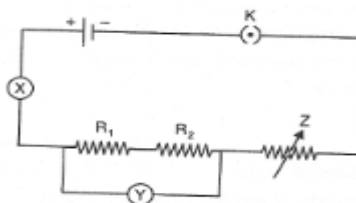
- a) A b) B c) C d) D

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

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

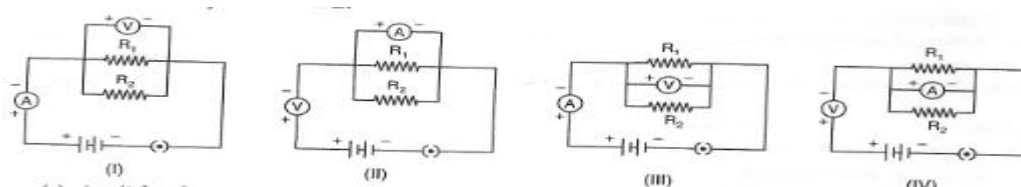


- a) Ammeter A_1 and voltmeter V_1 b) Ammeter A_2 and voltmeter V_2
c) Ammeter A_1 and voltmeter V_2 d) Ammeter A_2 and voltmeter V_2
- 37 The given circuit diagram shows the experiment arrangement of different circuit components for determination of equivalent resistance of two resistors connected in series. The components X, Y and Z shown in the circuit, respectively represent



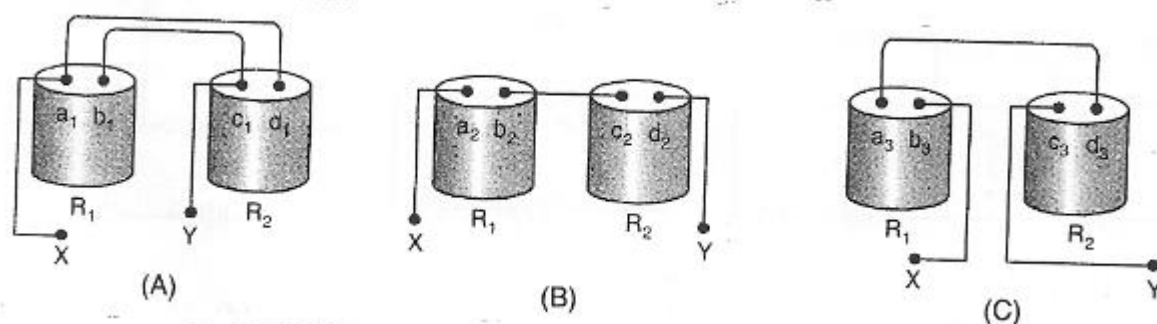
- a) Rheostat, Resistor, Ammeter b) Ammeter, Voltmeter, Rheostat
c) Voltmeter, Ammeter, Rheostat d) Rheostat, Ammeter, Voltmeter
- 38 In the experiment on finding the equivalent resistance of two resistors, connected in parallel,

the voltmeter has been correctly connected in



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

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



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

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

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

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

- a) Boiled in alcohol
b) Dipped in iodide solution
c) Boiled in water
d) Placed in 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 methylene blue and mounted in water

TERM II

(Second Term)

Contents:

Nos:

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2. Periodic classification of elements	97
3. How do organisms Reproduce	102
4. Heredity and evolution	105
5. Light-Reflection and refraction	110
6. The human eye and the colourful world	115
7. Management of natural resources	119
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Topic 1: Carbon and its compounds

Important terms and conditions

Versatility of carbon : Carbon is known metal and occurs in free as well as 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_2 .

Carbon has 4 valance 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 valance 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:

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

Unsaturated hydro carbon:

Compounds having single bond compounds having double and triple bonds.

ALKANES	ALKENES	ALKYNES
$\text{C}_n\text{H}_{2n+2}$	C_nH_{2n}	$\text{C}_n\text{H}_{2n-2}$
ethane (C_2H_6)	Ethene C_2H_4	Ethyne C_2H_2

S. 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 cyclic hydro carbon		Cyclohexane.
a	Saturated	Carbon atoms are bonded by single covalent bond.	Ethane
b	Unsaturated	Carbon atoms are bonded by doubled or triple covalent bond.	Ethene and Ethyne

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_3Cl)
2.	oxygen	1.Alcohol 2.Aldehyde 3.Ketone 4.Carboxylic acid	-OH -CHO >C=O -COOH	Ethanol $\text{C}_2\text{H}_5\text{OH}$ Methanal HCHO Propanone CH_3COCH_3 Ethanoic acid CH_3COOH

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 CH_2 groups e.g CH_4 , C_2H_6 , C_3H_8 etc.

NOMENCLATURE OF CARBON COMPOUNDS:

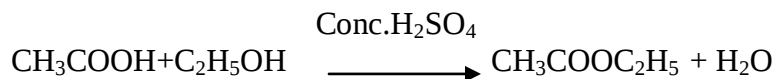
Prefix word root + suffix + Functional group.

CARBON COMPOUNDS:

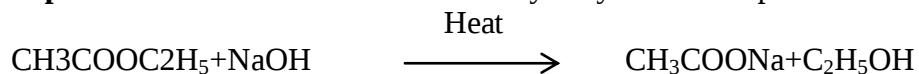
ETHANOL $-\text{C}_2\text{H}_5\text{OH}$ common name ethyl alcohol

ETHANOIC ACID- CH_3COOH . common name acetic acid.

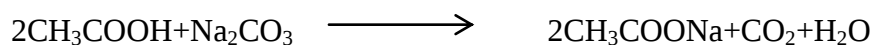
ESTERIFICATION REACTION: The reaction between carboxylic acid and an alcohol in the presence of conc. Sulphuric acid to form a sweet smelling substance ester. .e.g



Saponification reaction : Alkaline hydrolysis of ester produces soaps.



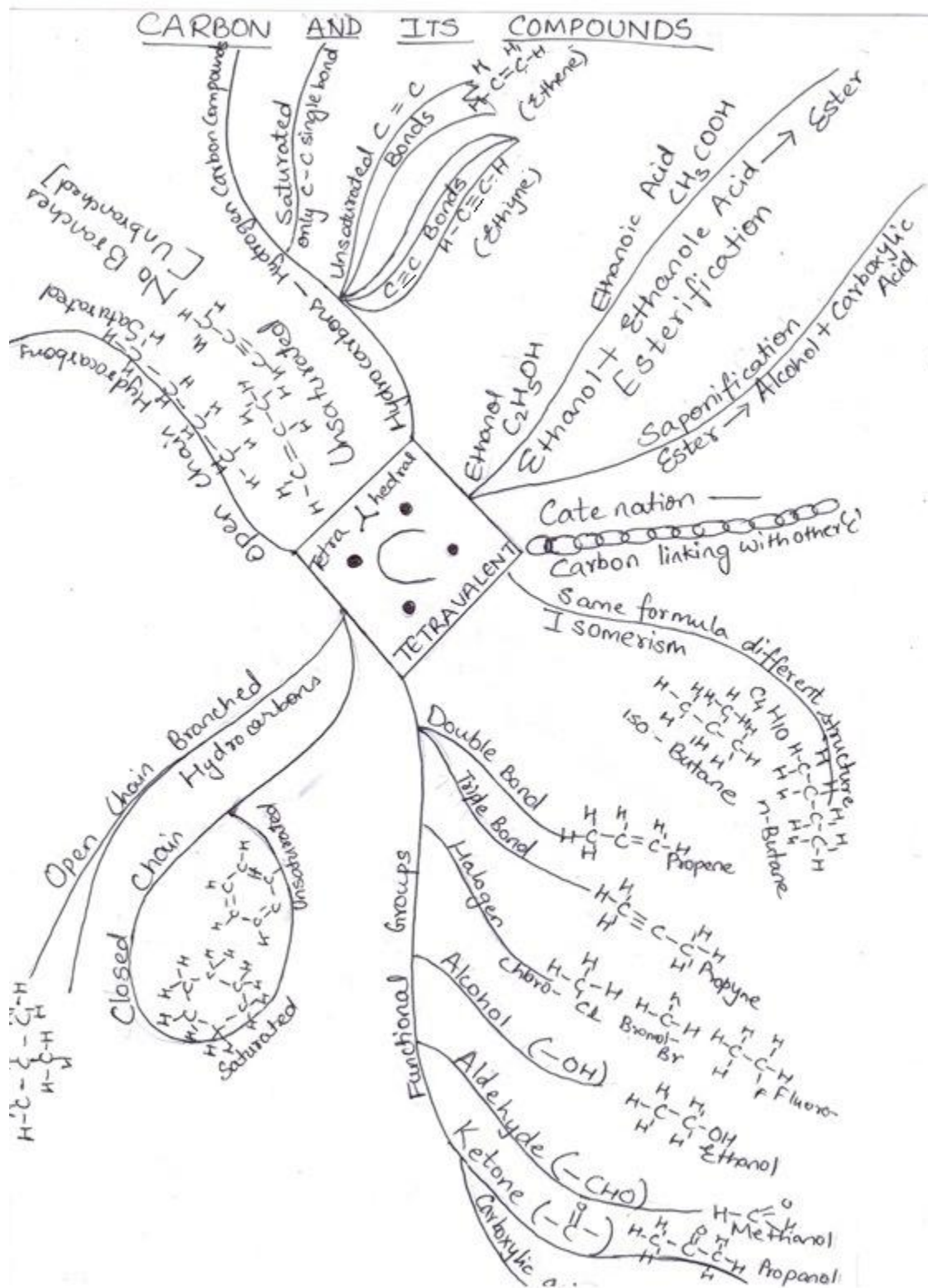
Reaction with carbonates and hydrogen carbonates: reaction of ethanoic acid with carbonates or bi carbonate evolves carbon dioxide gas.



SOAP AND DETERGENT: Soap is sodium and potassium salt of long chain of carboxylic acid .They form 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
marks:40.

Max

1. Name the compound form heating ethanol at 443 K with excess of conc. H_2SO_4 . 1
2. What happened when a small piece of sodium is dropped into ethanol ? 1
3. Write the chemical equation for the decarboxylation of ethanoic acid? 1
4. Give an example of esterification reaction. 1
5. Name the product obtained when ethanol is oxidized by acidified potassium dichromate or alkaline potassium permanganate. 1
6. Write the chemical equation representing the preparation reaction of ethanol from ethane. 1
7. Name the 2 elements which are present both in CNG and Petroleum 2
8. Draw the electronic dot structure of ethane molecule (C_2H_6) 2
9. Write the IUPAC name of the next homologous of $\text{CH}_3\text{OHCH}_2\text{CH}_3$. 2
10. Define homologous series of organic compounds series of organic compounds ,Mention any two characteristics of homologous series. 2
11. Describe a chemical test to distinguish between ethanol and ethanoic acid. 2
12. Give the name of functional groups (i)-CHO (ii) $=\text{C}=\text{O}$ 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 $\text{C}_2\text{H}_4\text{O}_2$ produces brisk effervescence on addition of sodium carbonate /bicarbonate.
a .Identify the organic compound.
b. Name the gas evolved.

- c. How will you test the gas evolved.
 - d. Write the chemical equation for the above reaction.
 - e. List two important uses of the above compound.
3. a. What are the various possible structure formulae of a compound having molecular formula C_3H_6O .
 b. Also give the IUPAC names of the above possible compounds.
 c. What is the similarity in these compounds?
4. A mixture of oxygen and ethyne is burnt for welding, can you tell why a mixture of ethyne and air is not used.
5. Two carbon compound A and B have molecular formula C_3H_8 and C_3H_6 respectively. Which one of the two is most likely to show addition .justify your answer .Explain with the help of a chemical equation, how an addition reaction is used in vegetable ghee industry.
6. 1ml glacial acetic acid and 1ml of ethanol are mixed together in a test tube. Few drops of concentrated sulphuric acid is added in the mixture are warmed in a water bath for 5 min.
 a. Name the resultant compound formed.
 b. Represent the above change by a chemical equation .
 c. What term is given to such a reaction.
 d. What are the special characteristics of the compound formed.
7. An organic compound 'X' with a molecular formula C_2H_6O undergoes oxidation in the presence of alkaline $KMnO_4$ and forms the compound 'Y'.
 a. Identify 'X' and 'Y'
 b. Write your observation when the compound 'X' is made to react with compound 'Y' which is used as a preservative for pickles.

Topic 1: Carbon and its compounds

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.

MCQs.

1. Dilute acetic acid was added to the four test tubes containing the following chemical.
i.KOH ii.NaHCO₃ iii. K₂CO₃ 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 of 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. up to 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 8 groups in table and group is subdivided into subgroups A and B except group VIII 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:

Moseley modified the Mendeleev'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 metals.

Elements in group 2 are called alkaline earth metals.

Elements in group 17 are called halogens.

Group 18 elements are called inert gases or noble gases.

Significance of group in the periodic table is that an element in a group has same number of valence 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 chemical compound.

ATOMIC SIZE / ATOMIC RADIUS:

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

On moving down the group the atomic radius increases.

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 radius decreases. Due to the increase in nuclear charge, the pull on the electron increases and hence, they are pulled closer to the nucleus thus, decreasing the atomic size.

Oxides and their nature. Metal reacts with oxygen to form oxides by loss of electrons. These oxides on dissolution in water form bases.

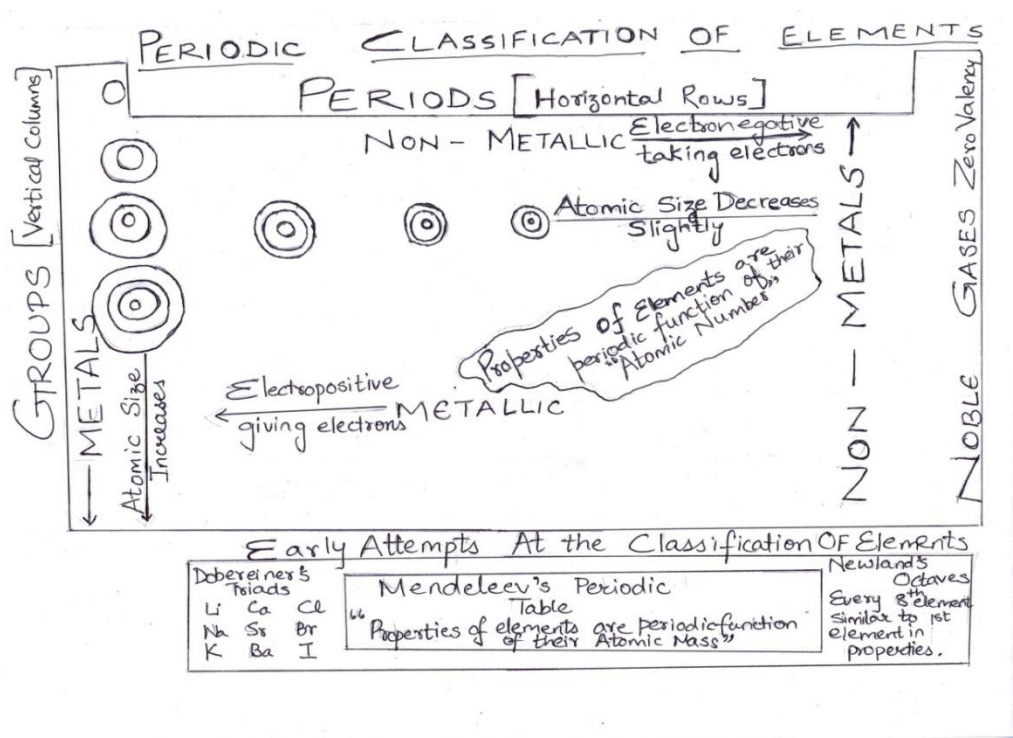
REACTIVITY OF ELEMENTS.

Down the group reactivity of metal increases as the tendency to lose electron increases due to the increased atomic size .

Reactivity of non metals decreases down the group because of the increased atomic size and the tendency to gain electron decreases.

On moving across the period the reactivity first increases due to the decreased in the metallic character and increase in non-metallic 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 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 shell in magnesium and sulphur? (1)
- Q.6 on the basis of electronic configuration , how will you select (1)
- the terminating member in a period .
 - 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 element in a group of periodic table have similar chemical properties why ? (2)

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

Q. 10 where in periodic table do we find :

i) elements classified as non metal .

ii) elements forming negative ions .

iii) elements with high melting points .

iv) elements forming positive ions . (2)

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

Q.12 elements in a group of periodic table have similar chemical properties why. (2)

Q.13 elements of group 18 are called zero group. Why? (2)

Q.14 Write the electronic configuration of atoms of

a) potassium (K) b) argon (Ar) c) lithium (Li) d) fluorine (F) e) chlorine (Cl) (5)

Q.15 i) Why is potassium more reactive than lithium?

ii) Why is fluorine 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.16 The 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 than an element of atomic no. 18?

iv) What type of bonds will it form with elements of group 18?

v) How would its oxide behave with litmus solution? (5)

HOTS QUESTIONS

Q.1 an element has two electrons 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 number 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 group 14.
- Q.3 Name 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.7 Name 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

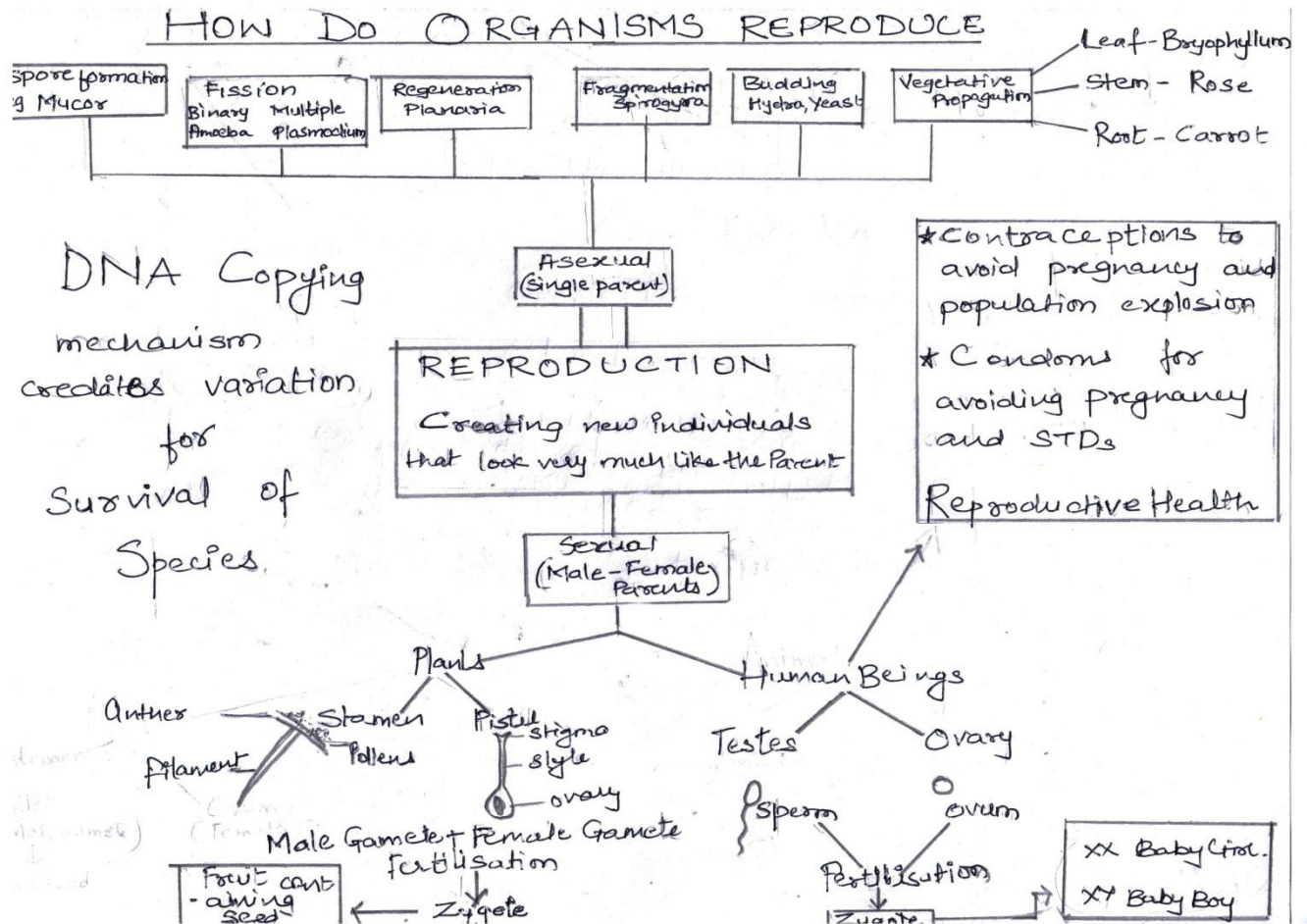
- 1 Power point Presentation on the following topics:
 - 1. Modern Periodic Table based on the similarity of properties of elements
 - 2. Contribution by various Scientists towards the development of Periodic Table.
 - 3. PERIODIC CLASSIFICATION
 - a) Making flash cards to study atomic numbers electronic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

TOPIC 3: HOW DO ORGANISMS REPRODUCE?

GIST OF THE LESSON

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

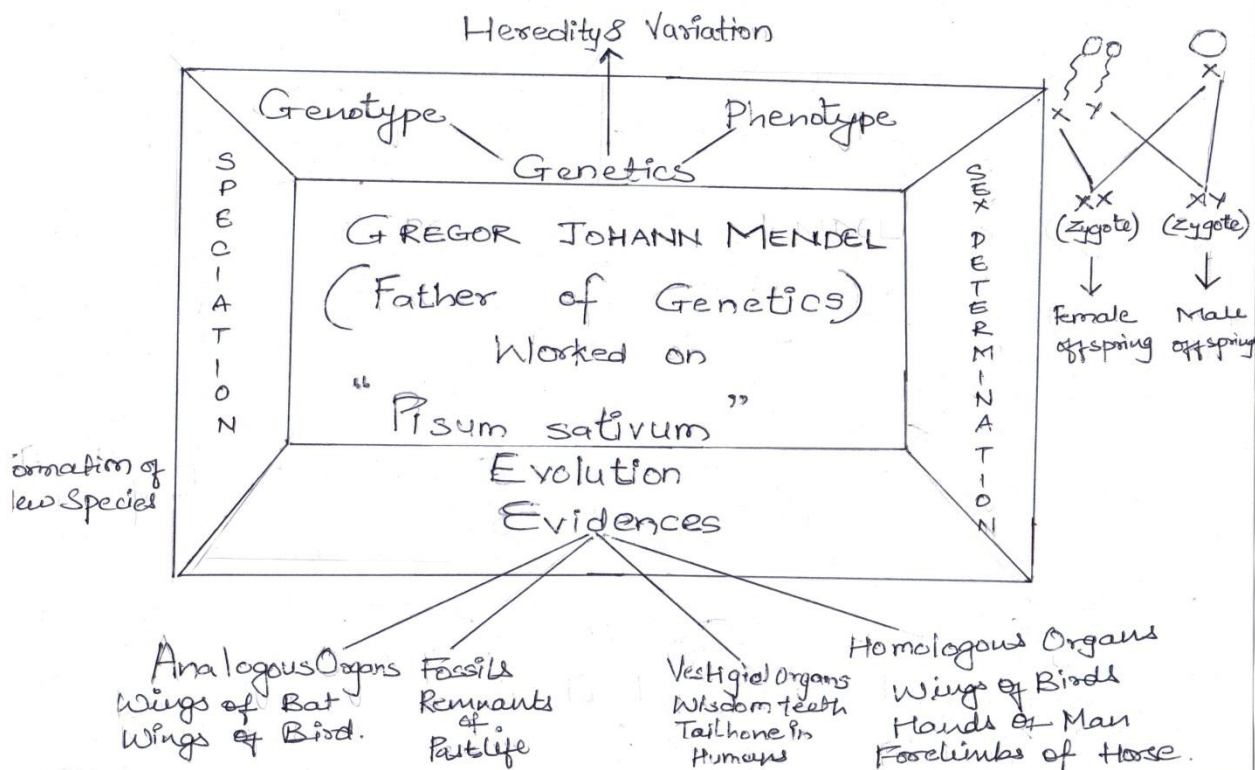
TOPIC 4: HEREDITY AND EVOLUTION

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 replication (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

HEREDITY AND EVOLUTION



FORMATIVE ASSESSMENT -III

TICK THE CORRECT OPTION:

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

HOTS

1.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?

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

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

3. Explain how advantages variations like long neck help an organism like Giraffe to survive better?

4. Which of the following is the clearly acquired trait in human beings?

a.Intelligence

b.Height

C.Swimming

d. Skin colour.

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

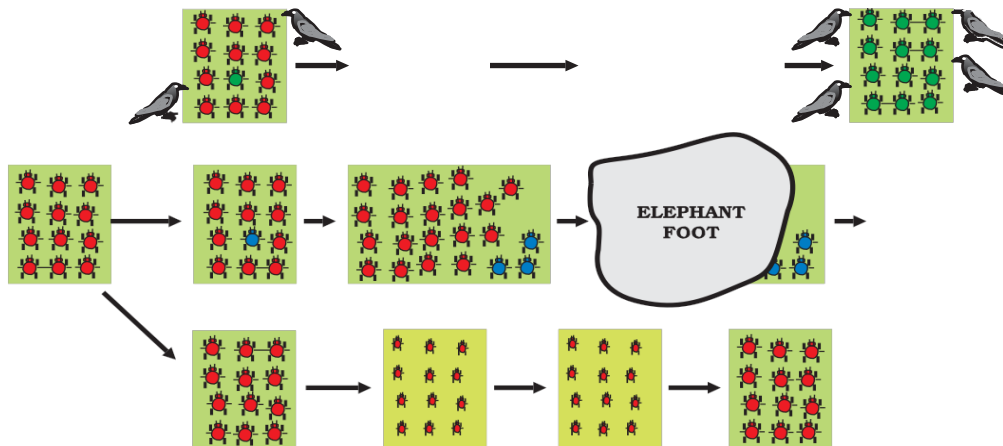
6. Acquired characters are not inherited .Give reasons.

7. All the human races like Africans, Asians ,European and others might have from common ancestors

provide few evidence in support of the view.

8. How is genetic drift different from natural selection? From the diagram given below which case shows natural selection?

Refer to diagram 9.7 ,page 147 of textbook.



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.

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

Refer to page 132, diagram 9.8. of text book.

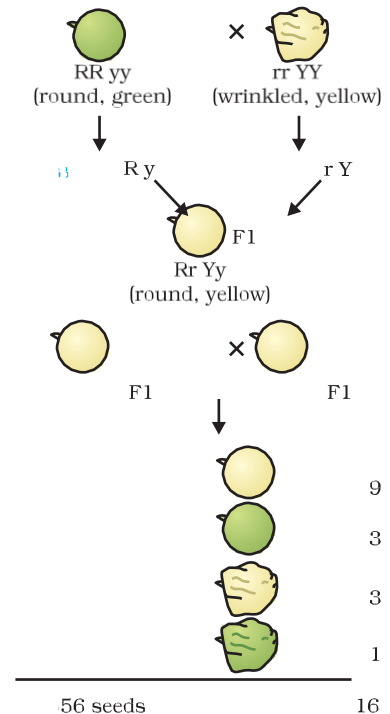
FORMATIVE ASSESSMENT –IV

QUIZ

- Decomposers are also called _____
- Producers prepare their _____
- Ozone layer is destroyed by _____
- Ecology is the study of the interaction of _____ with each other and their surroundings.

SEMINAR

- Mendel's work
- Sex determination in organisms
- Role play
- 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 incidence 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.

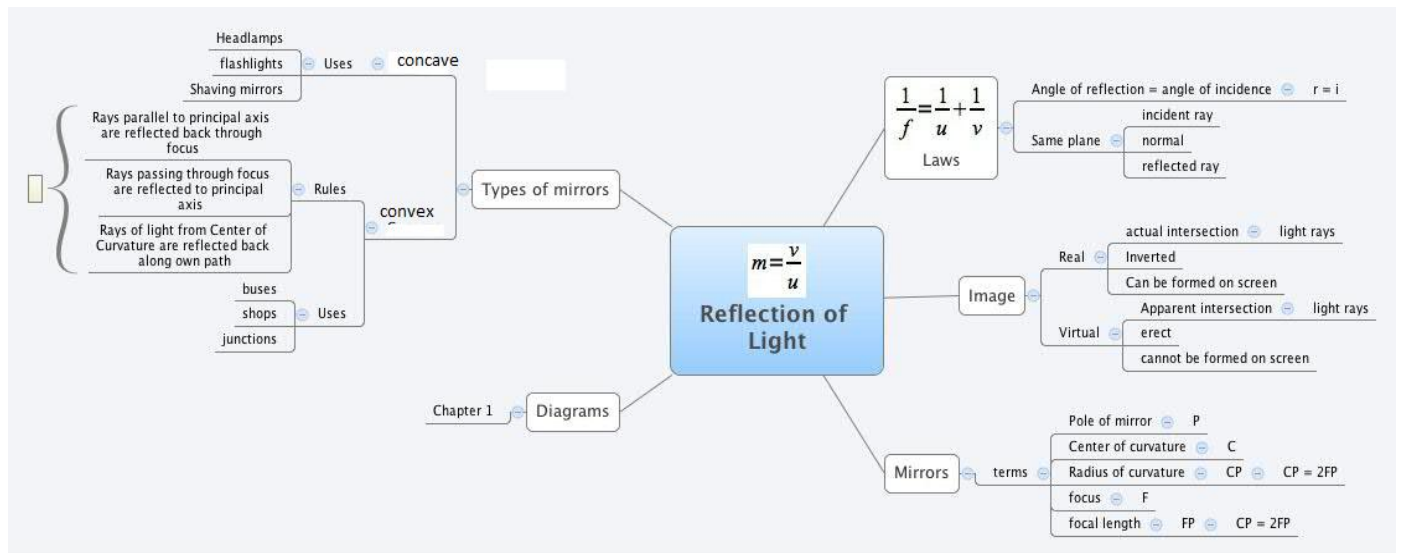
15) Lens formula: if u, v and f are the object distance, image distance and focal length respectively then $1/f = 1/v - 1/u$

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

17. Magnification of a mirror : $m = -\frac{v}{u} = (h_1) / (h_0)$

18. Power of the lens is defined as the reciprocal of its focal length. $P=1/f$, Unit-Dioptre(D); 1D is the power of the lens whose focal length is 1 metre.

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) 20 D 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 colours?

8) What makes bees respond to 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 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 .

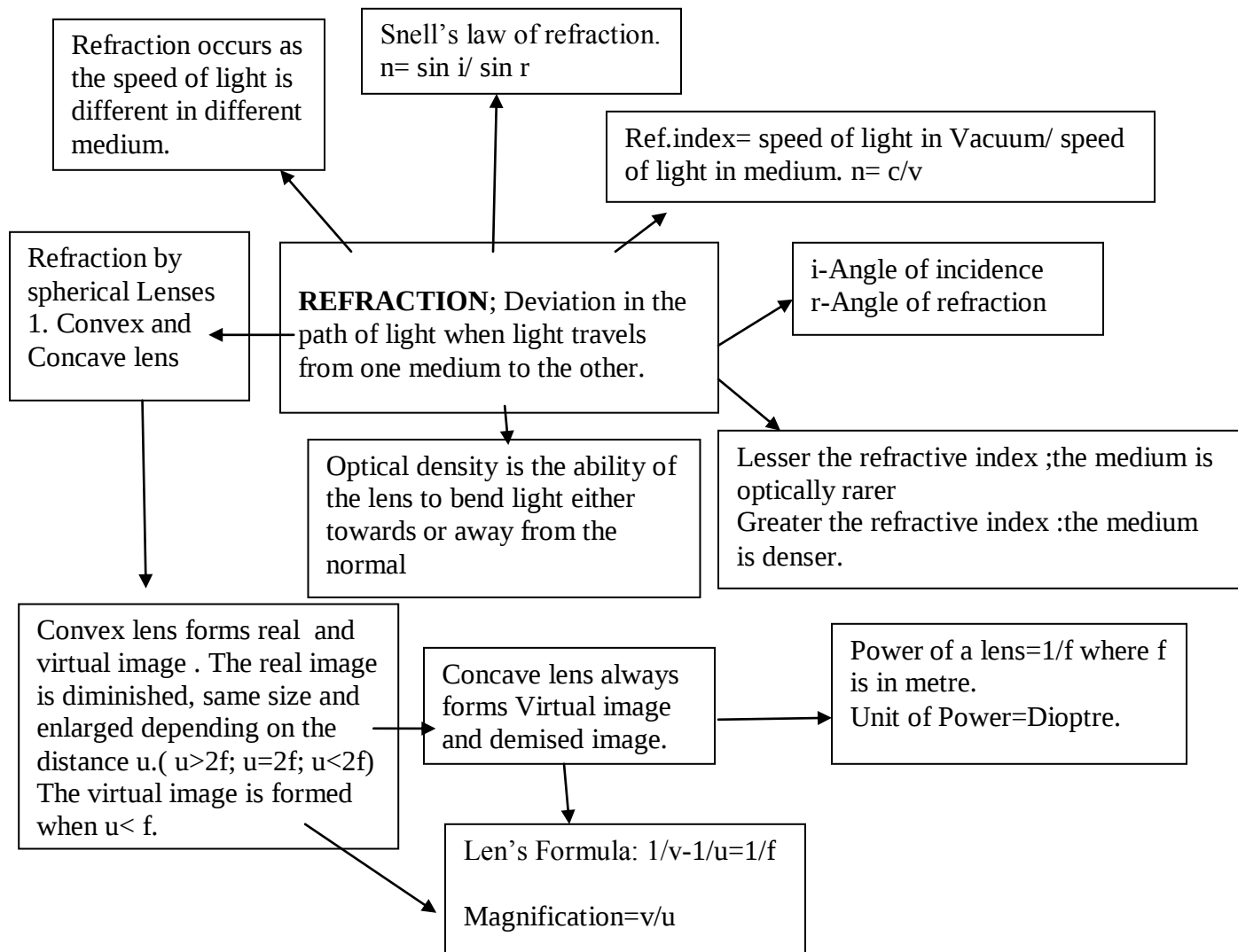
4. The power of the lens is -2D .What is the focal length and nature of the lens?

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

Key concepts and terms:

1. Eye : The natural optical device using which man can see objects around him. It forms an inverted, real image on a light sensitive surface called the retina.

Refer to NCERT figure 11.1 page no. 187

2. Power of accommodation: The maximum variation in power of the lens so that the far off and near by objects are viewed is called power of accommodation.

3. Near point of eye : The minimum distance between the object and the eye so that a clear image is formed on the retina. This distance is 25 cm.

4. Far point of Eye : The farthest point upto which the eye can see objects clearly is called the far point of the eye. It is infinity for normal eye.

5. Persistence of vision: The time for which the impression or sensation continues in the eye is called the persistence of vision. It is about $1/16^{\text{th}}$ of a second.

6. Myopia or short sightedness : Inability of the eye in viewing long distance objects. It is caused due to : i) excessive curvature in the eye lens ii) elongation of eye ball. It is corrected by using concave lens.

7. Hypermetropia or long-sightedness: The inability of the eye in viewing the nearby objects. It is caused due to i) greater focal length of the lens ii) eyeball becoming smaller. It is corrected by using convex lens.

8. Presbyopia: In human eye, with age, the near point recedes and the far point get reduced. The eye becomes both myopic and hypermetropic. This is caused due to i) weakening of ciliary muscles and ii) reducing ability of the lens to change the curvature. It can be corrected by using bifocal lens.

9. Dispersion : The process of splitting of white light into its seven constituting colours is called dispersion. The band of seven colours is called spectrum of visible light.

- Rainbow is a natural spectrum which is caused by dispersion of sunlight by tiny water droplets, present in the atmosphere.

10. Atmospheric refraction : The optical density of our atmosphere decreases with altitude. Thus a ray of light entering any layer of the atmosphere suffers refraction as it travels through the other layers. This is called atmospheric refraction. Natural phenomena which occur due to atmospheric refraction are – a) twinkling of stars b) Advance sunrise and delayed sunset

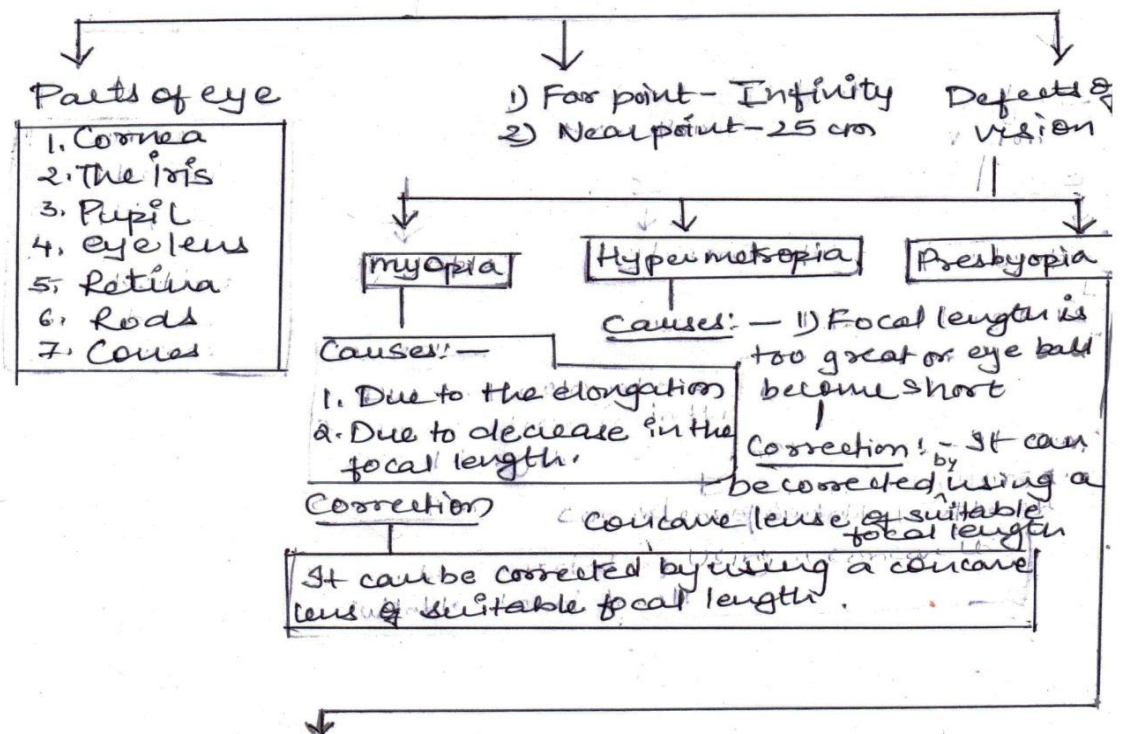
11. Scattering of light : The earth's atmosphere consists of gases and many kinds of particles. When light falls on such particles it gets scattered in all directions. Smaller particles scatter blue light to a larger extent than the red light. Natural phenomena which occur due to scattering of light are - i) blue colour of sky b) Reddening of the sun at sunrise and sunset.

MIND MAP

The Human Eye And The Colourful World.

Human eye

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



FORMATIVE ASSESSMENT –III

Give reason for the following:

- 1) Red light is used for danger signal
- 2) Cause of Colour 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.

HOTS

1. Why does it take 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 enters the eye and rods of the retina are also adjusted in the same way. but when a person enters into a dim light the 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.

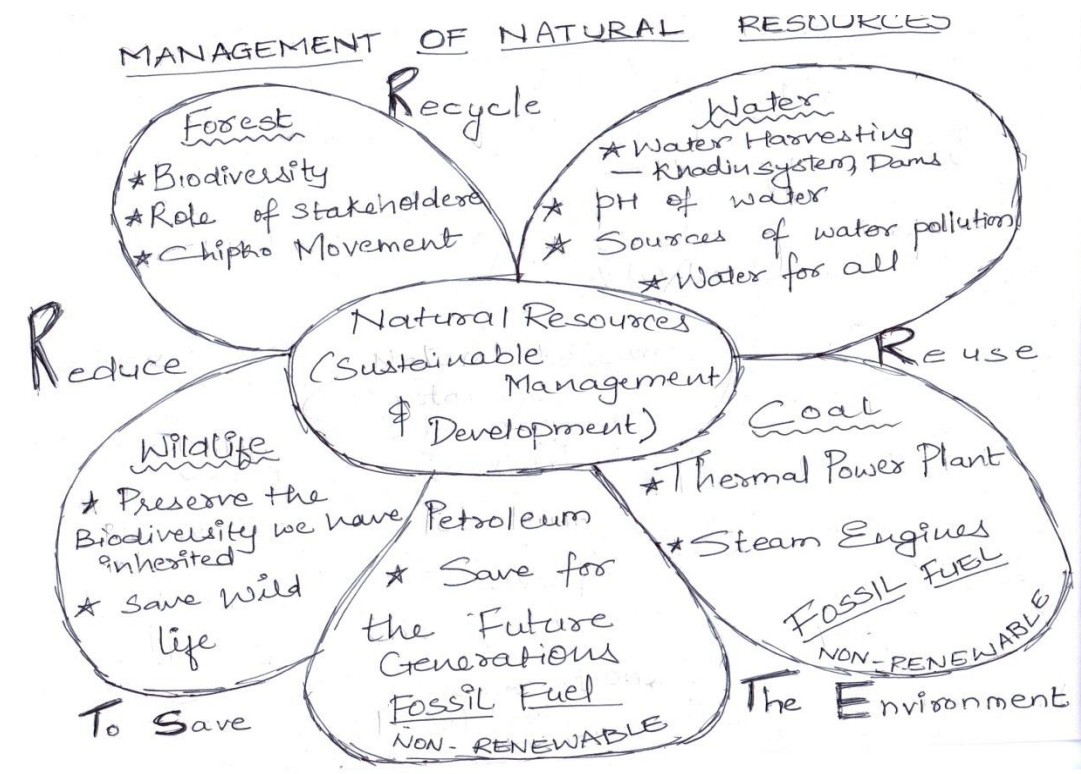
13) Uses of Fossil Fuels:

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 Bishnoi c. Sundar Lal Bahuguna d. Medha patekar.

ii. From the list given pick the item that is not a natural resource?

a.soil b. water c. air d. Electricity

1

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 “Rs” 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 greenhouse gas?

a. Sulphurdioxide

b. Carbon monoxide

c. Carbondioxide

d. Nitrogen dioxide

4. Which of the following bacteria is found in Gangawater ?

a. Coliform bacteria

b. Streptococcus bacteria

c. Staphylococcus bacteria

d. Diplococcus bacteria

5. Stake holders of forest resources in India are

- a. Local people and industries
- b. NGO
- c. Forest enthusiasts
- d. All of these

6. Arabari forest of Bengal is dominated by

- a. Teak
- b. Sal
- c. Bamboo
- d. Mangrove

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

- a. Industries b. Forest c. Crops d. Resources

8. Red data book provides a list of :

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

9. Sardar sarovar dam is situated on river

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

10. Pynes System of irrigation is common in:

- a. Bihar b. Madhya Pradesh c. Rajasthan d. Himachal Pradesh

Debate:

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

Seminar :

Reading papers by the students on the following topics:

- i. River water pollution –source and solution
- ii. Sustainable development

Symposium

- i. Global warming and melting Himalaya –a controversy”
- ii Save the tiger.

Home Assignment

- 1. Making a model to show Rainwater Harvesting.
- 2. Carry out a survey in your locality where Rainwater is being harvested.
- 3. Record the mode of transport used by your classmates.
- 4. Find out the amount of diesel/petrol used by families of your classmates.
- 5. Checking the PH of water from various sources.

Topic 8 OUR ENVIRONMENT

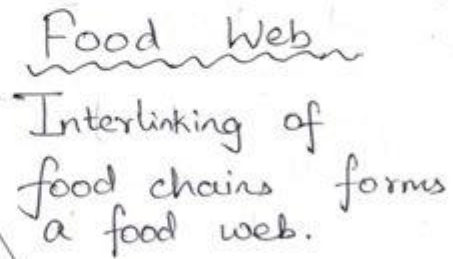
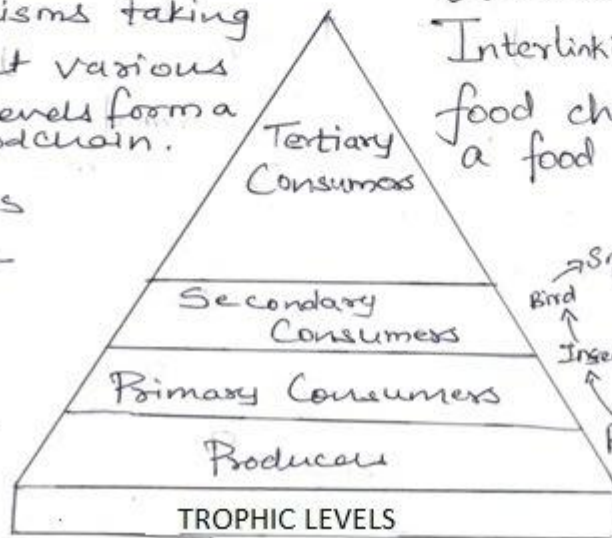
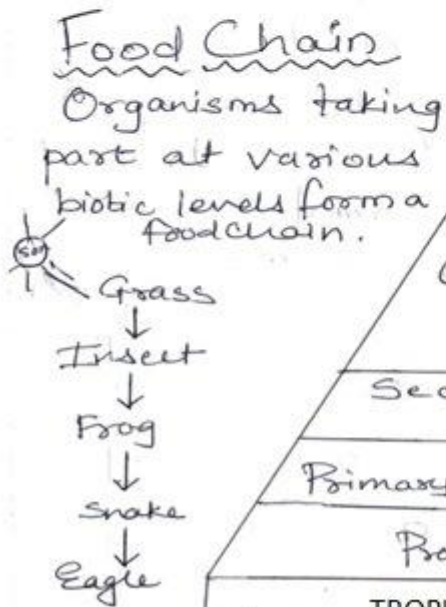
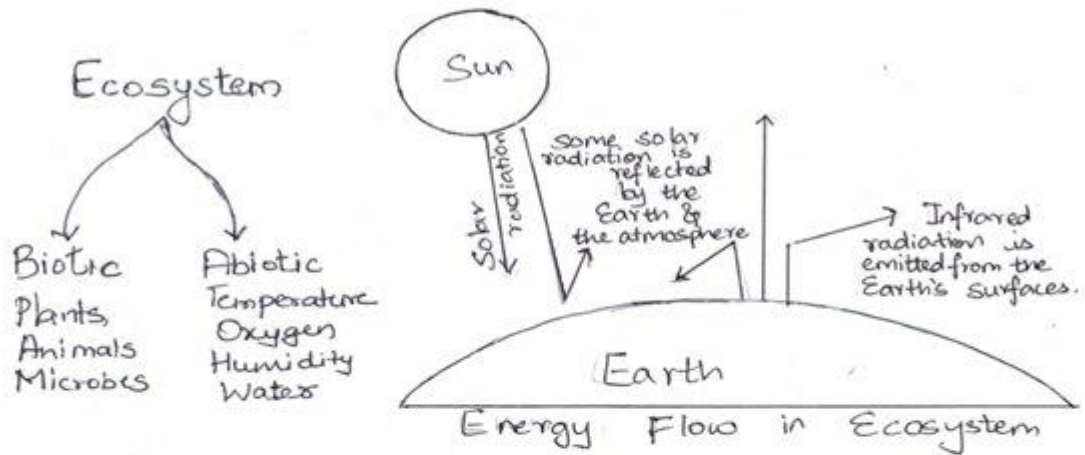
GIST

1. **ECOLOGY** – The study of the interaction of living organisms with each other and their surrounding is called ecology.
2. **ENVIRONMENT** – Everything that surrounds organisms and influences its life.
 - a) Biotic components of environment – The living organisms e.g. Plants and animals.
 - b) Abiotic components of environment – the nonliving components like air, light, etc.
3. **ECOSYSTEM** – All interacting organism in area =together with the nonliving constituents of environment. (Functional unit of an environment)
4. **PRODUCERS** – They make the energy from sunlight available to the rest of the ecosystem.
5. **CONSUMERS** – Living beings which depend on other sources for food are called consumers.
6. **BIODEGRADABLE** – Substances that are broken down by the action of bacteria or saprophytes. e. g. Paper.
7. **NONBIODEGRADABLE**- Substances that are not broken down by the action of bacteria or saprophytes. e.g. Plastic.
8. **FOOD CHAIN** – The process of transfer of energy from one organism to the other organism by the process of eating and being eaten.

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. It was given by Scientist Lindmann.
11. **BIOLOGICAL MAGNIFICATION** – Progressive accumulation of non-biodegradable waste at various trophic levels of food chain.

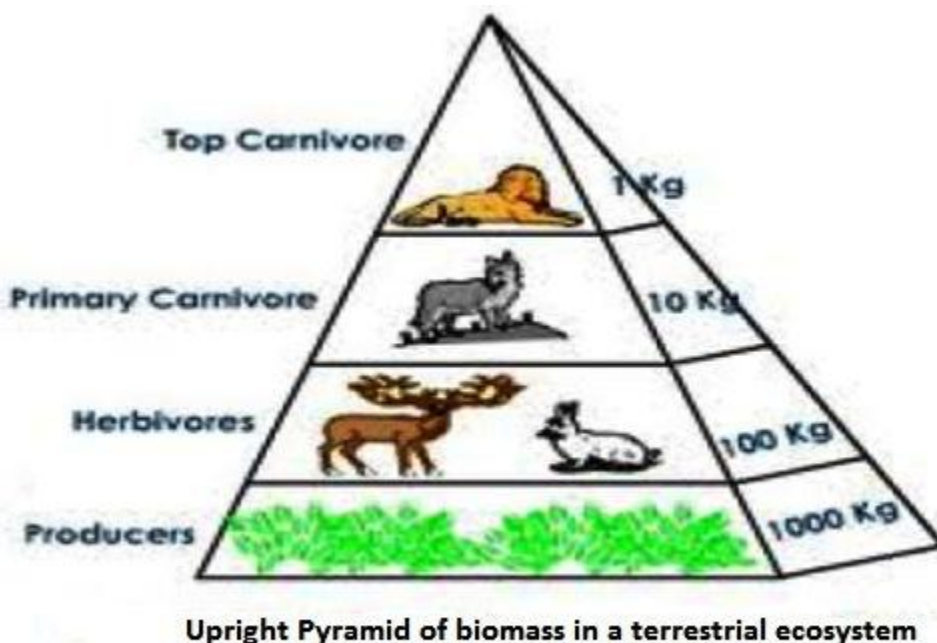
MIND MAP

OUR ENVIRONMENT



HIGHER ORDER THINKIN 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?



4. Why is pond self-sustaining unit while an aquarium may not be? Justify the answer.
5. Arrange grasshopper, frog, grass, eagle and snake in the form of food chain.
6. If 1000 KJ energy is available at producer level, how much energy will be available at first carnival level?
7. Why do most food chains have 3-5 steps only?
8. Select the biodegradable items from the list given blow-

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

9. What will be impact on ecosystem if bacteria and fungi are removed from the Environment?
10. Express your feelings on the picture given down below. What will happen if all Carnivores are eliminated from the environment? What measures will you take to 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) SO_2 | b) Smog | c) CFCs | d) CO_2 |
|------------------|---------|---------|------------------|
2. Which of the following is biodegradable?
- | | | | |
|-------------|------------|--------|-----------------------|
| a) Cow dung | b) Plastic | c) DDT | d) Radioactive wastes |
|-------------|------------|--------|-----------------------|

3. Vegetables peels, waste paper, wood carvings and egg shells can be used to make
- a) Bricks b) Compost c) Urea d) None of these
4. Which of the following is constituent of food chain?
- a) Grass, wheat and mango b) Grass, goat and human
- c) Goat, cow and elephant d) Grass, fish and goat
5. Acid rain is caused by precipitation of
- a) Oxides of sulphur b) CFCs c) Ozone d) CO₂

SHORT ANSWER QUESTIONS:

EACH QUESTION CARRRIES TWO MARKS:

- 1) Classify the followings 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:

- 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 modern 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 CH_3COOH and identify its functional group.

(b) Give a chemical test to identify this compound.

(c) Name the gas evolved when this compound acts on solid carbonate. How would you identify this gas.

Q.11(a) Explain the terms (i)Implantation (ii)Placenta

(b) What is the average duration of human pregnancy?

(c) What happens when the egg is not fertilized?

Q.12(a) A spherical mirror A forms an erect image of an object, a spherical mirror B forms erect as

well as inverted image of an object. Name the types of the spherical mirror A and B.

(b) What is the relation between the focal length and radius of curvature of a spherical mirror?

If the radius of a curvature of a spherical Mirror is 25 cm, what is the focal length?

Q.13 An organic compound 'A' is an essential constituent of wine and beer. Oxidation of 'A' yields An organic acid 'B' which is present in vinegar. Name the compounds 'A' and 'B' and write their structural formula. What happens when 'A' and 'B' react in the presence of an acid Catalyst? Write the chemical equation for the reaction.

Q.14 which of the following are homologous and which are the analogous? Give reasons

1. Trunk of the elephant and hand of a chimpanzee

2. Wing of a bird and wing of a bat.

3. Scales of fishes and shell of molluscs.

Q.15 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? F, Cl, Br, I

Q.17Write three advantages of constructing dams across the rivers?

Q.18 (a) State two effects produced by scattering of light by the atmosphere?

(b)Why are 'danger' signal lights red in colour?

(c)What would the sky look like if the earth had no atmosphere?

Q.19The electronic configuration of these elements X, Y and Z are given below?

X	2
Y	2, 6
Z	2, 8, 2

i)Which element belongs to second period ?

ii) Which element belongs to second group?

iii) Which element belongs to 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) Name 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 gases 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 Name 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 in each of 4 test-tubes 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
 (d) aluminum sulphate
- Q.27. Four test tubes were taken and marked as A, B, C & D respectively. 2mL of solution of $\text{Al}_2(\text{SO}_4)_3$ in water was filled in each of the test tubes. A clean piece of metal zinc was placed in A, a clean iron nail in B, a 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 unfavourable 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 a light, passing through a rectangular slab, for three different angles of incidence:

A) Draw outline of the glass slab at three positions on the drawing sheet.

B) Draw normal on the top side of these outlines near their left end

C) Draw the incident rays on the three outlines in direction, making angles of 30° , 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?



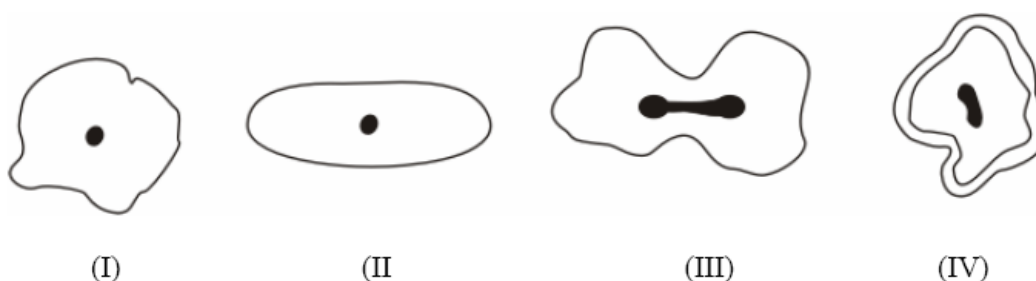
(a) Binary fission in yeast

(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 $2F$

VALUE BASED QUESTIONS: AN IDEA

Our Environment

Q1. Contextual Part

a) Why do you think Mohini should convince her friend Meena to choose jute carry bags? (1)

Value based

b) What values did Mohini exhibit while shopping using a Jute Bag? (1)

Value Points

- a. Environmentally sensitive
 b. Active and Responsible citizen
 c. Practice of 3 R's
 d. Being futuristic

Q2. Mohan is affected by the news in the clearance of fourteen thousand trees to construct

the new metro line and as a result he encourages others to plant saplings regularly.

Contextual Part

(a) Construct a food chain that will be affected by the clearance of this bio diversity. (2)

Value Based

(b) What values do you think are depicted by Mohan's efforts? (2)

Value Points

Environmentally sensitive

Participatory citizenship

Awareness

Correct decision

Any other relevant point

Q3. Rahul always makes it a point to throw paper bits in green bin and also encourages his

friends to do so. Rohit ignores it and throws it in black bin.

Contextual Part

a) Why there is a need to segregate wastes? (1)

Value based

b) What concern Rahul is showing towards the environment. (2)

Value Points

Responsible behavior

Participating citizenship

Teamwork

Sensitive to environment

How do organisms reproduce?

Q 4. Rajeev, a sales executive in a MNC was not keeping well for a long time. He underwent a

complete medical checkup and was diagnosed as HIV+. He was terminated on account of this

condition.

Contextual Part

a) To which category of disease does AIDS belong to? Give its causative organism. (2)

b) Do you think it was a right decision by the head of the company. justify? (1)

Value based

C) What concern should the society show towards HIV+ individuals (2)

Value Point

-empathy

-compassion

-sensitivity

Any other relevant point

CARBON AND ITS COMPOUNDS

Q5. 'The two characteristic features seen in carbon, that is, tetravalency and catenation, put

together give rise to a large number of compounds'.

Contextual Part

a. What kind of compounds does carbon form? (1)

Value Based

b. Mention two values that you can imbibe into your life from these properties of carbon.

(2)

Value Points

- i. Team work
- ii. Accepting diversity
- lii Any other relevant points

Periodic classification of elements

Q6. 'In a departmental store we see soaps are kept at one place while biscuits are kept together elsewhere. Similarly scientists made several attempts to classify elements according to

their properties and obtained an orderly arrangement out of chaos.'

Contextual Part

a) Why do we need to classify elements? (1)

Value Based

b) Mention two values depicted by the scientists while making an attempt to classify elements?

(2)

Value Points

- 1. Organizational skills

PROFORMA-1 FOR ERROR ANALYSIS AT STUDENT AND VIDYALAYA LEVEL
[SAMPLE]

KENDRIYA VIDYALAYA SANGATHAN, PATNA REGION.
SESSION ENDING EXAMINATION 2012-13

VIDYALAYA LEVEL ERROR ANALYSIS

Class XI GEOGRAPHY 2012-13

		Book-1																				
		UNIT-I		UNIT-II					UNIT-III		UNIT-IV					UNIT-V		UNIT-VI				
		Geography As a Discipline(3)		The Earth(5)				Land Forms(8)			Climate(10)				Oceans(4)			Life On The Earth(3)		Map Question(2)		
		11	TOTAL	2	7	15	TOTAL	18	23	TOTAL	1	6	14	24	TOTAL	9	12	TOTAL	17	TOTAL	26-a	TOTAL
S.No.	Marks Alloted	3	3	1	1	3	5	3	5	8	1	1	3	5	10	1	3	4	3	3	2	2
	Name of the Student																					
1		2	2	1	1	1	3	1	4	5												
2		3	3	1	1	2	4	2	3	5												
3		2	2	0	0	1	1	3	5	8												
4		1	1	0	0	0	0	3	2	5												
5		3	3	0	0	1	1	1	3	4												
6		3	3	0	0	2	2	0	3	3												
7		2	2	0	1	1	2	0	5	5												
8		3	3	0	0	1	1	0	1	1												
9		0	0	0	0	0	0	1	0	1												
10		2	2	0	0	0	0	2	0	2												
11		3	3	1	0	0	1	1	3	4												
12		2	2	0	0	1	1	3	4	7												
13		3	3	1	0	1	2	2	5	7												
14																						
	Total	29	29	4	3	11	18	19	38	57	0	0	0	0	0	0	0	0	0	0	0	0
	AVERAGE	2.23	2.23	0.31	0.23	0.85	1.38	1.46	2.92	4.38	#	#	#	#	#	#	#	#	####	####	####	####
	PERCENTAGE	74.36	74.36	30.77	23.08	28.21	27.69	48.72	58.46	54.81	#	#	#	#	#	#	#	#	####	####	####	####

LEARNING GAP >70

TEACHING GAP<40

<70 & >40

PRACTICALS- FIRST TERM

Practical should be conducted alongside the concepts taught in theory classes.

List of Experiments

1. To find the pH of the following samples by using pH paper/universal indicator.

- Dilute Hydrochloric acid
- Dilute NaOH solution
- Dilute ethanoic acid solution
- Lemon juice
- Water
- Dilute sodium bicarbonate solution.

2. To study the properties of acids and bases HCl & NaOH by their reaction with

- Litmus solution (Blue/Red)
- Zinc metal
- Solid sodium carbonate

3. To perform and observe the following reactions and classify them into:

- Combination reaction
 - Decomposition reaction
 - Displacement reaction
 - Double displacement reaction
- Action of water on quick lime.
 - Action of heat on ferrous sulphate crystals.
 - Iron nails kept in copper sulphate solution.

4) Reaction between sodium sulphate and barium chloride solutions.128

- To observe the action of Zn, Fe, Cu and Al metals on the following salt solutions.
 - $\text{ZnSO}_4(\text{aq})$
 - $\text{FeSO}_4(\text{aq})$
 - $\text{CuSO}_4(\text{aq})$
 - $\text{Al}_2(\text{SO}_4)_3(\text{aq})$
- Arrange Zn, Fe, Cu and Al metals in the decreasing order of reactivity based on the above result.

5. To study the dependence of potential difference (V) across a resistor on the current (I) passing through it and determine its resistance. Also plot a graph between V and I.

6. To determine the equivalent resistance of two resistors when connected in series.

7 To determine the equivalent resistance of two resistors when connected in parallel.

8 To prepare a temporary mount of a leaf peel to show stomata.

9 To show experimentally that light is necessary for photosynthesis.

10 To show experimentally that carbon dioxide is given out during respiration.

PRACTICALS- SECOND TERM

Practical should be conducted alongside the concepts taught in theory classes.

List of Experiments

1. To study the following properties of acetic acid (ethanoic acid):

- i) odour
- ii) solubility in water
- iii) effect on litmus
- iv) reaction with sodium bicarbonate

2. To study saponification reaction for preparation of soap.

3. To study the comparative cleaning capacity of a sample of soap in soft and hard water.

4. To determine the focal length of

- i. Concave mirror
- ii. Convex lens

by obtaining the image of a distant object.

5. To trace the path of a ray of light passing through a rectangular glass slab for different angles of incidence. Measure the angle of incidence, angle of refraction, angle of emergence and interpret the result.

6. To study (a) binary fission in Amoeba and (b) budding in yeast with the help of prepared slides.

7. To trace the path of the rays of light through a glass prism.

8. To find the image distance for varying object distances in case of a convex lens and draw corresponding ray diagrams to show the nature of image formed.

9. To study homology and analogy with the help of preserved / available specimens of either animals or plants.

10. To identify the different parts of an embryo of a dicot seed (Pea, gram or red kidney bean).

PRESCRIBED BOOKS:

Science - Textbook for class IX - NCERT Publication

Science - Textbook for class X - NCERT Publication

Assessment of Practical Skills in Science - Class IX - CBSE Publication

Assessment of Practical Skills in Science - Class X - CBSE Publication

Laboratory Manual Science - Class IX , NCERT Publication

Laboratory Manual Science - Class X, NCERT Publication