QUESTION BANK

Class- X

Subject- SCIENCE (086)

NOTE: SUGGESTIVE VALUE POINTS ARE PROVIDED WITH EACH QUESTION FOR ANSWER FORMULATION

CHAPTER-1: CHEMICAL REACTIONS AND EQUATIONS

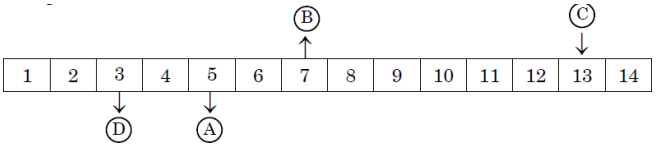
S.No.	1 MARK QUESTIONS	2025
1	The products formed when Aluminium and Magnesium are burnt in the presence of air respectively are: (A) Al_3O_4 and MgO_2 (B) Al_2O_3 and MgO (C) Al_3O_4 and MgO (D) Al_2O_3 and MgO APPROPRIATE OPTION: (B) Al_2O_3 and MgO	MAIN
2	Consider the following chemical equation: **p** Al + **q** H_2O ⟶ **r** Al_2O_3 + **s** H_2 To balance this chemical equation, the values of 'p', 'q', 'r' and 's' must be respectively: (A) 3, 2, 2, 1 (B) 2, 3, 3, 1 (C) 2, 3, 1, 3 (D) 3, 1, 2, 2 APPROPRIATE OPTION: (C) 2, 3, 1, 3	MAIN
3	Select exothermic processes from the following: (i) Dilution of acid (ii) Burning of natural gas (iii) Evaporation of water (iv) Electrolysis of water (A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (i) and (iv) APPROPRIATE OPTION: (A) (i) and (ii)	COMPTT.
4	Select from the following decomposition reactions in which the source of energy for decomposition is heat: (i) $CaCO_3 \rightarrow CaO + CO_2$ (ii) $2\ H_2O \rightarrow 2\ H_2 + O_2$ (iii) $2\ AgBr \rightarrow 2Ag + Br_2$ (iv) $2\ FeSO4 \rightarrow Fe_2O_3 + SO_2 + SO_3$ (A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (i) and (iv) APPROPRIATE OPTION: (D) (i) and (iv)	MAIN
5	Electrolysis of water is a decomposition reaction. The mass ratio (MH:MO) of hydrogen and oxygen gases liberated at the electrodes during electrolysis of water is: (A) 8: 1 (B) 2: 1	MAIN

	(C) 1: 2 (D) 1: 8 APPROPRIATE OPTION: (D) 1: 8	
6	The correct balanced chemical equation showing exothermic reaction in which natural gas burns in air is: (A) $CH_4 + O_2 \rightarrow CO_2 + 2\ H_2O$ (B) $CH_4 + 2\ O_2 \rightarrow 2\ CO_2 + 2\ H_2O$ + Energy (C) $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$ (D) $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$ + Energy APPROPRIATE OPTION: (D) $CH_4 + 2\ O_2 \rightarrow CO_2 + 2\ H_2O$ + Energy	MAIN
7	In which one of the following situations a chemical reaction does not occur: (A) Milk is left open at room temperature during summer (B) Grapes get fermented (C) An iron nail is left exposed to humid atmosphere (D) Melting of glaciers APPROPRIATE OPTION: (D) Melting of glaciers	MAIN
	For following Questions 08-09, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. **(A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).** **(B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).** **(C). Assertion (A) is true, but Reason (R) is false.** **(D). Assertion (A) is false, but Reason (R) is true.**	
8	Assertion (A): Decomposition reactions are generally endothermic reactions. Reason (R): Decomposition of organic matter into compost is an exothermic process. APPROPRIATE OPTION: (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).	MAIN
9	Assertion (A): All exothermic reactions are accompanied with evolution of heat and light. Reason (R): Combination reactions may or may not be exothermic. APPROPRIATE OPTION: (D). Assertion (A) is false, but Reason (R) is true.	MAIN
	2 MARKS QUESTIONS	
10	A student performs the following experiment in his school laboratory.  List two observations to justify that in this experiment a chemical change has taken place.	MAIN

	SUGGESTIVE VALUE POINTS: 1. Effervescence/ bubbling is seen due to evolution of hydrogen gas. 2. The flask/ test tube becomes warm because the reaction is exothermic and heat is produced.	
11	Translate the following statements into chemical equations and then balance them: (a) Nitric acid reacts with calcium hydroxide to form calcium nitrate and water. (b) Sodium chloride reacts with silver nitrate to form silver chloride and sodium nitrate. SUGGESTIVE VALUE POINTS: (a) $2\ HNO_3 + Ca(OH)_2 \rightarrow Ca(NO_3)_2 + 2\ H_2O$ (b) $NaCl + AgNO_3 \rightarrow AgCl + NaNO_3$	MAIN
12	Name the compound used in black and white photography. State whether the reaction that occurs is exothermic or endothermic. Give justification for your answer. SUGGESTIVE VALUE POINTS: • Silver bromide (AgBr) / Silver chloride (AgCl) • Endothermic Reaction. Justification: Requires energy/requires sunlight for breaking down the reactant.	MAIN
	3 MARKS QUESTIONS	
13	Give one chemical equation each for the chemical reaction in which the following changes occur (Mention the change in temperature/colour and/or the compound precipitated with the equation): (a) Change in temperature (b) Change in colour (c) Formation of precipitate SUGGESTIVE VALUE POINTS: (a) Change in temperature: $CaO + H_2O \rightarrow Ca(OH)_2 + Heat$ (b) Change in colour: $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ (Blue) (Green) (c) Formation of precipitate: $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 \downarrow + 2\ NaCl$ (white)	MAIN
14	How is a double displacement reaction different from a displacement reaction? Explain giving example in the form of balanced chemical equations. SUGGESTIVE VALUE POINTS: A displacement reaction is one in which a more reactive element displaces a less reactive element from its compound. $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$ A double displacement reaction is one in which two compounds exchange their ions to form two new compounds. $Na_2SO_4 + BaCl_2 \rightarrow 2\ NaCl + BaSO_4 \downarrow$	MAIN

CHAPTER-2: ACIDS, BASES AND SALTS

NOTE: SUGGESTIVE VALUE POINTS ARE PROVIDED WITH EACH QUESTION FOR ANSWER FORMULATION

S.No.	1 MARK QUESTIONS	2025
1	The following table shows the pH values of four solutions A, B, C and D on a pH scale:  The solutions A, B, C and D respectively are of a (A) Strong acid, weak acid, neutral, strong base (B) Weak acid, neutral, weak base, strong base (C) Weak acid, neutral, strong base, weak base (D) Weak acid, neutral, strong base, strong acid APPROPRIATE OPTION: (D) Weak acid, neutral, strong base, strong acid	MAIN
2	Consider the following reactions: (i) Dilute hydrochloric acid reacts with sodium hydroxide. (ii) Magnesium oxide reacts with dilute hydrochloric acid. (iii) Carbon dioxide reacts with sodium hydroxide. It is found that in each case: (A) Salt and water is formed. (B) Neutral salts are formed. (C) Hydrogen gas is formed. (D) Acidic salts are formed. APPROPRIATE OPTION: (A) Salt and water is formed.	MAIN
3	In one formula unit of salt 'X', seven molecules of water of crystallisation are present. The salt 'X' is: A) $CuSO_4$ (B) Na_2CO_3 C) $FeSO_4$ (D) $CaSO_4$ APPROPRIATE OPTION: C) FeSO4	MAIN
4	"Which of the given option represents a family of salts? (A)NaCl, Na_2SO_4, $CaSO_4$ (B) K_2SO_4, Na_2SO_4, $CaSO_4$ (C) $NaNO_3$, $CaCO_3$, Na_2CO_3 (D) $MgSO_4$, $CuSO_4$, $MgCl_2$ APPROPRIATE OPTION: (B) K_2SO_4, Na_2SO_4, $CaSO_4$	MAIN
5	Tooth enamel is made up of calcium hydroxyapatite (a crystalline form of calcium phosphate). These chemical starts corroding in the mouth when the pH is: (A) 7 (B) 5 (C) 10 (D) 14 APPROPRIATE OPTION: (B) 5	MAIN

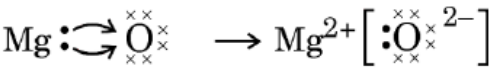
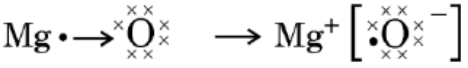
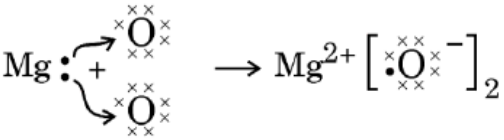
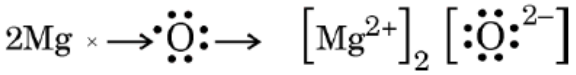
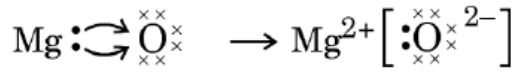
6	The body of human beings works within the pH range of: (A) 6.1 to 6.8 (B) 6.5 to 7.3 (C) 7.0 to 7.8 (D) 7.5 to 8.1 APPROPRIATE OPTION: (C) 7.0 to 7.8	MAIN
7	In order to prepare dry Hydrogen chloride gas in humid atmosphere the gas produced is passed through a guard tube (drying tube) which contains: (A) Calcium chloride (B) Calcium Oxide (C) Calcium hydroxide (D) Calcium carbonate APPROPRIATE OPTION: (A) Calcium chloride	MAIN
	For following Question No.8,9, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion(A) and Reason(R) are true and Reason(R) is the correct explanation of Assertion(A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	MAIN
8	Assertion (A): Sodium Chloride and potassium chloride are neutral salt. Reason(R): The pH of these salts is 7. APPROPRIATE OPTION: (A). Both Assertion(A) and Reason(R) are true and Reason(R) is the correct explanation of Assertion(A).	MAIN
9	Assertion (A): Concentrated Nitric acid is diluted by adding water slowly to acid with constant stirring. Reason (R): Concentrated Nitric acid is easily soluble in water. APPROPRIATE OPTION: (D). Assertion (A) is false, but Reason (R) is true.	MAIN
	2 MARKS QUESTIONS	
10	Write the formula of the ions which (i) acids, and (ii) bases generate in water solutions. Dry HCl gas does not change the colour of dry litmus paper. Why? SUGGESTIVE VALUE POINTS: (i) In water, acids generate hydrogen ions: H+ (or hydronium ions H_3O+). (ii) In water, bases generate hydroxide ions: OH-. Dry HCl gas does not change the colour of dry litmus paper because HCl shows acidic behavior only in aqueous solution, where it can produce H+ (or H_3O+ ions; in the absence of water, these ions are not formed, so there is no effect on litmus.	MAIN
11	Giving reason, state the advantage of using baking powder over baking soda for the preparation of bread or cakes. SUGGESTIVE VALUE POINTS: Baking powder is preferred over baking soda in bread and cakes because it produces carbon dioxide on its own upon mixing with water, causing the dough to rise properly and give a fluffy texture. Baking soda ($NaHCO_3$) requires an acid to react and release CO_2; without it, it decomposes to Na_2CO_3 on heating, making the cake taste bitter and soapy. Baking powder contains both $NaHCO_3$ and a mild acid, ensuring reliable leavening.	MAIN

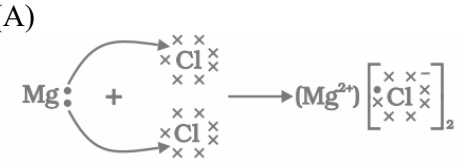
12	A chemical compound 'X' is used to bleach washed clothes in laundry as well as to make drinking water free from germs. Identify 'X'. How is this compound represented? Write the method of its preparation along with the chemical equation for the reaction that occurs. SUGGESTIVE VALUE POINTS: The compound 'X' is bleaching powder, chemically represented as CaOCl2. Method of preparation and equation: Bleaching powder is prepared by passing chlorine gas over dry slaked lime $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$	MAIN
	3 MARKS QUESTIONS	
13	Common salt is an important raw material for various chemicals of daily use. State in brief the method of preparation of (i) Sodium hydroxide, and (ii) Sodium hydrogen carbonate from common salt. Write balanced chemical equations of the reactions that occur. SUGGESTIVE VALUE POINTS: Common salt (NaCl) is used to prepare both sodium hydroxide and sodium hydrogen carbonate as follows: (i) Sodium hydroxide from common salt • Method: Electrolysis of concentrated aqueous sodium chloride solution (brine). • Overall balanced equation: $2NaCl + 2H_2O \rightarrow 2NaOH + Cl_2 + H_2$ (ii) Sodium hydrogen carbonate from common salt • $NaCl + NH_3 + CO_2 + H_2O \rightarrow NaHCO_3 + NH_4Cl$ Thus, sodium hydroxide is obtained by electrolysis of brine, and sodium hydrogen carbonate is obtained by using brine, ammonia and carbon dioxide.	MAIN
	4 MARKS QUESTIONS	
14	Seawater contains many salts dissolved in it. Common salt is separated from these salts. Deposits of solid salt are also found in several parts of the world. These large crystals are often brown due to impurities. This is called rock salt and is mined like coal. The common salt is an important raw material for chemicals of daily use. • Write balanced chemical equations to show the products formed during electrolysis of brine. • List two uses of any one product obtained during electrolysis of brine. • (i) A mild non-corrosive basic salt 'A', used for faster cooking, is strongly heated to produce a compound 'B', that is used for removing permanent hardness of water. Identify A and B and also write the equation for the reaction that occurs when A is heated. **OR** • Define water of crystallisation. Give two examples of salts that have water of crystallisation. SUGGESTIVE VALUE POINTS: o $2\ NaCl + 2\ H2O\ electricity \rightarrow 2\ NaOH + H2 + Cl2$ o Uses of NaOH: Degreasing metals/ Soaps and Detergents/ paper making/ artificial fibres/ preparation of bleach Uses of H2: As fuel/ Margarine/ In preparation of ammonia for fertilizers/Preparation of HCl Uses of Cl2: Disinfectant/ PVC/ water treatment/ in swimming pools/ CFC's/ preparation of bleach/ preparation of HCl/ pesticides (Any two uses of anyone product) o (i) A – NaHCO3/ Sodium Hydrogen	MAIN

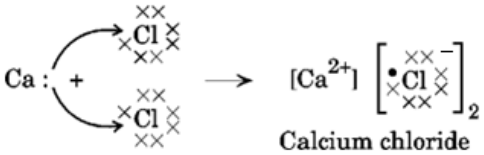
	Carbonate/ Baking soda B – Na2CO3 / Sodium Carbonate 2 $NaHCO3\ heat \rightarrow Na2CO3 + H2O + CO2$ A B **OR** • (ii) The fixed number of water molecules present in one formula unit of a salt. • CuSO4.5H2O/Copper Sulphate pentahydrate/Blue vitriol • CaSO4.2H2O/Gypsum/Calcium sulphate dihydrate • Na2CO3.10H2O/Washing Soda/Sodium carbonate decahydrate • FeSO4.7H2O/ Green Vitriol/Ferrous sulphate hepta hydrate • CaSO4.½H2O/ Calcium Sulphate hemihydrate /POP (Any two examples)	
15	Common salt is a very important chemical compound for our daily life. Its chemical name is sodium chloride and it is used a raw material in the manufacture of caustic soda, washing soda, baking soda etc. It is also used in the preservation of pickles, butter, meat etc. i. Name the acid and the base from which common salt can be obtained. ii. State the nature (acidic/basic/neutral) of sodium chloride. Give the reason for the justification for your answer. iii. (A) What happens when electric current is passed through an aqueous solution of sodium chloride (called brine)? Name the products obtained along with the corresponding places in the electrolytic cell where each of these products is obtained. **OR** (B) How is washing soda obtained from sodium chloride? Give chemical equation of the reactions involved in the process. SUGGESTIVE VALUE POINTS: (i) Hydrochloric acid / HCl and Sodium hydroxide / NaOH (ii) -Neutral - as it is a salt of strong acid and strong base (iii) (A) • Aqueous solution of sodium chloride(brine) decomposes (electrolysed) and produces: • NaOH solution near cathode • Cl2 at anode • H2 at cathode **OR** (iii)(B) Washing soda is obtained from sodium chloride by following reactions: NaCl + $H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$ $2NaHCO_3 \rightarrow Na_2CO_3 + H_2O + CO_2$ Recrystallisation of sodium carbonate gives washing soda. $Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3 .10H_2O$	MAIN

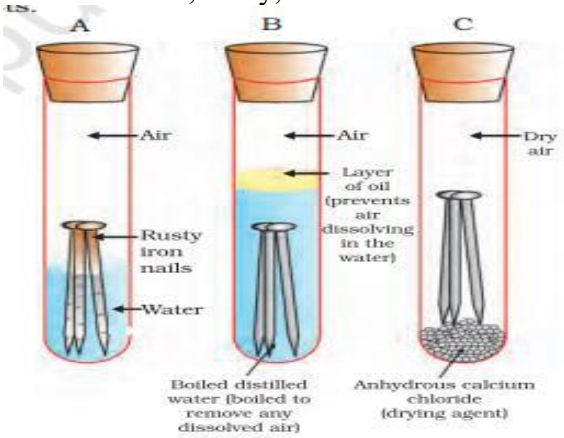
CHAPTER-3: METALS AND NON-METALS

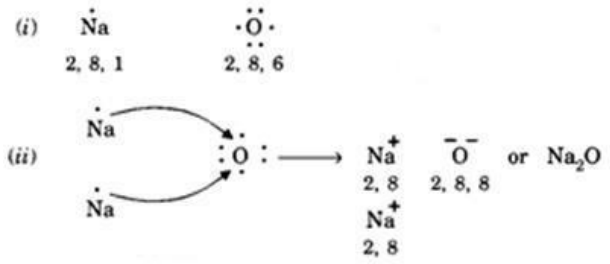
NOTE: SUGGESTIVE VALUE POINTS ARE PROVIDED WITH EACH QUESTION FOR ANSWER FORMULATION

S.No.	1 MARK QUESTIONS	2025
1	The metals obtained from their molten chlorides by the process of electrolytic reduction are : (A) Gold and silver (B) Calcium and magnesium (C) Aluminium and silver (D) Sodium and iron APPROPRIATE OPTION: (B) Calcium and magnesium	MAIN
2	The formation of magnesium oxide is correctly shown in option : (A)  (B)  (C)  (D)  APPROPRIATE OPTION: (A) 	MAIN
3	Aluminium powder is used in thermit welding because : (A) Its reaction with iron is highly exothermic. (B) When it is heated with iron (III) oxide, molten iron is obtained. (C) When it is heated with iron (III) oxide, molten aluminium oxide is obtained to join railway tracks. (D) Its melting point is low as compared to iron and a molten alloy of iron and aluminium is formed on heating which is used to join railway tracks. APPROPRIATE OPTION: (B) When it is heated with iron (III) oxide, molten iron is obtained.	MAIN
4	Two metals zinc and tin are dissolved separately in definite proportions in molten copper (the primary metal) to obtain two different alloys respectively known as : (A) Bronze and Brass (B) Brass and Solder (C) Brass and Bronze (D) Solder and Bronze APPROPRIATE OPTION: (C) Brass and Bronze	MAIN

	For following Question No. 6,7,8, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. **(A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).** **(B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).** **(C). Assertion (A) is true, but Reason (R) is false.** **(D). Assertion (A) is false, but Reason (R) is true.**	
5	Assertion (A) :Brass is prepared by first melting copper and then dissolving tin into it in a definite proportion. Reason (R) : The primary metal of brass is copper. APPROPRIATE OPTION: (D). Assertion (A) is false, but Reason (R) is true.	MAIN
6	Assertion (A) : The metals high up in the reactivity series cannot be obtained from their compounds by heating with carbon. Reason (R) : Displacement reactions can also be used to obtain metal. APPROPRIATE OPTION: (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).	MAIN
7	The property by virtue of which a solid material can be drawn into thin wires is called: (A) Malleability (B) Ductility (C) Rigidity (D) Resistivity APPROPRIATE OPTION: (B) Ductility	MAIN
8	An element 'M' has 25% of the electrons filled in the third shell as in the second shell. The element 'M' is: (A) Sodium (B) Magnesium (C) Aluminium (D) Calcium APPROPRIATE OPTION: (B) Magnesium	MAIN
	2 MARKS QUESTIONS	
9	(A) Show the formation of Magnesium chloride by electron transfer. Write the name of the cation and anion present in the compound formed. (Atomic number of Mg=12, Cl= 17). OR (B) How is zinc extracted from its ore? Name the processes involved in the extraction and write chemical equations of the reactions that occur during these processes. SUGGESTIVE VALUE POINTS: (A)  Cation - magnesium ion / (Mg^{2+}) Anion - chloride ion / (Cl^-)	MAIN

	OR (B) (i) If Zinc is in the form of sulphide ore. Roasting $2ZnS + 3O_2 \xrightarrow{Heat} 2ZnO + 2SO_2$ - Reduction $ZnO + C \xrightarrow{Heat} Zn + CO$ **OR** (ii) If Zinc is in the form of carbonate ore. -Calcination $ZnCO_3 \xrightarrow{Heat} ZnO + CO_2$ - Reduction $ZnO + C \xrightarrow{Heat} Zn + CO$ (either i or ii)	
10	(A) Show the formation of Calcium chloride by electron transfer. (Atomic number of Ca=20, Cl= 17). OR (B) ''Aluminium oxide is an amphoteric oxide''. Justify this statement giving chemical equation for the reactions involved. SUGGESTIVE VALUE POINTS: (A)  Calcium chloride • $Ca \longrightarrow Ca2^{+} + 2e^{-}$ • $Cl + e^{-} \longrightarrow Cl^{-}$ **OR** (B) • Amphoteric oxide can react with both acids as well as bases to form salt and water. • Reactions: $Al_2O_3 + 6HCl \rightarrow 2AlCl_3 + 3H_2O$ $Al_2O_3 + 2NaOH \rightarrow 2NaAlO_2 + H_2O$ (ignore balancing)	MAIN
	3 MARKS QUESTIONS	
11	(i) Name two metals which react violently with cold water. List any three observations which a student notes when these metal are dropped in a beaker containing water. (ii) Write a test to identify the gas evolved (if any) during the reaction of these metals with water. SUGGESTIVE VALUE POINTS: (a)	MAIN

	Take three test tubes and place clean iron nails in each of them. Label these test tubes A, B and C. Pour some water in test tube A and cork it. Pour boiled distilled water in test tube B, add about 1 mL of oil and cork it. The oil will float on water and prevent the air from dissolving in the water. Put some anhydrous calcium chloride in test tube C and cork it. Anhydrous calcium chloride will absorb the moisture, if any, from the air.  **OR** (b) (i) • Sodium, Potassium, Lithium **(any two)** Observations: -A violent reaction occurs. -Large amount of heat is evolved. -Evolved gas may catch fire. (ii) The gas (bubbles) burns with a pop sound	
12	(a) "Displacement reactions also play a key role in extracting metals in the middle of the reactivity series." Justify this statement with two examples. (b) Why can metals high up in the reactivity series not be obtained by reduction of their oxides by carbon ? SUGGESTIVE VALUE POINTS: (a) $3\ MnO_2(s) + 4\ Al(s) \rightarrow 3\ Mn(l) + 2\ Al_2O_3(s) + heat$ $Fe_2O_3(s) + 2\ Al(s) \rightarrow 2\ Fe(l) + Al_2O_3(s) + heat$ (b) Metals towards the top of the reactivity series (Na, Mg, Ca) have more affinity for oxygen than carbon.	MAIN
13	Write the electron-dot structures of (i) sodium, and (ii) oxygen. Using these structures, show the formation of sodium oxide. Mark the anion and cation present in this compound. (At. No. – Sodium = 11 and Oxygen = 8) SUGGESTIVE VALUE POINTS:	MAIN

		
	5 MARKS QUESTIONS	
14	(i) A compound 'X' having two carbon atoms in its molecule turns blue litmus red and 5 – 8% solution of 'X' in water is widely used as a preservative. Identify the compound 'X' and write its structure. (ii) Compare its pH nature with a mineral acid. (iii) 'X' on reacting with alcohols produces sweet smelling compounds, used in making perfumes. Name the reaction and write its chemical equation. (iv) When sodium carbonate is added to 'X', a colourless gas is produced which turns lime water milky. Write the chemical equation for the reaction giving the name of the salt produced. SUGGESTIVE VALUE POINTS: **(i) Identification of compound 'X' and structure** • Compound 'X' has two carbon atoms and turns blue litmus red, indicating it is acidic. • A 5-8% aqueous solution of 'X' is widely used as preservative, suggesting it is acetic acid (ethanoic acid). • Structure of acetic acid: **(ii) Compare pH nature with a mineral acid** • Acetic acid is a weak acid and partially ionizes in solution. • Mineral acids like hydrochloric acid (HCl) are strong acids and completely ionize in solution. • Therefore, the pH of acetic acid is higher (less acidic) than that of mineral acids of similar concentration. **(iii) Reaction with alcohols producing sweet-smelling compounds** • The reaction is called **esterification**. • Acetic acid reacts with alcohols to form esters, which have pleasant smells. • General chemical equation: For example, with ethanol: (ethyl acetate, a sweet-smelling ester) **(iv) Reaction of 'X' with sodium carbonate producing a colourless gas** • Acetic acid reacts with sodium carbonate to produce sodium acetate, carbon dioxide gas, and water. • Carbon dioxide is the colourless gas which turns lime water milky. Chemical equation: • The salt formed is sodium acetate (CH_3COONa).	MAIN
15	(i) Differentiate between saturated and unsaturated hydrocarbons by giving one example each, with a structural formula. (ii) Write the method of converting an unsaturated hydrocarbon into a saturated hydrocarbon. Name the industry where this reaction is commonly used.	MAIN

(iii) Write the name and structure of a hydrocarbon having double bond and four carbon atoms in its one molecule.

SUGGESTIVE VALUE POINTS: **(i) Difference between Saturated and Unsaturated Hydrocarbons**

Aspect	Saturated Hydrocarbons	Unsaturated Hydrocarbons
Bond Type	Only single bonds between carbon atoms	Contains at least one double or triple bond between carbon atoms
Example	Ethane (C_2H_6)	Ethene (C_2H_4)

Structural Formulas:

- Ethane (Saturated): $CH_3–CH_3$
- Ethene (Unsaturated): $CH_2=CH_2$

(ii) Method of converting an unsaturated hydrocarbon into a saturated hydrocarbon

- **Method:** Hydrogenation
- **Explanation:** The unsaturated hydrocarbon (containing double or triple bonds) is reacted with hydrogen gas in the presence of a catalyst at elevated temperature. This adds hydrogen atoms across the double or triple bond, converting it into single bonds, thus forming a saturated hydrocarbon.
- **Industry:** This reaction is commonly used in the **food industry**, especially in the process of **hydrogenation of vegetable oils** to convert unsaturated fats into saturated fats.

(iii) Hydrocarbon with double bond and four carbon atoms

- **Name:** Butene
- **Structural formula for Butene:** $CH_2=CH-CH_2-CH_3$

This molecule has four carbon atoms and contains a carbon-carbon double bond, making it an unsaturated hydrocarbon.

CHAPTER-4: CARBON AND ITS COMPOUNDS

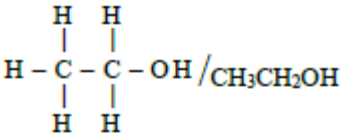
NOTE: SUGGESTIVE VALUE POINTS ARE PROVIDED WITH EACH QUESTION FOR ANSWER FORMULATION

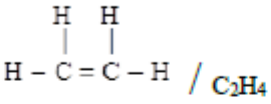
S.No.	1 MARK QUESTIONS	2025
1	Choose the incorrect statement about the common reaction used in hydrogenation of vegetable oils. (A) It is an addition reaction. (B) It takes place in the presence of nickel or palladium catalyst. (C) The product contains only single bonds between carbon atoms. (D) It is an addition reaction which occurs in the presence of an acid catalyst. APPROPRIATE OPTION: **(D) It is an addition reaction which occurs in the presence of an acid catalyst**	MAIN
2	Select from following a hydrocarbon having one C-C bond and one C≡C bond: (A) Benzene (B) Cyclohexane (C) Butyne (D) Propyne APPROPRIATE OPTION: **(D) Propyne**	MAIN
	3 MARKS QUESTIONS	
3	Write the chemical equations for the following reactions. Mention one essential condition each for these reactions to take place. (I) Ethanol undergoes complete oxidation (II) Propene undergoes hydrogenation (III) Ethanoic acid reacts with ethanol SUGGESTIVE VALUE POINTS: The chemical equations and essential conditions for the reactions are as follows: 1. Ethanol undergoes complete oxidation: $C_2H_5OH + 3O_2 \rightarrow 2CO_2 + 3H_2O$	MAIN

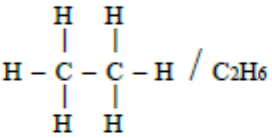
	Essential condition: Presence of a strong oxidizing agent like potassium dichromate ($K_2Cr_2O_7$) in acidic medium. 2. Propene undergoes hydrogenation: $C_3H_6 + H_2 \rightarrow C_3H_8$ Essential condition: Presence of a catalyst such as nickel (Ni) at high temperature. 3. Ethanoic acid reacts with ethanol: $CH_3COOH + C_2H_5OH \rightarrow CH_3COOC_2H_5 + H_2O$ Essential condition: Presence of a small amount of concentrated sulfuric acid (H_2SO_4) as a catalyst.	
	5 MARKS QUESTIONS	
4	(i) A carbon compound X is a good solvent. On reaction with sodium, X forms two products Y and Z. Z is used to convert vegetable oil into vegetable ghee. Identify and name X, Y and Z. Also write the equation of reaction of X with sodium to justify your answer. (ii) Write chemical equation to show what happens when ethanol: (I) burns in oxygen/air. (II) is heated at 443 K in excess conc. (H_2SO_4). (III) reacts with acidified potassium dichromate. SUGGESTIVE VALUE POINTS: (a) • X = Ethanol (C_2H_5OH) — a good solvent. • Y = Sodium ethoxide (C_2H_5ONa). • Z = Hydrogen gas (H_2) — hydrogen is used for hydrogenation to convert vegetable oil into vegetable ghee. Reaction with sodium : $2C_2H_5OH + 2Na \longrightarrow 2C_2H_5ONa + H_2(\uparrow)$ (b)	MAIN

	1. Combustion of ethanol : Ethanol burns in air to form carbon dioxide and water, releasing heat and light which shows ethanol acts as a clean fuel. Chemical equation : $$C_2H_5OH + 3O_2 \longrightarrow 2CO_2 + 3H_2O$$ 2. Dehydration of ethanol (443 K, conc. H_2SO_4) : When ethanol is heated with concentrated sulphuric acid, it loses a water molecule and forms ethene, an unsaturated hydrocarbon. Chemical equation : $$C_2H_5OH \xrightarrow[443K]{conc.H_2SO_4} C_2H_4 + H_2O$$ 3. Oxidation by acidified potassium dichromate : Ethanol is oxidised to ethanoic acid by acidified potassium dichromate, with the solution's colour changing from orange to green. Chemical equation : $$C_2H_5OH \xrightarrow{\text{acidified } K_2Cr_2O_7} CH_3COOH$$	
5	(A) A carbon compound 'A' on heating with excess conc. H_2SO_4 forms a compound 'B', which on addition of one mole of hydrogen gas in the presence of nickel catalyst forms a compound 'C'. 'C' on combustion in air forms 2 moles of carbon dioxide and 3 moles of water. Identify 'A', 'B', and 'C' and write their structures. Give chemical equations of the reactions involved. Also state the role of concentrated sulphuric acid in the formation of 'B' from 'A'. SUGGESTIVE VALUE POINTS:	MAIN

(A)

Compound A: Ethanol/ Ethyl alcohol;  / CH_3CH_2OH

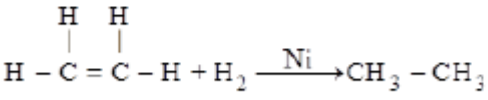
Compound B: Ethene;  / C_2H_4

Compound C: Ethane ;  / C_2H_6

$CH_3CH_2OH \xrightarrow{Hot\ Conc._{H_2SO_4}} CH_2 = CH_2 + H_2O$

'A' 'B'

Conc. H_2SO_4 is a dehydrating agent.



'B' 'C'

$C_2H_6 + 7/2\ O_2 \longrightarrow 2CO_2 + 3H_2O$

'C'

OR

(B) A carbon compound 'A' is widely used as a preservative in pickles and has a molecular formula $C_2H_4O_2$. This compound reacts with ethanol to form a sweet-smelling compound 'B'.

a) Identify the compound 'A' and write its structure.

b) Write chemical equation for the reaction of 'A' with ethanol to form compound 'B'. State the role of presence of an acid in the reaction.

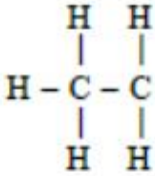
c) How can we get compound 'A' back from 'B'?

d) How can 'A' be obtained from ethanol?

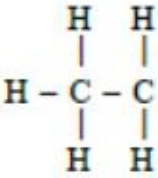
e) Name the gas produced when compound 'A' reacts with washing soda.

SUGGESTIVE VALUE POINTS:

(A)

Compound A: Ethanol/ Ethyl alcohol;  / CH_3CH_2OH

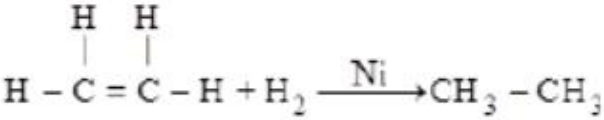
Compound B: Ethene;  / C_2H_4

Compound C: Ethane ;  / C_2H_6

$CH_3CH_2OH \xrightarrow{Hot\ Conc\ H_2SO_4} CH_2 = CH_2 + H_2O$

'A' 'B'

Conc. H_2SO_4 is a dehydrating agent.

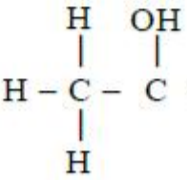


'B' 'C'

$C_2H_6 + 7/2\ O_2 \longrightarrow 2CO_2 + 3H_2O$

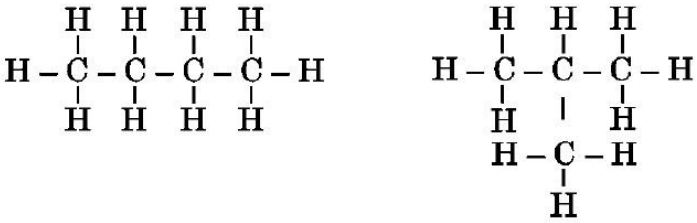
'C'

(B)

(i) A – Ethanoic acid ;  / CH_3COOH

(ii)

$CH_3COOH + C_2H_5OH \xrightarrow{acid} CH_3COOC_2H_5$

6	(A) What are structural isomers? Draw structural isomers of Butane (C_4H_{10}). Give reason why propane has no structural isomers? What happens when butane is burnt in air? Write chemical equation for the reaction. Differentiate between the flames obtained when butane and butyne both are burnt in air in the similar conditions? SUGGESTIVE VALUE POINTS: (A) (i) • Structural isomers: compounds with identical molecular formula but different structures. •  • Reason: In propane there are three carbon atoms whose branching is not possible. / Two different skeletal or structures are not possible. (ii) • Carbon dioxide, water, heat and light are produced. • Chemical equation: $2C_4H_{10} + 13\ O_2 \longrightarrow 8CO_2 + 10H_2O$ +heat and light. (ignore balancing) • Butane gives blue flame • Butyne gives yellow flame with smoke/sooty flame. **OR** (B) i) Give reason why carbon can neither form C^{4+} cations nor C^{4-} anions but forms covalent compounds. ii) What is meant by functional group in carbon compounds? Write in tabular form the structural formula and the functional group present in the following compounds:	MAIN

a) Ethanol

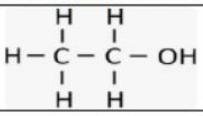
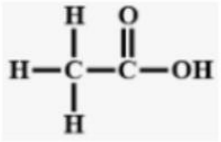
b) Ethanoic acid

(B) (i)

• Carbon can gain four electrons forming C^{4-} anion but it would be difficult for the nucleus with six protons to hold on ten electrons.

• Carbon can lose a four electrons forming C^{4+} but it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons. Thus, carbon forms covalent compounds.

(ii) An atom or a group of atoms/heteroatoms which determines the chemical properties of an organic compound is called functional group.

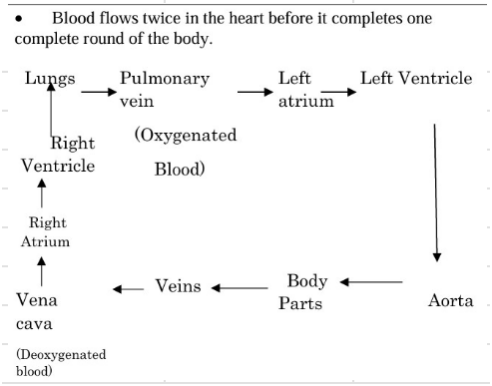
Name	Structural formula	Functional group
(a) Ethanol	 / CH_3CH_2OH	– OH / alcohol
(b) Ethanoic Acid	 / CH_3COOH	– COOH / / carboxylic acid

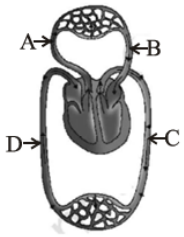
Lesson 5: Life Processes		
S.No.	**1 MARK QUESTIONS**	**2025**
1	Secretion of less saliva in mouth will effect the conversion of : (A) proteins into amino acids (B) fats into fatty acids and glycerol (C) starch into simple sugars (D) sugars into alcohol APPROPRIATE OPTION:(C) starch into simple sugars	MAIN
2	The breakdown of glucose has taken the following pathway : $\text{Glucose} \xrightarrow{(a)} \text{Pyruvate + Energy} \xrightarrow{(b)} \text{Lactic acid + Energy}$ The sites 'a' and 'b' respectively are : (A) Mitochondria and Oxygen deficient muscle cells (B) Cytoplasm and Oxygen rich muscle cells (C) Cytoplasm and Yeast cells (D) Cytoplasm and Oxygen deficient muscle cells APPROPRIATE OPTION:(D) Cytoplasm and Oxygen deficient muscle cells	MAIN
3	One-cell thick blood vessels are known as : (A) Alveoli (B) Capillaries (C) Arteries (D) Veins APPROPRIATE OPTION:(B) Capillaries	MAIN
4	The opening and closing of stomata is regulated by : (A) CO_2 concentration in stomata (B) Temperature in guard cells (C) O_2 concentration in stomata (D) Amount of water in guard cells APPROPRIATE OPTION:(D) Amount of water in guard cells	MAIN
5	The gastric glands present in the wall of the stomach release : (A) Mucus and Trypsin (B) Pepsin and Trypsin (C) Mucus and Pepsin (D) Pepsin and Salivary amylase APPROPRIATE OPTION: (C) Mucus and Pepsin	MAIN

6	Temporary finger-like extensions on the cell surface to take in food is formed in : (A) Paramoecium (B) Amoeba (C) Leishmania (D) Rhizopus APPROPRIATE OPTION: (B) Amoeba	MAIN
7	Parasitic mode of nutrition is observed in : (A) Bryophyllum (B) Hibiscus (C) Cuscuta (D) Helianthus APPROPRIATE OPTION:(C) Cuscuta	MAIN
8	Select TRUE statements about lymph from the following: a. Lymph vessels carry lymph through the body and finally open into larger arteries. b. Lymph contains some amount of plasma, proteins and blood cells. c. Lymph contains some amount of plasma, proteins and red blood cells. d. Lymph vessels carry lymph through the body and finally open into larger veins. The true statements are: (A) a and b (B) b and d (C) a and c (D) c and d APPROPRIATE OPTION:(B) b and d	MAIN
9	The essential element taken up from the soil by the plants to synthesize proteins is: (A) Phosphorus (B) Nitrogen (C) Iron (D) Magnesium APPROPRIATE OPTION:(B) Nitrogen	MAIN
	For following Question No. 10,11 two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	

10	Assertion (A) : Animals will not get energy if they eat (consume) coal as food. Reason (R) : Specific enzymes are needed for the breakdown of a particular food. APPROPRIATE OPTION: (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	MAIN
11	Assertion (A): In large animals, oxygen can reach different parts of the animal's body easily. Reason (R): Respiratory pigments take up oxygen from the air and carry it to body tissues. APPROPRIATE OPTION: (D). Assertion (A) is false, but Reason (R) is true.	MAIN
	2 MARKS QUESTIONS	
12	Besides minimising the loss of blood, why is it essential to plug any leak in a blood vessel ? Name the component of blood which helps in this process and state how this component perform this function. SUGGESTIVE VALUE POINTS: Besides minimising the loss of blood, it is essential to plug any leak in a blood vessel to prevent the entry of disease-causing microorganisms (pathogens) into the body. Component of blood involved:Platelets How platelets perform this function: Platelets accumulate at the site of injury They release substances that help in the formation of a blood clot. The clot seals the wound, thereby preventing blood loss and entry of pathogens	MAIN

13	(i) The transport system in plants is relatively slower than in animals. Give reasons. (ii) State the role of phloem in the transport of materials in plants. SUGGESTIVE VALUE POINTS: (i) Reasons: (Any two) Plants do not have a pumping organ like the heart. Transport in plants occurs mainly by diffusion, osmosis, transpiration pull and root pressure, which are slow processes. Plants are less metabolically active compared to animals and hence require slower transport. (ii)Phloem transports food (sugars) prepared in the leaves to all parts of the plant. This transport can occur in both upward and downward directions (bidirectional transport).	MAIN
14	State the main function of veins in human circulatory system. Why do they not need thick walls ? SUGGESTIVE VALUE POINTS: • Veins carry deoxygenated blood from different organs and bring it back to the heart. • Because blood flows at low pressure inside veins.	MAIN
15	‘’Plants use a variety of techniques to get rid of waste material”. Justify this statement giving any four ways. SUGGESTIVE VALUE POINTS: Four ways: 1. O2 as a waste product through stomata. 2. Excess water by transpiration. 3. Shedding of leaves. 4. Stored as resins and gums in old xylem. 5. Into the soil 6. Stored in cellular vacuoles	MAIN
16	Name the tissue which form the vascular bundle. State their function in plants. SUGGESTIVE VALUE POINTS: • Xylem and Phloem • Xylem – transports water and minerals obtained from the soil into the different parts of the plant. • Phloem – Transports food from leaves to other parts of the plant. Translocation of soluble products.	MAIN

17	State the main function of arteries. Why do they have thick and elastic walls ? SUGGESTIVE VALUE POINTS: • To carry oxygenated blood away from the heart to various organs of the body. • Because blood flows in Arteries under high pressure	MAIN
18	Why is blood circulation in vertebrates known as ‘‘double circulation’’? Trace its path in the form of a flow chart. SUGGESTIVE VALUE POINTS: • Blood flows twice in the heart before it completes one complete round of the body.  	MAIN
	3 MARKS QUESTIONS	
19	On the basis of the characteristics of the processes given in the brackets in each case, differentiate between the following : (a) Products of breakdown of pyruvate in aerobic and anaerobic respiration in human beings (product(s) of the processes) (b) Respiration and photosynthesis in plants (gas released) (c) Respiration in terrestrial animals and fishes (organs involved) SUGGESTIVE VALUE POINTS: (a) Aerobic – carbon dioxide+water Anaerobic - Lactic Acid (b) Respiration –carbon dioxide Photosynthesis – oxygen (c) Terrestrial Animals – lungs / skin Fish– Gills	MAIN
20	The digestion of food in human alimentary canal is a complex process. State the enzyme/salt present in the following and mention their function in the process of digestion: i. Saliva ii. Bile Juice iii. Pancreatic juice SUGGESTIVE VALUE POINTS: (i) Salivary amylase - converts Starch to sugar (ii) Bile salts – changing the acidic food alkaline/ emulsifies fats. (iii) Trypsin – Helps in digestion of proteins / Lipase – Breaking down emulsified fats	MAIN

21	'In human alimentary canal the small intestine is designed to absorb the digested food'. Justify the statement. i. Study the diagram and name the parts marked as A, B, C and D.  ii. Write the function of A and C. SUGGESTIVE VALUE POINTS: (i) A: pulmonary artery B: pulmonary vein C: aorta D: vena cava (ii) • Function of A: Carries deoxygenated blood from heart to lungs. • Function of C: Transports oxygenated blood from heart to all parts of the body.	MAIN
22	What is the first step of cellular respiration? In which part of the cell does it occur? Write the equation for the process of breakdown of glucose in a human cell: i. In the presence of oxygen ii. Due to lack of oxygen SUGGESTIVE VALUE POINTS: • The breakdown of glucose to form pyruvate or pyruvic acid. • Occurs in cytoplasm of the cell. (i) In the presence of oxygen: Glucose $\xrightarrow{\text{In cytoplasm}}$ Pyruvate $\xrightarrow{\text{Presence of oxygen}}$ Carbon dioxide + Water + Energy (ii) Due to lack of oxygen: Glucose $\xrightarrow{\text{In cytoplasm}}$ Pyruvate $\xrightarrow{\text{Lack of oxygen}}$ Lactic acid + Energy	MAIN

23	(a)Enlist any two nitrogenous waste products removed from the blood of human kidney. (b)Name the capillary cluster formed by the branch of renal artery in the Bowman's capsule. (c)Depict in the form of a flow chart the path of the urine formed in each kidney until it is finally passed out through the urethra. SUGGESTIVE VALUE POINTS: (a) Urea, Uric acid (b) Glomerulus (c) (Kidney) → Ureter → Urinary bladder → (Urethra)	MAIN
	4 MARKS QUESTIONS	

24	The maintenance functions of all living organisms must go on even when they are not doing anything particular. Even when we are just sitting in a class or even asleep, this maintenance job has to go on. These maintenance processes require energy to prevent damage and break-down of cells and tissues, which is obtained by the individual organism from the food prepared by the autotrophs, called producers. (a) Name and define the process by which green plants prepare food. (b) Write chemical equation involved in the above process. (c) (i) State in proper sequence the events that occur in synthesis of food by desert plants. OR (c) (ii) Explain giving reasons what happens to the rate at which the green plants will prepare food (I) during cloudy weather, and (II) when stomata get blocked due to dust. SUGGESTIVE VALUE POINTS: (a)Process: Photosynthesis Definition: Photosynthesis is the process by which green plants prepare their own food from carbon dioxide and water using sunlight in the presence of chlorophyll, with the release of oxygen. (b) $$6CO_2 + 6H_2O \xrightarrow[\text{chlorophyll}]{\text{sunlight}} C_6H_{12}O_6 + 6O_2$$ (c)Events : At night, stomata open and carbon dioxide enters the leaf. CO_2 is converted into organic acids and stored in vacuoles. During the day, stomata remain closed to prevent water loss. Stored CO_2 is released from organic acids. In presence of sunlight and chlorophyll, food (glucose) is synthesised. OR (c) (ii) Explain giving reasons what happens to the rate at which green plants prepare food: (I) During cloudy weather Rate of photosynthesis decreases Reason: Reduced sunlight lowers the light-dependent reactions. (II) When stomata get blocked due to dust	MAIN

	5 MARKS QUESTIONS	

25	(i) “The length of the small intestine in various animals depends on the food they eat.” Justify the statement. (ii) Discuss the role of the pancreas and bile juice in the digestion of food in human beings. (iii) How is the small intestine designed to absorb digested food ? SUGGESTIVE VALUE POINTS: (i)Herbivores eat plant food (cellulose) which is difficult to digest, so they have a longer small intestine to allow complete digestion and absorption. Carnivores eat meat, which is easier to digest, so they have a shorter small intestine. Omnivores (like humans) have a moderately long small intestine. Example: Cow (herbivore) → long intestine; Lion (carnivore) → short intestine. (ii) Role of Pancreas: Pancreas secretes pancreatic juice into the small intestine. It contains enzymes: Amylase → digests carbohydrates Trypsin → digests proteins Lipase → digests fats Role of Bile Juice: Bile juice is produced by the liver and stored in the gall bladder. It: Emulsifies fats (breaks large fat globules into smaller ones) Neutralises acidic chyme, providing an alkaline medium for enzyme action. (iii)Adaptations for absorption: Inner lining has numerous finger-like projections called villi. Villi increase surface area for absorption. Each villus has a thin wall, blood capillaries, and lacteal: Blood capillaries absorb glucose, amino acids, etc. Lacteals absorb fatty acids and glycerol.	MAIN

26	(i) State the role of rings of cartilage present in the throat. (ii) Discuss the role of the ribs and diaphragm when air is taken in during the breathing cycle. (iii) Why do we get muscle cramps during heavy exercise ? Explain. SUGGESTIVE VALUE POINTS: (i)The rings of cartilage present in the trachea (windpipe) prevent it from collapsing and keep the air passage open at all times, ensuring smooth flow of air during breathing. (ii)During inhalation (breathing in): Ribs move upward and outward, increasing the volume of the chest cavity. Diaphragm contracts and flattens downward, further increasing chest cavity volume. (iii)During heavy exercise, muscles do not get enough oxygen, so they switch to anaerobic respiration, leading to the formation and accumulation of lactic acid in the muscles. This lactic acid buildup causes muscle cramps and pain Increase in chest cavity volume reduces air pressure inside the lungs, causing air to rush into the lungs.	MAIN

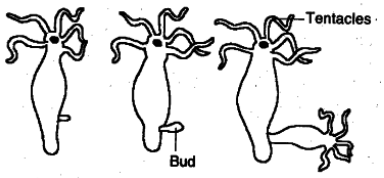
Lesson 6: Control and Coordination		
S.No.	**1 MARK QUESTIONS**	**2025**
1	The plant hormone whose concentration stimulates the cells to grow longer on the side of the shoot which is away from light is : (A) Cytokinins (B) Gibberellins (C) Adrenaline (D) Auxins APPROPRIATE OPTION :(D) Auxins	MAIN
2	The part of the brain which maintains the posture and balance of the body is : (A) Pons (B) Cerebrum (C) Cerebellum (D) Medulla APPROPRIATE OPTION :(C) Cerebellum	MAIN
3	The plant hormone present in greater concentration in the areas of rapidly dividing cells is : (A) Auxin (B) Cytokinins (C) Gibberellins (D) Abscisic acid APPROPRIATE OPTION:(B) Cytokinins	MAIN
	For following Question No. ....., two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	MAIN
4	Assertion (A) : In our actions of writing or talking, our nervous system communicates with the muscles. Reason (R) : Cranial nerves and spinal nerves form the peripheral nervous system. APPROPRIATE OPTION:(B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).	MAIN
	3 MARKS QUESTIONS	

5	Plants have neither a nervous system nor muscles, even then they respond to stimuli. For example, the leaves of chhui-mui (touch-me-not) plant when touched begin to fold up and droop. (a) How is the information communicated in ''touch-me-not'' plants ? (b) What enables the plant cells to bring out the observable response ? (c) Differentiate the movement mentioned above from the movement of tendrils in a pea plant. SUGGESTIVE VALUE POINTS: (a)The information is communicated through electrical signals that pass from cell to cell in the plant tissue. (b)The observable response is brought about by changes in turgor pressure of the cells due to movement of water (osmosis), causing the cells to lose water and become flaccid. (c) **Touch-me-not movement** — **Tendril movement in pea plant** It is a nastic movement — It is a tropic movement (thigmotropism). It is not directional. — It is directional. Caused by change in turgor pressure — Caused by differential growth	MAIN
6	State two limitations of electrical impulses in multicellular organisms. Why is chemical communication better than electrical impulses as a means of communication between cells in multicellular organisms? SUGGESTIVE VALUE POINTS: Limitations of electrical impulse: • They reach only those cells that are connected by nervous tissue, and not every cell in the animal body. • Once an electrical impulse is generated in a cell and transmitted, the cell will take some time to reset its mechanism before it can generate and transmit a new impulse. / Takes sometime to reset its mechanism. (Any other limitation) • In chemical communication the signals (chemical compound) potentially reach all cells of the body steadily and persistently providing the desired changes.	MAIN
	4 MARKS QUESTIONS	

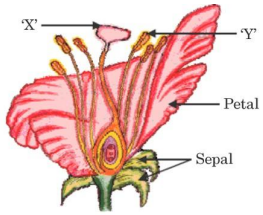
7	A person while climbing up a rocky hill comes into a panic state and fear. His body starts reacting in a ‘‘flight-or-flight’’ condition to adjust to the dangerous and stressful situation. Based on the above facts, answer the questions that follow. (a) (i) Name the hormone secreted in the blood of the person in this situation. OR (ii) Name the source gland of the hormone secreted in this condition. b) State any two responses in the body of the person as a result of the secretion of this hormone. c) How does the action of the chemical signal in terms of hormones differ from the electrical impulses via nerve cells ? SUGGESTIVE VALUE POINTS: (a)(i)Adrenaline OR (ii) Adrenal Gland (b) Heart beat becomes faster / more supply of oxygen to the muscles / blood supply to the digestive system is reduced / blood supply to the skin is reduced / blood diverted to the skeletal muscles / breathing rate increases / increased alkalinity / increased sweating. (Any two) (c) Chemical signal – travel through bloodstream and reach a wide range of target cells across the body. Electrical signal – travels through a nerve cell. (Any other)	MAIN
	5 MARKS QUESTIONS	

8	"In life there are certain changes in the environment called 'stimuli' to which we respond appropriately. Touching a flame is a dangerous situation for us. One way is to think consciously about the possibility of burning and then moving the hand. But our body has been designed in a such a way that we save ourself from such situations immediately." i. Name the action by which we protect ourself in the situation mentioned above and define it. ii. Write the role of (a) motor and (b) relay neuron. iii. (A) What are two types of nervous system in human body? Name the components of each of them. OR (B)Which part of human brain is responsible for: a) Thinking b) Picking up a pencil c) Controlling blood pressure d) Controlling hunger SUGGESTIVE VALUE POINTS: (i) Reflex action: The sudden action in response to stimuli in the environment. (ii) (a) Motor neuron – carries message from spinal cord to the effector organ/muscle (b)Relay neuron – Connects sensory neuron to motor neuron. (iii) (A) Central Nervous system. Components: Brain; spinal cord Peripheral Nervous system. Components: cranial nerves; spinal nerves. OR (iii)(B) (a)Fore-brain/Cerebrum (b)Cerebellum / Hind-brain (c)Medulla/ Hind-brain (d)Fore-brain	MAIN

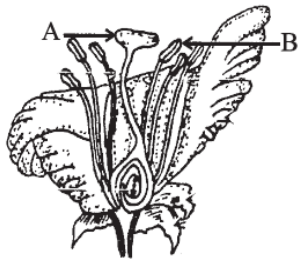
Lesson 7:How do Organisms Reproduce?		
S.No.	**1 MARK QUESTIONS**	**2025**
1	The correct/true statement(s) for a bisexual flower is/are : (i) They possess both stamen and pistil. (ii) They possess either stamen or pistil. (iii) They exhibit either self-pollination or cross-pollination. (iv) They cannot produce fruits on their own. (A) (i) only (B) (iv) only (C) (i) and (iii) (D) (i) and (iv) APPROPRIATE OPTION:(C) (i) and (iii)	MAIN
2	Plants like rose and banana have lost the capacity to produce: (A) Flowers (B) Buds (C) Seeds (D) Fruits APPROPRIATE OPTION: (C) Seeds	MAIN
3	In a bisexual flower the male gametes are present in the: (A) Anther (B) Ovary (C) Stigma (D) Filament APPROPRIATE OPTION:(A) Anther	MAIN
4	Select a pair of bisexual flowers from the following : (A) Papaya and mustard (B) Hibiscus and mustard (C) Hibiscus and papaya (D) Hibiscus and watermelon APPROPRIATE OPTION:(B) Hibiscus and mustard	MAIN
5	Which one of the following has half the number of chromosomes and half amount of DNA as compared to the non- reproductive body cells? (A) Male germ cell (B) Female germ cell (C) Zygote (D) Both, male and female germ cells APPROPRIATE OPTION:(D) Both, male and female germ cells	MAIN
6	The growth of the pollen tubes towards ovules is an example of : (A) Phototropism (B) Hydrotropism (C) Geotropism (D) Chemotropism APPROPRIATE OPTION: (D) Chemotropism	MAIN

	For following Question No. 6, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	
6	Assertion (A): In reptiles, the temperature at which the fertilized eggs are kept decides the sex of the offsprings. Reason (R): Sex is not genetically determined in some animals. APPROPRIATE OPTION:(A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	MAIN
	2 MARKS QUESTIONS	
7	Draw labelled diagrams to show different stages of budding in Hydra. SUGGESTIVE VALUE POINTS:  	MAIN
8	"Sex of the children is determined by type of sex chromosome which they inherit from their father." Justify the statement. SUGGESTIVE VALUE POINTS: Males have sex chromosomes XY while females have XX. If the male gamete with X chromosome fuses with the female gamete, then the offspring will be a female child and if the male gamete with Y chromosome fuses with the female gamete, then the offspring will be a male child. Hence, the sex of a child/ children will be determined by the chromosome inherited from the father.	MAIN
	3 MARKS QUESTIONS	

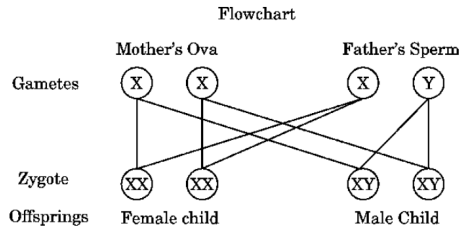
9	(i) Write the functions of the following parts of human female reproductive system : (I) Ovary (II) Fallopian tube (III) Uterus. (ii) State briefly two contraceptive methods used by human males. SUGGESTIVE VALUE POINTS: (i) Functions of parts of human female reproductive system (I) Ovary -Produces female gametes (ova/eggs). -Secretes female sex hormones such as oestrogen and progesterone. (II) Fallopian tube (Oviduct) Transports the ovum from the ovary to the uterus. Fertilisation of ovum by sperm usually occurs here. (III) Uterus Site for implantation of the fertilised egg. Provides nourishment and protection for the developing embryo/foetus. (ii) Two contraceptive methods used by human males Condom – A barrier method that prevents sperm from entering the female reproductive tract. Vasectomy – A surgical method in which the vas deferens are cut and tied, preventing sperm from reaching semen.	MAIN
	5 MARKS QUESTIONS	

10	(i)Identify the parts 'X' and 'Y' in the figure given below :  (ii) Name the yellowish coloured structures produced by the part labelled as 'Y'. (iii) Write the name of the process by which these are transferred to the part labelled as 'X'. (iv) Explain the process of seed formation in a flowering plant. OR i) Name the type of asexual mode of reproduction shown in the given figure. ii) Identify the unicellular organism in the diagram. (iii) List any two advantages of asexual reproduction over sexual reproduction. (iv) Name and explain any one mode of asexual reproduction observed in Hydra. SUGGESTIVE VALUE POINTS: (a) (i) 'X' – Stigma 'Y' – Anther (ii) Pollen grains (iii) Pollination (iv) After the transfer of pollen grains from anther into stigma, a pollen tube grows out of the pollen grain and travels through the style to reach the ovary. Male germ cell fuses with the female germ cell to form a zygote which divides several times to form an embryo within the ovule. The ovule develops a tough coat and is gradually converted into a seed. OR (b) (i) Binary fission (ii) Leishmania (iii) Produces a greater number of offsprings within a short period of time /Ensures better chances of survival of organisms in unfavorable conditions/Formation of genetically similar organisms /gamete formation is not required. (any two) (iv) Budding A bud develops as an outgrowth due to repeated cell division at a specific site, develop into tiny individuals, and after being matured, detach from parent body and become new independent individuals. (Award marks if explained through labelled diagram) (or any other mode of reproduction)	MAIN

11	(A) (i) What is regeneration? Give an example of an organism that shows this process and one organism that does not. Why does regeneration not occur in the latter? (ii) Water in a pond appears dark green and contains filamentous structures. Name these structures and the method by which they reproduce. Explain the process. OR (B) (i) Name the part performing following functions in human male reproductive system: a) Carries sperm b) Production of male gametes c) Whose secretion makes the transport of sperms easier d) Provide suitable temperature for sperm formation (ii) Write any two characteristics of sperms. (iii) What are surgical contraceptive methods? Give the side effect caused by this procedure. SUGGESTIVE VALUE POINTS: (A) (i)Regeneration: The ability to give rise to new individual organism from their body parts / If the individual is somehow cut or broken up into many pieces, then each piece grows into a new organism. •Organism show regeneration: Planaria /Hydra •Organism does not show regeneration: Spirogyra (any other example) •Because it does not have specialised cells which proliferate to make new cell types and tissues. (ii) •Spirogyra. •It reproduces through Fragmentation. •It simply breaks up into smaller pieces upon maturation. The pieces grow into new individuals. OR (B)(i) (a) vas deferens (b) testes (c) prostate gland/ seminal vesicles (d) scrotum (ii) Consists of genetic material, has a tail for movement, small in size. (any two) (iii) •Vas deferens in the males and fallopian tube in females is blocked to prevent fertilization. •Can cause infections if not performed properly.	MAIN

12	(A) Name the parts marked as 'A' and 'B' in the given diagram. Write in detail changes that take place in a flower when the product of 'B' reaches 'A' till a fruit is formed.  **OR** (B) in human female reproductive system state the changes that take place once fertilisation has taken place. Write the role of placenta in this process. What happens when egg is not fertilised? SUGGESTIVE VALUE POINTS: (A) A – Stigma ; B – Anther • pollen germinate to form pollen tube which carries male germ cells to the egg cell in the ovule of the ovary. • Fusion of germ cells/fertilization gives rise to zygote. • Zygote divides to form an embryo within the ovule. Ovule develops and converted into a seed. • Ovary grows rapidly to form a fruit. Petals, sepals, stamens, style, etc. shrivel and fall off. OR (B) Changes after fertilization: · Fertilisation results in the formation of a zygote. • Zygote starts dividing to form an embryo, which is implanted in the lining of the uterus. · Embryo continues to grow and derive nutrition through placenta. Role of placenta – To provide oxygen and glucose to the embryo from mother's blood To remove waste substances generated by the developing embryo. If the egg is not fertilized: • the lining of the uterus slowly breaks and comes out through the vagina as blood and mucous./ menstruation will occur.	MAIN

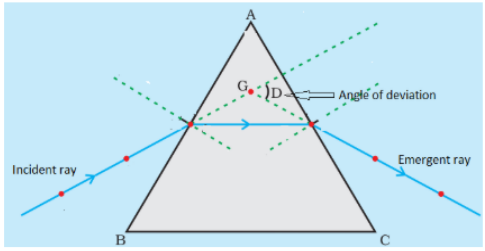
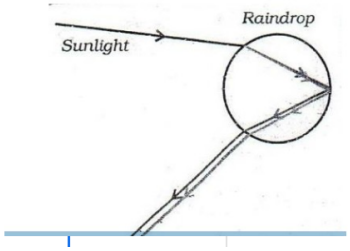
Lesson 8: Heredity		
S.No.	**1 MARK QUESTIONS**	**2025**
1	If pea plants with round and green seeds (RRyy) are crossed with pea plants having wrinkled and yellow seeds (rrYY), the seeds developed by the plants of \(F1) generation will be : (A) 50% round and green (B) 75% wrinkled and green (C) 100% round and yellow (D) 75% wrinkled and yellow APPROPRIATE OPTION:(C) 100% round and yellow	MAIN
2	When a pure- tall pea plant is crossed with a pure-dwarf pea plant, the percentage of tall pea plants in F1 and F2 generation pea plants will be respectively: (A) 100 % ; 25% (B) 100% ; 50% (C) 100% ; 75% (D) 100% ; 100% APPROPRIATE OPTION:(C) 100% ; 75%	MAIN
3	Match Column-I with Column-II and select the correct option from the choices provided. Column-I — Column-II a. Site of fertilisation of egg with the sperm — (i) Vagina b. Site of implantation of embryo — (ii) Uterus c. Site of entry of sperm into the female reproductive tract — (iii) Oviduct d. Site through which the waste materials generated by the developing embryo are removed — (iv) Placenta (v) Cervix (A) a-(ii), b-(i), c-(v), d-(iv) (B) a-(iii), b-(i), c-(v), d-(iv) (C) a-(iv), b-(ii), c-(iii), d-(i) (D) a-(iii), b-(ii), c-(i), d-(iv) APPROPRIATE OPTION:(D) a-(iii), b-(ii), c-(i), d-(iv)	MAIN
	For following Question No. ....., two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	

4	Assertion (A) : A human child bears all the basic features of human beings. Reason (R) : It looks exactly like its parents, showing very little variations. APPROPRIATE OPTION:(C). Assertion (A) is true, but Reason (R) is false.	MAIN
	2 MARKS QUESTIONS	
5	Explain how the proteins control the 'characteristics' in an organism with the help of an example of 'tallness' trait in pea plant. Name the section of DNA that controls the 'characteristics' in an organism. SUGGESTIVE VALUE POINTS: (a) Tallness depends on the amount of plant hormone, synthesis of plant hormone depends on the efficiency of enzymes (proteins), synthesis of enzymes (proteins) depends on specific DNA sequence (gene). More the synthesis of hormone, more the pea plant will be taller. (b) Gene	MAIN
6	Explain with the help of a flow chart that in human beings father is responsible for the sex (male or female) of the child.If a sperm carrying X chromosomes fertilizes an ovum which carries X chromosome, then the child born will be a girl. SUGGESTIVE VALUE POINTS:  If a sperm carrying Y chromosome fertilizes an ovum which carries X-Chromosome, then the child born will be a boy.	MAIN

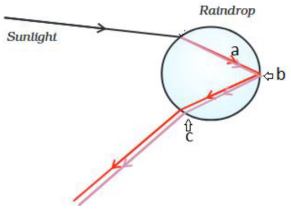
7	Pure- tall (TT) pea plants are crossed with pure- dwarf (tt) pea plants. The pea plants obtained in F1 generation are then self-pollinated to produce F2 generation. i. What do the plants of F1 generation look- like? Justify your answer. ii. What is the ratio of pure- tall plants to pure-dwarf plants in F2 generation? SUGGESTIVE VALUE POINTS: (i) • All tall • Tallness is a dominant trait (ii) 1 : 1	MAIN
	3 MARKS QUESTIONS	
8	(a) What are chromosomes ? (b) Explain in brief how stability of DNA content of a species is ensured in sexually reproducing organisms ? SUGGESTIVE VALUE POINTS: (a)Chromosomes are thread-like structures present in the nucleus of a cell. They are made of DNA and proteins and carry genes responsible for inheritance. (b)During meiosis, gametes are formed with half the chromosome number (haploid). During fertilisation, fusion of male and female gametes restores the diploid chromosome number. Thus, the DNA content of the species remains constant from generation to generation.	MAIN
9	A pure pea plant having round (R), yellow (Y) seeds is crossed with another pure pea plant having wrinkled (r), green (y) seeds. Subsequently F1 progeny is self-pollinated to obtain F2 progeny. (a)What do the seeds of F1 generation look like ? (b)Give the possible combinations of traits in seeds of F2 generation. Also give their ratio. (c) State the reason of obtaining seeds of new combination of traits in F2 generation. SUGGESTIVE VALUE POINTS: (a) Round, yellow (b) round yellow : 9 round green : 3 wrinkled yellow : 3 wrinkled green : 1 (c) Traits are inherited independently/Independent assortment of the traits.	MAIN

Lesson 9 : Light:Reflection and Refraction		
S.No.	**1 MARK QUESTIONS**	**2025**
1	Mirror 'X' is used to concentrate sunlight in solar furnace and Mirror 'Y' is fitted on the side of the vehicle to see the traffic behind the driver. Which of the following statements are true for the two mirrors ? (i) The image formed by mirror 'X' is real, diminished and at its focus. (ii) The image formed by mirror 'Y' is virtual, diminished and erect. (iii) The image formed by mirror 'X' is virtual, diminished and erect. (iv) The image formed by mirror 'Y' is real, diminished and at its focus. (A) (i) and (ii) (B) (ii) and (iii) (C) (iii) and (iv) (D) (i) and (iv) APPROPRIATE OPTION:(A) (i) and (ii)	MAIN
2	Absolute refractive index of water and glass is 4/3 and 3/2 respectively. If the speed of light in glass is 2 x 10*8 m/s, the speed of light in water is : (A) 9/4 x 10*8 m/s (B) 7/3 x 10*8 m/s (C) 16/9 x 10*8 m/s (D) 9/8 x 10*8 m/s APPROPRIATE OPTION:(A) 9/4 x 10*8 m/s	MAIN
3	When a beam of white light passes through a region of very fine dust particles, the colour of light that scatters the most in that region is : (A) red (B) orange (C) blue (D) yellow APPROPRIATE OPTION:(C) blue	MAIN
4	To get an image of magnification -1 on a screen using lens of a focal length 20 cm, the object distance must be: (A) Less than 20 cm (B) 30 cm (C) 40 cm (D) 80 cm APPROPRIATE OPTION:(C) 40 cm	MAIN

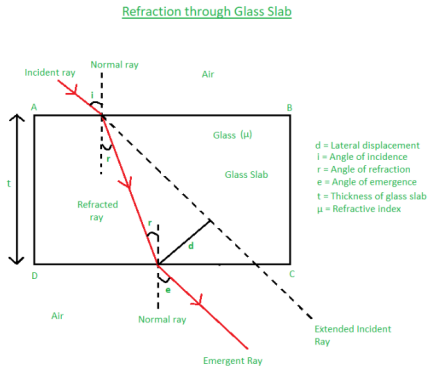
Lesson 9 : Light:Reflection and Refraction		
S.No.	**1 MARK QUESTIONS**	**2025**
5	An optical device 'X' is placed obliquely in the path of a narrow parallel beam of light. If the emergent beam gets displaced laterally, the device 'X' is: (A) Plane mirror (B) Convex lens (C) Glass slab (D) Glass prism APPROPRIATE OPTION:(C) Glass slab	MAIN
5	Select the correct statement from the following : (A) The size of the molecules of air is larger than the wavelength of visible light. (B) The blue light has a wavelength about 1·8 times greater than that of red light. (C) When sunlight passes through the fine particles in air, they scatter the blue colour of visible light more strongly than red. (D) The light of red colour is scattered the most by fog or smoke. APPROPRIATE OPTION:(C) When sunlight passes through the fine particles in air, they scatter the blue colour of visible light more strongly than red.	MAIN
6	A candle flame is placed in front of the reflecting surface of a convex mirror of focal length f. If the distance of the flame from the pole of the mirror is 'f', its image is formed : (A) at infinite distance from the mirror (B) behind the mirror at the principal focus (C) behind the mirror at a distance 2f (D) behind the mirror at a distance f 2 APPROPRIATE OPTION:(D) behind the mirror at a distance f 2	MAIN
	For following Question No. 7, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	MAIN

Lesson 9 : Light:Reflection and Refraction		
S.No.	**1 MARK QUESTIONS**	**2025**
7	Assertion (A): White light is dispersed by a glass prism into seven colours. Reason (R): The red light bends the least while the violet the most when a beam of white light passes through a glass prism. APPROPRIATE OPTION:(B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).	MAIN
	2 MARKS QUESTIONS	
8	Draw a ray diagram to show the refraction of a ray of light passing through an equilateral glass prism. Mark the angle through which the emergent ray bends from the direction of the incident ray and also name it. SUGGESTIVE VALUE POINTS:  • Angle of deviation	MAIN
	3 MARKS QUESTIONS	
9	What is a rainbow ? Draw a labelled diagram to show its formation. SUGGESTIVE VALUE POINTS: A rainbow is a natural spectrum appearing in the sky after a rain shower.  	MAIN

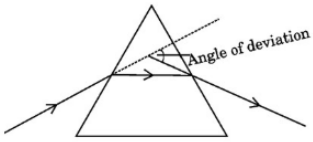
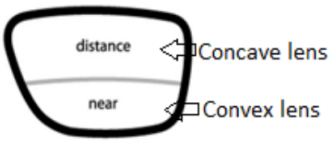
Lesson 9 : Light:Reflection and Refraction		
S.No.	**1 MARK QUESTIONS**	**2025**
10	If we want to obtain a virtual and magnified image of an object by using a concave mirror of focal length 18 cm, where should object be placed? Use mirror formula to determine the object distance for an image of magnification +2 produced by this mirror to justify your answer. SUGGESTIVE VALUE POINTS; Object should be placed between F and P. At less than 18cm distance from the mirror. Mirror formula = 1/v + 1/u = 1/f Magnification m = +2 f = – 18 cm m= -v/u = +2 v= -2u 1/-2u + 1/u = 1/-18 cm 1/2u = 1/-18 cm u= -9 cm	MAIN
	4 MARKS QUESTIONS	

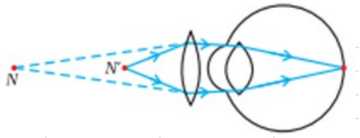
Lesson 9 : Light:Reflection and Refraction		
S.No.	**1 MARK QUESTIONS**	**2025**
11	The students in a class took a thick sheet of cardboard and made a small hole in its centre. Sunlight was allowed to fall on this small hole and they obtained a narrow beam of white light. A glass prism was taken and this white light was allowed to fall on one of its faces. The prism was turned slowly until the light that comes out of the opposite face of the prism appeared on the nearby screen. They studied this beautiful band of light and concluded that it is a spectrum of white light. i. Give any one more instance in which this type of spectrum is observed. ii. What happens to white light in the above case? iii. (A) List two conditions necessary to observe a rainbow. OR iii. (B) Draw a ray diagram to show the formation of a rainbow. Mark on it, points (a), (b) and (c) as given below: a) Where dispersion of light occurs b) Where light gets reflected internally c) Where final refraction occurs. SUGGESTIVE VALUE POINTS: (i) A rainbow (or any other) (ii) Dispersion of white light takes place. (iii) (A) •The presence of water droplets in the atmosphere. •The sun must be at the back of the observer. OR (iii) (B)  	MAIN
	5 MARKS QUESTIONS	

Lesson 9 : Light:Reflection and Refraction		
S.No.	**1 MARK QUESTIONS**	**2025**
12	(i) The power of a lens 'X' is – 2.5 D. Name the lens and determine its focal length in cm. For which eye defect of vision will an optician prescribe this type of lens as a corrective lens ? (ii) "The value of magnification 'm' for a lens is – 2." Using new Cartesian Sign Convention and considering that an object is placed at a distance of 20 cm from the optical centre of this lens, state : (I) the nature of the image formed; (II) size of the image compared to the size of the object; (III) position of the image, and (IV) sign of the height of the image. (iii) The numerical values of the focal lengths of two lenses A and B are 10 cm and 20 cm respectively. Which one of the two will show higher degree of convergence/divergence ? Give reason to justify your answer. SUGGESTIVE VALUE POINTS: (i)Given : Power of lens,P= -2.5 D Since the power is negative, the lens is a concave (diverging) lens. P=1/f f= 1/P = 1/(-2.5) = -0.4 m = -40 cm A concave lens is used to correct myopia (short-sightedness). (ii) Given: m=−2, object distance, u=−20 cm (New Cartesian sign convention) For a lens, m= v/u -2= v/(-20) v= +40cm (I) Nature of image: Since m is negative, the image is real and inverted. (II) Size of image compared to object: image is 2 times (twice) the size of the object (magnified) (III) Position of image: the image is formed 40 cm on the other side of the lens (real image side). (IV) Sign of height of image: For inverted image, image height is negative (iii) P= 1/f(in metres) f_A = 10 cm =0.10 m, f_B = 20 cm =0.20 m P_A = 1/0.10= 10D , P_B = 1/0.20 = 5 D Hence,Lens A will show higher degree of convergence/divergence because it has smaller focal length, hence greater power($P \propto 1/f$)	MAIN

Lesson 9 : Light:Reflection and Refraction		
S.No.	**1 MARK QUESTIONS**	**2025**
13	(i) Draw a ray diagram to show the refraction of a ray of light through a rectangular glass slab when it falls obliquely from air into glass. (ii) State Snell's law of refraction of light. (iii) Differentiate between the virtual images formed by a convex lens and a concave lens on the basis of : (I) object distance, and (II) magnification. SUGGESTIVE VALUE POINTS: (i)  (ii)Snell's law states that for a given pair of media, the ratio of the sine of the angle of incidence to the sine of the angle of refraction is constant: sin i/sin r = constant = n_2/n_1 where $n_1$and n_2 are the refractive indices of the first and second media respectively. Basis — Convex Lens (Virtual Image) — Concave Lens (Virtual Image) (I) Object distance : — Object placed between optical centre and focal point — Object can be placed at any distance (II) Magnification: — Greater than 1 (image is magnified) — Less than1 (image idiminished)	MAIN

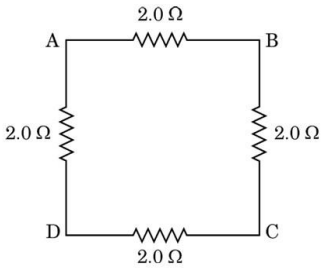
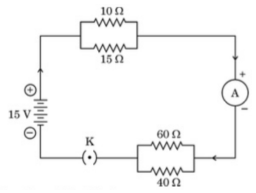
Lesson 10: The Human Eye and the Colourful World		
S.No.	**1 MARK QUESTIONS**	**2025**
1	An old person is suffering from an eye defect caused by weakening of ciliary muscles and diminishing flexibility of the eye lens. If the defect of vision is ‘a’ which can be corrected by lens ‘b’, then ‘a’ and ‘b’ respectively are : (A) hypermetropia and convex lens (B) presbyopia and bifocal lens (C) myopia and concave lens (D) myopia and bifocal lens APPROPRIATE OPTION:(B) presbyopia and bifocal lens	MAIN
	For following Question No. 2, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	
2	Assertion (A): When ciliary muscles contract, eye lens becomes thin. Reason (R): Ciliary muscles control the power of the eye lens. APPROPRIATE OPTION:(d) Assertion (A) is false but Reason (R) is true.	MAIN
	2 MARKS QUESTIONS	
3	A student has difficulty in reading his textbooks but can read the blackboard clearly while sitting in the last row. Name the defect of vision the student is suffering from. List two reasons due to which this defect arises. Write the nature of the lenses required to correct this defect. SUGGESTIVE VALUE POINTS: Hypermetropia /Farsightedness/Longsightedness. Reasons: (i) Focal length of the eye lens is too long (ii) Eyeball becomes too small. Correction Convex lens /Converging lens	MAIN

4	Draw a ray diagram to show the path of a ray of light falling obliquely on one of the refracting faces of a triangular glass prism and mark the angle of deviation on it. SUGGESTIVE VALUE POINTS: Diagram showing direction of rays and marking of angle  	MAIN
5	Name the type of lenses required by the persons for the correction of their defect of vision called presbyopia. Write the structure of the lenses commonly used for the correction of this defect giving reason for such designs. SUGGESTIVE VALUE POINTS: I. Bi-focal lens. Bi-focal lens having upper portion consists of a concave lens and lower portion consists convex lens to facilitate the distant and near vision respectively.  II. convex lens. Convex lens is thickened at the middle as compared to edges to facilitate the near vision.	MAIN
	3 MARKS QUESTIONS	

6	A person has to keep reading material much beyond 25 cm (say at 50 cm) from the eye for comfortable reading. Name the defect of vision he is suffering from. List two causes responsible for arising of this defect. Draw a labelled diagram showing correction of this defect using eye-glasses. Are these glasses convergent or divergent of light ? SUGGESTIVE VALUE POINTS: Hypermetropia/ far-sightedness • (i) Focal length of the eye lens is too long (ii) Eye ball has become too small/shortened • Convergent of light 	MAIN

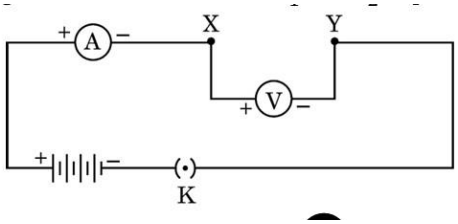
Lesson 11 : Electricity		
S.No.	**1 MARK QUESTIONS**	**2025**
1	A wire of length 'l' is gradually stretched so that its length increases to 3l. If its original resistance is R, then its new resistance will be : (A) 3R (B) 6R (C) 9R (D) 27R APPROPRIATE OPTION:(C) 9R	MAIN
2	A piece of wire of resistance 'R' is cut lengthwise into three identical parts. These parts are then connected in parallel. If the equivalent resistance of this combination is R', then value of R/R' is: (A) 1/9 (B) 1/3 (C) 3 (D) 9 APPROPRIATE OPTION:(D) 9	MAIN
3	An electric bulb is rated 220 V, 11 W. The resistance of its filament when it glows with a power supply of 220 V is: (A) 4400 Ω (B) 440 Ω (C) 400 Ω (D) 20 Ω APPROPRIATE OPTION:(A) 4400 Ω	MAIN
4	The minimum number of identical bulbs of rating 4 V: 6 W, that can work safely with desired brightness, when connected in series with a 240 V mains supply is: (A) 20 (B) 40 (C) 60 (D) 80 APPROPRIATE OPTION:(C) 60	MAIN
5	In domestic electric circuits, the colour of insulation covers of wires in the cables of electric iron/electric toaster is generally : (A) red for live wire, green for neutral wire and black for earth wire (B) red for live wire, black for neutral wire and green for earth wire (C) green for live wire, black for neutral wire and red for earth wire (D) green for live wire, red for neutral wire and black for earth wire APPROPRIATE OPTION:(B) red for live wire, black for neutral wire and green for earth wire	MAIN
	2 MARKS QUESTIONS	

6	A wire of resistance R is cut into three equal parts. If these three parts are then joined in parallel, calculate the total resistance of the combination so formed. SUGGESTIVE VALUE POINTS: R-->R/3 $1/R_{eq} = 1/(R/3) + 1/(R/3) + 1/(R/3)$ $1/R_{eq} = 3/R + 3/R + 3/R = 9/R$ Req = R/9	MAIN
7	Define electric power. When do we say that the power consumed in an electric circuit is 1 watt ? SUGGESTIVE VALUE POINTS: Electric power is defined as the rate at which electrical energy is consumed or electrical work is done in an electric circuit. The power consumed in an electric circuit is 1 watt when 1 joule of electrical energy is consumed in 1 second. P= E/t Here: P = electric power E = electrical energy (in joules) t = time (in seconds)	
8	State the role of electric fuse, used in series with an electrical appliance. Why should in an electric circuit a fuse with defined rating not be replaced by one with a larger rating? SUGGESTIVE VALUE POINTS: • An electric fuse is a safety device used to prevent any damage to an electrical appliance due to short-circuiting and overloading of the electrical circuit. • If a fuse wire with defined rating is replaced by one with a larger rating, then the fuse wire will not melt and the electrical appliance will be damaged due to flow of unduly high current during shortcircuiting and overloading.	MAIN
9	A voltage source sends a current of 2 A to a resistor of 40 Ω connected across it for 5 minutes. Calculate the electrical energy supplied by the source. SUGGESTIVE VALUE POINTS: Given- I= 2 A, R = 40Ω, t= 5 min. = 5 x 60 =300 s Electrical Energy, E= I2Rt E = (2)2 x 40 x 300 E = 48000 J = 4.8 X 104 J	MAIN

10	Four resistors, each of resistance 2·0 Ω, are joined end to end to form a square ABCD as shown. Using appropriate formula, determine the equivalent resistance of the combination between its two ends A and B.  SUGGESTIVE VALUE POINTS: $1/R_{eq} = 1/R_1 + 1/R_2$ $= 1/2 + 1/6$ ($R_2 = 2+2+2 = 6\ \Omega$) (as Arm BC, CD, AD in series) $=(3+1)/ 6= 4/6= 2/3$ $R_{eq} = 3/2$ $=1.5\ \Omega$	MAIN
	3 MARKS QUESTIONS	
11	Consider the following electric circuit :  Image provided in PDF of an electric circuit with a 15V battery, and resistors of 10Ω, 15Ω, 60Ω, and 40Ω. Calculate the values of the following : (a) The total resistance of the circuit (b) The total current drawn from the source (c) Potential difference across the parallel combination of 10 Ω and 15 Ω resistors. SUGGESTIVE VALUE POINTS: (a)Equivalent resistance of parallel combination (10 Ω and 15 Ω) $1/R_p= 1/10 + 1/10$ $= (3+2)/30 = 5/30$ $=6\ \Omega$ (b) Total current drawn from the source $I= V/R$ $=15/106$ $= 0.14$ A (c)Potential difference across the parallel combination (10 Ω and 15 Ω) $V= I \times R$ $= 0.14 \times 6$ $= 0.84$ V	MAIN

12	(a) Write the relationship between resistivity and resistance of a cylindrical conductor of length l and area of cross-section A. Hence derive the SI unit of resistivity. (b) Why are alloys used in electrical heating devices ? SUGGESTIVE VALUE POINTS: (a) Relationship between Resistance and Resistivity- For a cylindrical conductor of length ,l and cross-sectional area A, the resistance R R is given by: R = ρ .l/A here ρ = resistivity of the material Derivation of SI unit of resistivity From the formula: $\rho = R.A/l$ =Ω x m2/m = Ω m (bAlloys are used in electrical heating devices because: -High resistivity – They produce more heat for a given current. -High melting point – They can withstand high temperatures without melting. -Do not oxidize easily – They do not burn or form oxides at high temperatures, increasing durability.)	MAIN
13	The electrical resistivity of three materials A, B and C at 20°C is given below: Material | Resistivity (Ωm) A | 10^{17} B | 44×10^{-6} C | 1.62×10^{-8} i. Classify these materials as conductor, alloy and insulator. ii.Give one example of each of these materials and state one use of each material in the design of an electrical appliance say an electric stove or electric iron. SUGGESTIVE VALUE POINTS: (i) • A - Insulator • B - Alloy • C - Conductor (ii)• A: Plastic - handle of an electric iron. • B: Nichrome – used as a heating element in an electric iron. • C: Copper - electric wires. A: Rubber– foot of the electric stove. B: Nichrome – used as a heating element in an electric stove. C: Copper- electric wires.	MAIN

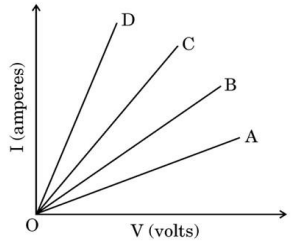
14	Define the term ‘’potential difference’’ between two points in an electric circuit carrying current. Name and define its S.I. unit. Also express it in terms of S.I. unit of work and charge. SUGGESTIVE VALUE POINTS: The work done to move a unit charge from one point to other in a conductor. (V=W/Q) • volt (V) •In a current carrying conductor, when one joule of work is done to move a charge of 1 coulomb from one point to another. •1 volt = 1 joule/1 coulomb or 1V=1 J C-1	MAIN
	4 MARKS QUESTIONS	



As shown in the diagram, an electric circuit consisting of an ammeter, a voltmeter, 4 cells of 1·5 V each, a plug key with a gap XY was set up. Voltmeter and ammeter readings were recorded in the observation table for four arrangements as given below :
Arrangement No. 1 – only resistor R1 in gap XY
Arrangement No. 2 – only resistor R2 in gap XY
Arrangement No. 3 – Resistors R1 and R2 in series in gap XY
Arrangement No. 4 – Resistors R1 and R2 in parallel in gap XY

Based on the observations, four V – I graphs A, B, C and D as shown in
figure were drawn. Study these graphs.

15

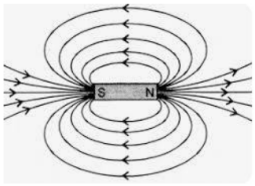


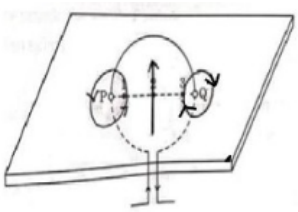
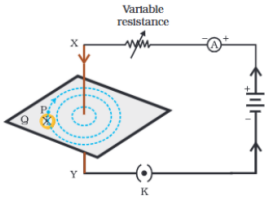
MAIN

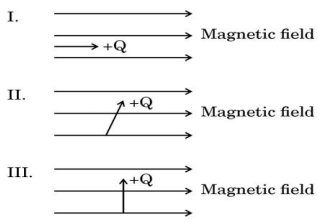
a) Which one of the graphs represents the series combination of R1 and R2 ?
b) Which one of these graphs represents the parallel combination of R1 and R2 ?
c) i) Show an arrangement of three resistors, each of resistance 10 Ω, so that the combination has a resistance of 15 Ω . Give justification for your answer.
OR
ii) A battery of 6 V is connected with a series combination of five resistors of 0·1 Ω , 0·2Ω , 0·3 Ω , 0·4Ω and 0·5Ω . How much current would flow through the 0.3 Ω resistor ? Justify your answer.
SUGGESTIVE VALUE POINTS:
(a) Graph A
(b) Graph D
(c) (i) R = $R1R2 / (R1 + R2) + R3$
R = (10 × 10) / (10 + 10) + 10
= 5 Ω + 10 Ω = 15 Ω
or
(c) (ii) • I = V / R
= 6 V / (0.1 + 0.2 + 0.3 + 0.4 + 0.5) Ω
= 6 V / 1.5 Ω = 4·0 A
• same current flows when resistors are connected in series.

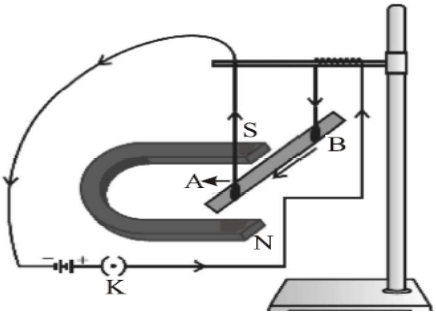
16	In our houses we receive A.C. electric power of 220 V. In electric iron or electric heater cables having three wires with insulation of three different colours- red, black and green are used to draw current from the mains. i.What are these three different wires called? Name them colour wise. ii.What is the potential difference between the red wire and black wire? iii.What is the role of the wire with green insulation in case of accidental leakage of electric current to the metallic body of an electrical appliance. SUGGESTIVE VALUE POINTS: (a)•red wire : Live wire •black wire : Neutral wire •green wire : Earth wire (b) 220 V (c) This is used as a safety measure. It ensures that any leakage of the current to the metallic body of the appliance keeps its potential to that of the earth and the user may not get a severe electric shock.	

Lesson 12: Magnetic effects of Electric Current		
S.No.	**1 MARK QUESTIONS**	**2025**
1	Which one of the following statements is not true about a bar magnet ? (A) It sets itself in north-south direction when suspended freely. (B) It has attractive power for iron filings. (C) It produces magnetic field lines. (D) The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole. APPROPRIATE OPTION: (D) The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.	MAIN
2	The strength of magnetic field produced inside a long straight current carrying solenoid does not depend upon : (A) number of turns in the solenoid (B) direction of current flowing through the solenoid (C) material of the core filled inside the solenoid (D) radius of the coil of the solenoid APPROPRIATE OPTION: (D) radius of the coil of the solenoid	MAIN
	For following Question No.3, 4 two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	
3	Assertion (A) : No two magnetic field lines are found to cross each other. Reason (R) : The compass needle cannot point towards two directions at the point of intersection of two magnetic field lines. APPROPRIATE OPTION: (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	MAIN

4	Assertion (A) : Magnetic field lines around a bar magnet never intersect each other. Reason (R) : Magnetic field produced by a bar magnet is a quantity that has both magnitude and direction. APPROPRIATE OPTION: (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).	MAIN
	2 MARKS QUESTIONS	
5	What are magnetic field lines. List two important properties of magnetic field lines. SUGGESTIVE VALUE POINTS: The lines representing magnetic field around a magnet.  Properties: -No two field lines cross each other. -Field lines emerge from north pole and merge at south pole. -Field lines are closed curves. -The direction of the field lines inside the magnet is from its south pole to north pole.(any two)	MAIN

6	Draw the pattern of the magnetic field lines for the two parallel straight conductors carrying current of same magnitude 'I' in opposite direction as shown. Show the direction of magnetic field at a point O which is equidistant from two conductors.  (Consider that the conductors are inserted normal to the plane of a rectangular cardboard.) SUGGESTIVE VALUE POINTS: 	MAIN
	3 MARKS QUESTIONS	
7	Draw a labelled diagram to show the pattern of magnetic field lines on a horizontal white board due to a straight current carrying conductor passing perpendicular through its centre. If the direction of current in the conductor is vertically downwards, mark the direction of (i) current, and (ii) magnetic field lines. State the right hand thumb rule and check whether the directions marked on the diagram are in accordance with this rule. SUGGESTIVE VALUE POINTS:  • Right hand thumb rule:If you hold a current-carrying conductor in your right hand such that your thumb points in the direction of the conventional current (positive to negative), then the direction in which your fingers curl around the wire indicates the direction of the magnetic field lines.	MAIN

8	Name and state the rule which determines the force on a current carrying conductor placed in a uniform magnetic field. Consider the following three diagrams in which the entry of a positive charge (+Q) in a magnetic field is shown. Identify giving reason the case in which the force experienced by the charge is (i) maximum, and (ii) minimum.  SUGGESTIVE VALUE POINTS: (i) Maximum in Case III – Magnetic field and current/motion of charge are perpendicular to each other. (ii) Minimum in Case I – Magnetic field and current/motion of charge are parallel to each other.	MAIN
	5 MARKS QUESTIONS	

9	By using the given experimental set-up. How can it be shown that:  a)A force is exerted on the current- carrying conductor AB when it is placed in a magnetic field. b)The direction of force can be reversed in two ways. ii) When will be the magnitude of the force be highest? iii) State Fleming's left hand rule. SUGGESTIVE VALUE POINTS: (a) The conductor AB gets displaced. (b) - By reversing the direction of the current. - By reversing the direction of the magnetic field. (ii) When the direction of current is at right angles to the direction of the magnetic field. (iii) Stretch the thumb, fore finger and middle finger of your left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of the current, then the thumb will point in the direction of the force acting on the conductor.	MAIN

Lesson 13: Our Environment		
S.No.	**1 MARK QUESTIONS**	**2025**
1	Other than the abiotic components, which of the given biotic components are not required to make an aquarium with small herbivorous fishes a self-sustaining system ? (i) Aquatic plants and aquatic animals (ii) Terrestrial plants and terrestrial animals (iii) Decomposers as bacteria and fungi (iv) Consumers as clown fishes and sea urchins (A) (i) and (iv) (B) (ii) and (iii) (C) (i) and (iii) (D) (ii) and (iv) APPROPRIATE OPTION:(D) (ii) and (iv)	MAIN
2	In the food chains given below. Select the most efficient food chains in terms of energy: (A) Grass → Grasshopper → Frog → Snake (B) Plants → Deer → Lion (C) Plants → Man (D) Phytoplankton → Zooplankton → Small fish → Big Fish APPROPRIATE OPTION:(C) plants -> man	MAIN
	For following Question No. 3, two statements are given — one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below. (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). (B). Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A). (C). Assertion (A) is true, but Reason (R) is false. (D). Assertion (A) is false, but Reason (R) is true.	
3	Assertion (A) : Use of jute bags for shopping reduces pollution. Reason (R) : Jute is biodegradable and its bag may be reused as and when needed. APPROPRIATE OPTION: (A). Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	MAIN
	3 MARKS QUESTIONS	

4	In a food chain energy flow is unidirectional.'' Give two reasons for the given statement. If 10,000 J energy is available at the producer level, how much energy will be available to the secondary consumers ? Give reason to justify your answer. SUGGESTIVE VALUE POINTS: The energy captured by plants does not revert to solar input and the energy which passes to the herbivores does not revert back to autotrophs. • As energy moves progressively through the various trophic levels it is no longer available to the previous level. • The energy available at each trophic level gets diminished progressively due to loss of energy at each level. (any two) (b) 100 J • Autotrophs ———→Primary consumer ———→ secondary 10000 J (1000 J) consumer (100 J) Only 10% energy of the organic matter of previous trophic level is transferred to next trophic level. /10% law	MAIN
5	What are decomposers? Give two examples. State how they maintain a balance in an ecosystem SUGGESTIVE VALUE POINTS: • Decomposers are the microorganisms which breakdown the complex organic substances into simple inorganic substances. • Examples: bacteria and fungi The simple substances formed by decomposition go into the soil and are used up once more by the plants, thus maintain balance of an ecosystem.	MAIN