

**INDIAN SCHOOL SOHAR****PRE-BOARD I 2024-25****Science (086)**

CLASS: X

Max. Marks: 80

Date:08/01/25

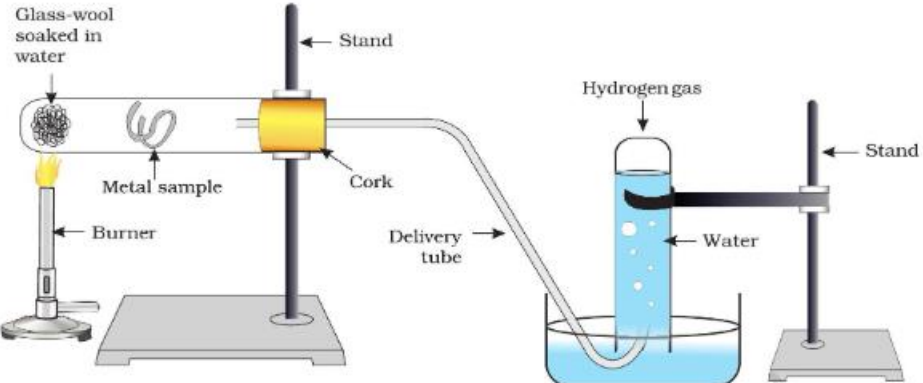
Time: 3 hours

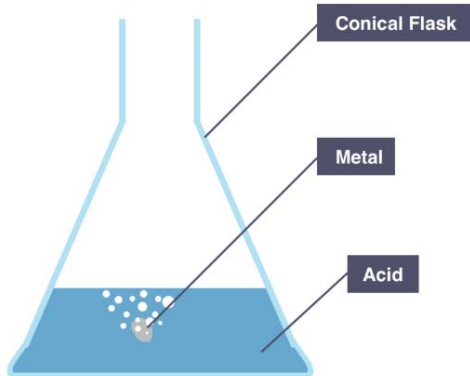
General Instructions:

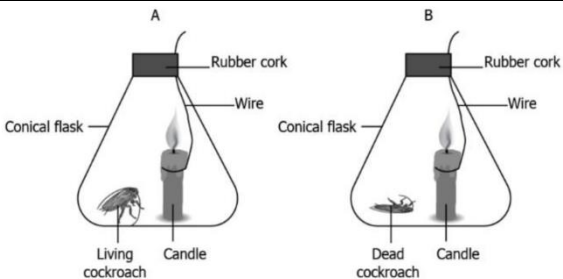
1. All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.
2. Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B would have 6 Short Answer (SA) type questions carrying 02 marks each.
4. Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.
5. Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.
6. Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1/2/3 marks.

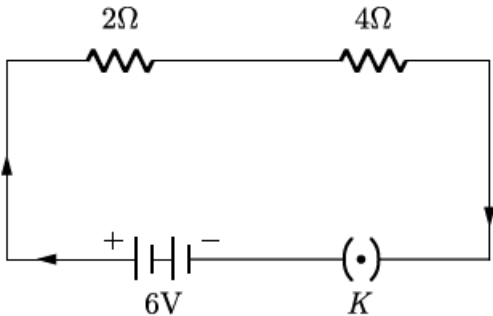
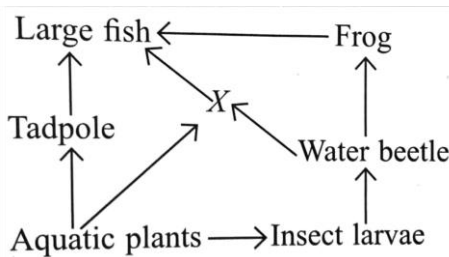
SECTION - A

Question 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.

1	What does the experiment shown below demonstrate?  A. Reaction of metals with salt solutions B. Heating a salt sample on a spatula C. Action of steam on a metal D. Testing the conductivity of a salt solution	1
2	Which of the following reactions is not balanced? A. $2\text{NaHCO}_3 \rightarrow \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$ B. $2\text{C}_4\text{H}_{10} + 12\text{O}_2 \rightarrow 5\text{CO}_2 + 10\text{H}_2\text{O}$ C. $2\text{Al} + 6\text{H}_2\text{O} \rightarrow 2\text{Al}(\text{OH})_3 + 3\text{H}_2$ D. $4\text{NH}_3 + 5\text{O}_2 \rightarrow 4\text{NO} + 6\text{H}_2\text{O}$	1
3	Four students, A, B, C, and D were asked to carry out a decomposition reaction. Each one followed a different method as mentioned below: 1. Heated an aqueous solution of iron sulphate in a test tube. 2. Added Zn granules to iron sulphate in a test tube and then heated the mixture. 3. Heated crystals of iron sulphate in a test tube. 4. Heated crystals of iron sulphate along with copper sulphate crystals in a China dish. Which student adopted the correct method? A. 1 B. 2 C. 3 D. 4	1

4	Based on the figure, which of the following combinations are correct?  <table><thead><tr><th>Metal</th><th>Gas Evolved</th></tr></thead><tbody><tr><td>(i) Copper</td><td>Yes</td></tr><tr><td>(ii) Iron</td><td>Yes</td></tr><tr><td>(iii) Magnesium</td><td>No</td></tr><tr><td>(iv) Zinc</td><td>Yes</td></tr></tbody></table> A. i and iii B. i and iv C. ii and iii D. ii and iv	Metal	Gas Evolved	(i) Copper	Yes	(ii) Iron	Yes	(iii) Magnesium	No	(iv) Zinc	Yes	1
Metal	Gas Evolved											
(i) Copper	Yes											
(ii) Iron	Yes											
(iii) Magnesium	No											
(iv) Zinc	Yes											
5	A student dips pH papers in solutions A and B and observes that the pH paper turns blue and orange, respectively, in them. He infers that: A. A is HCl solution; B is NaOH solution B. A is sodium bicarbonate solution; B is acetic acid C. A is acetic acid; B is sodium carbonate solution D. A is oxalic acid solution; B is sodium carbonate solution	1										
6	In the decomposition of lead nitrate to form lead oxide, nitrogen dioxide, and oxygen gas, what is the coefficient of nitrogen dioxide in the balanced equation? A. 1 B. 2 C. 3 D. 4	1										
7	An organic compound A with the molecular formula C_2H_5OH, on oxidation, gives an acid B with the molecular formula CH_3COOH. Compound A is commonly used for sterilization of skin by doctors. What are the formulae of compounds A and B? A. Compound A is C_2H_5OH and B is CH_3CHO B. Compound A is CH_3OCH_3 and B is CH_3COOCH_3 C. Compound A is C_2H_5OH and B is CH_3COOH D. Compound A is CH_3COOH and B is C_2H_5COOH	1										
8	A student sets up an experiment to study the human respiratory system. In the experiment, the student places candle and a living cockroach in the flask A, while a candle and a dead cockroach in flask B. The burning of candle needs oxygen.	1										

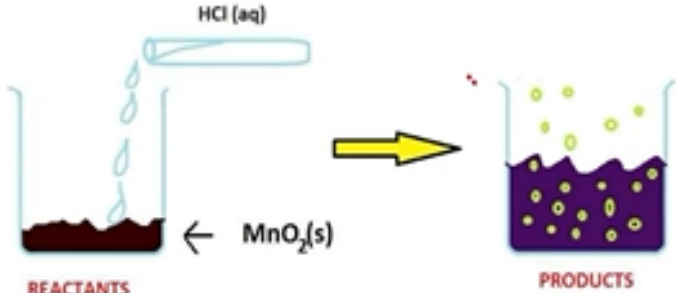
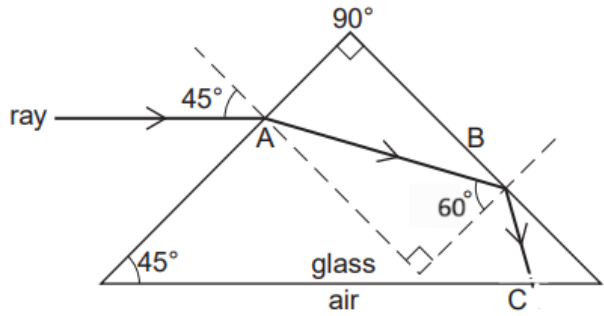
	 After 10 minutes, the student observes that the candle in flask A extinguishes faster while candle in flask B keeps burning for a longer time. What can be evaluated from this experiment? A. Water vapours produced by living beings prevent burning of candle. B. Living beings consume oxygen during respiration. C. Burning of candle decreases the life span of cockroach. D. Candle produces high amount of carbon dioxide.	
9	Refer to the given paragraph: There are three kinds of blood vessels in humans. Arteries are <u>thick</u> walled vessels that carry <u>deoxygenated</u> blood (except <u>pulmonary artery</u>) away from heart. Veins are <u>thin</u> walled, vessels that bring <u>oxygenated</u> blood (except <u>pulmonary vein</u>) back to the heart. Capillaries are thin walled vessels that are <u>permeable</u> to water and dissolved substances. Select correct option from following for underlined words/phrases. A. <u>Thick</u> and <u>thin</u> should be interchanged. B. <u>Oxygenated</u> and <u>deoxygenated</u> should be interchanged. C. <u>Pulmonary artery</u> should be replaced with <u>carotid artery</u> whereas <u>pulmonary vein</u> should not be replaced as it is correctly mentioned. D. <u>Permeable</u> should be replaced with <u>impermeable</u>.	1
10	An incomplete equation for the digestion of starch using saliva is shown as: Saliva + Starch (in test tube) $\longrightarrow$ What will be the likely outcome of this? A. Saliva will convert starch into complex fat molecules. B. Saliva will convert starch into complex sugar molecules. C. Saliva will breakdown starch into simple sugar molecules. D. Saliva will breakdown starch into simple protein molecules.	1
11	Upon receiving a signal the dendrite tip of a nerve cell sets off a chemical reaction that A. creates an electric impulse in the dendrite. B. creates an electric impulse in the next neuron. C. releases some chemicals in the cell body of the neuron. D. creates a stimulus.	1
12	In a plant, round seeds (S) are dominant over wrinkled seeds (s) and green seeds (G) are dominant over yellow seeds (g). A plant homozygous for round and green seeds is crossed with a plant having wrinkled and yellow seeds. The F₁ offspring are self-crossed to produce F₂ generation. If a total of 144 offsprings are produced, how many plants are expected to be having wrinkled and green seeds in F₂ generation, according to a typical Mendelian cross? A. 9 B. 18 C. 27 D. 81	1

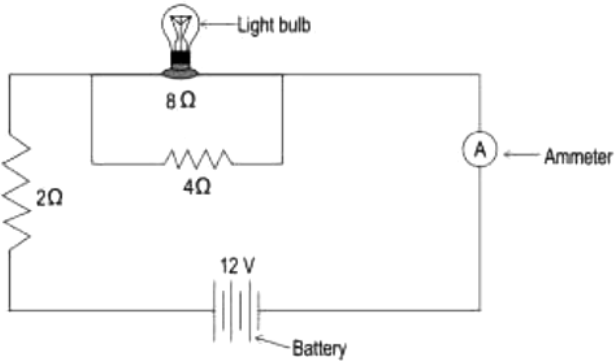
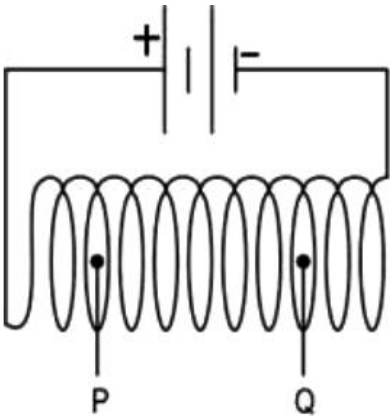
13	An object is situated at a distance of $f/2$ from a convex lens of focal length f. Distance of image will be A. $+(f/2)$ B. $+(f/3)$ C. $-(f/4)$ D. $-f$	1
14	In an electrical circuit two resistors of 2Ω and 4Ω respectively are connected in series to a 6 V battery as shown in the figure. The heat dissipated by the 4Ω resistor in 5 s will be  A. 5 J B. 10 J C. 20 J D. 30 J	1
15	The manufacturing of chlorofluorocarbons free refrigerators is mandatory throughout the world. How does this help prevent ozone depletion? A. This will help convert oxygen molecules into ozone. B. This will help convert the CFCs into ozone molecules. C. This will reduce the production of CFCs from oxygen molecules. D. This will reduce the release of CFCs that reacts with ozone molecules.	1
16	Refer to the given food web operating in an ecosystem. A new species Y was introduced in this community which exclusively drove away species X from this area. What could be correctly assumed about species X and Y? A. Species X could be predator of species Y and water beetle. B. Species Y could be predator of species X and exclusively preyed upon it. C. Species X is a carnivore but species Y is an omnivore therefore is exposed to more food options. D. Both B and C. 	1
Direction: Following questions no.17-20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below: (a) Both A and R are true and R is the correct explanation of A. (b) Both A and R are true but R is not the correct explanation of A. (c) A is true but R is false. (d) A is false but R is true.		
17	Assertion (A): Ionic compounds have high melting and boiling points. Reason (R): A large amount of energy is required to break the strong inter-ionic attraction in ionic compounds.	1

18	Assertion: Transpiration is necessary evil in plants. Reason: There is pressure on the plant for the absorption of water.	1
19	Assertion: Red light travels faster in glass than green light. Reason: The refractive index of glass is less for red light than for green light.	1
20	Assertion: Autotrophs can produce food on its own. Reason: Green plants can absorb 1% energy of sunlight that fall on the leaves.	1

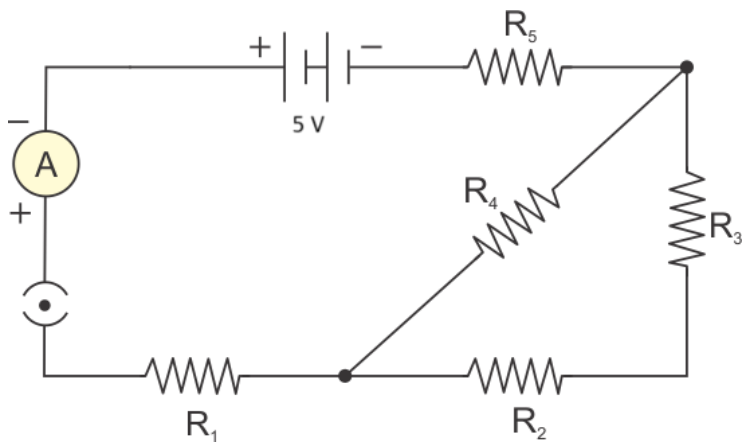
SECTION - B

Question No.21 to 26 are very short answer questions.

21	 Based on the diagram given above: (a) Identify the type of reaction and name the gas evolved. (b) Write the balanced chemical equation for the reaction.	2
22	A. Name two excretory products other than O_2 and CO_2 in plants. B. More concentrated yellowish urine is excreted in summers. Explain.	2
23	<u>Attempt either option A or B.</u> A. Both <i>Amoeba</i> and <i>Plasmodium</i> reproduce asexually, but their methods and impacts on their environment are quite different. Name the processes of asexual reproduction in <i>Amoeba</i> and <i>Plasmodium</i>. How do these processes differ in terms of reproduction rate and the number of offspring produced? OR B. Explain in brief how fertilization in flowering plants leads to the formation of seeds.	2
24	 (a) A monochromatic ray of light is incident on the face of the prism as shown in the figure. State the name given to what happens to the ray at A. Use the values on the diagram to calculate the angle of refraction at A and the refractive index of the material of the prism.	2

25	Ramya wants to measure the current flowing through the circuit shown below.  Which of the four ammeters can she use for the same? Show your calculations. <table border="1" data-bbox="210 698 967 931"> <thead> <tr> <th>Ammeter</th><th>Minimum range</th><th>Maximum range</th></tr> </thead> <tbody> <tr> <td>P</td><td>0 mA</td><td>1 mA</td></tr> <tr> <td>Q</td><td>0 mA</td><td>10 mA</td></tr> <tr> <td>R</td><td>0 A</td><td>1 A</td></tr> <tr> <td>S</td><td>0 A</td><td>10 A</td></tr> </tbody> </table> OR A coil whose length is greater than its diameter is connected to a battery as shown below.  (a) How does the magnetic field at point P compare with the magnetic field at point Q? Justify your answer. (b) State one way in which the strength of the magnetic field inside a current carrying coil can be changed?	Ammeter	Minimum range	Maximum range	P	0 mA	1 mA	Q	0 mA	10 mA	R	0 A	1 A	S	0 A	10 A	2
Ammeter	Minimum range	Maximum range															
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Q	0 mA	10 mA															
R	0 A	1 A															
S	0 A	10 A															
26	In a well balanced forest ecosystem, a simple food chain is observed. The chain begins with grass, which is eaten by grasshoppers, which are then consumed by frogs, and finally, snakes prey on the frogs. What would happen to the ecosystem if the population of snakes decreased significantly?	2															
<u>SECTION – C</u>																	
Question No. 27 to 33 are short answer questions.																	
27.	Give the reaction involved during the extraction of zinc from its ore by: (a) Roasting of zinc ore. (b) Calcination of zinc ore. (c) Reduction of zinc oxide.	3															

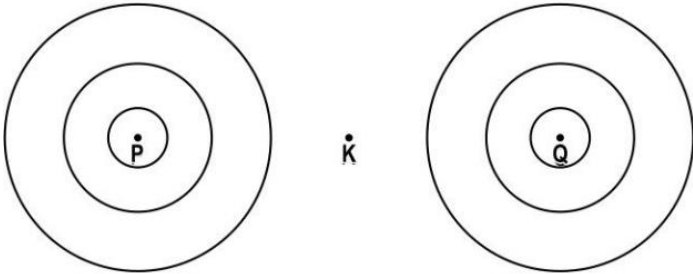
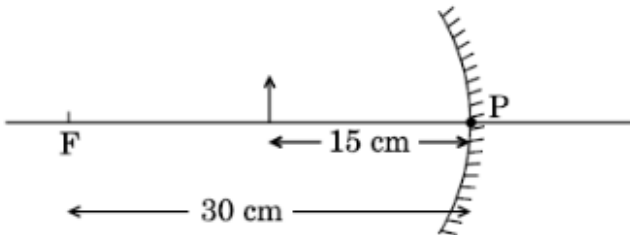
28.	Attempt either option A or B. A. Following are the observations of an experiment on conduction of electricity by acids: <table><thead><tr><th>S.No.</th><th>Sample Solution</th><th>Observation</th><th>Inference</th></tr></thead><tbody><tr><td>1</td><td>Hydrochloric acid</td><td>Bulb glows</td><td>Conducts electricity</td></tr><tr><td>2</td><td>Sulphuric acid</td><td>Bulb glows</td><td>Conducts electricity</td></tr><tr><td>3</td><td>Glucose solution</td><td>Bulb does not glow</td><td>No conduction</td></tr><tr><td>4</td><td>Alcohol solution</td><td>Bulb does not glow</td><td>No conduction</td></tr></tbody></table> (a) Why do acids conduct electricity? Explain (b) Why do glucose and alcohol solutions not conduct electricity? (c) Write an equation that shows the ionisation of sulphuric acid in an aqueous solution. OR B.(a) Identify compound X based on the reactions given below. Also, write the chemical formulae of A, B, and C. (b) What is the nature of compound B? Compound X + Zn → A + H₂(g) + HCl → B + H₂O + CH₃COOH → C + H₂O	S.No.	Sample Solution	Observation	Inference	1	Hydrochloric acid	Bulb glows	Conducts electricity	2	Sulphuric acid	Bulb glows	Conducts electricity	3	Glucose solution	Bulb does not glow	No conduction	4	Alcohol solution	Bulb does not glow	No conduction	3
S.No.	Sample Solution	Observation	Inference																			
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3	Glucose solution	Bulb does not glow	No conduction																			
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29	Refer to the graph plotted to show the energy output of two types of respiration. (a) Identify the types of respiration denoted by curves A and B. (b) Write down the biochemical equations for both types of respiration. Energy Output Time B A	3																				
30	A farmer is trying to breed a variety of tomato plants that are both resistant to a common disease and have large fruit size. The disease resistance trait (D) is dominant over susceptibility (d), and the large fruit size trait (F) is dominant over small fruit size (f). The farmer crosses two homozygous plants, one with genotype DDFF (disease-resistant and large fruits) and the other with genotype ddff (disease-susceptible and small fruits). (a) What are the genotype and phenotype of F₁ offspring? (b) If the farmer then crosses two F₁ plants, what will be the expected phenotypic traits and ratio of the F₂ generation?	3																				

31	A student uses spectacles of focal length – 2.5 m. (a) Name the defect he is suffering from and which lens is used for the correction of this defect. (b) Compute the power of this lens. Draw a ray-diagram to show how this defect can be corrected by using a lens.	3
32	(a) Deduce the expression for the equivalent resistance of the parallel combination of three resistors R_1, R_2 and R_3. Consider the following electric circuit:  (b) If every resistor of the circuit is of $3\ \Omega$, what current will flow in the circuit?	3
33	(a) Name a device that helps to maintain a potential difference across a conductor in a circuit. (b) When do we say that the potential difference across a conductor is 1 volt? Calculate the amount of work done in shifting a charge of 2 coulombs from a point A to B having potential +10V and -5V, respectively.	3

SECTION - D

Question No. 34 to 36 are long answer questions.

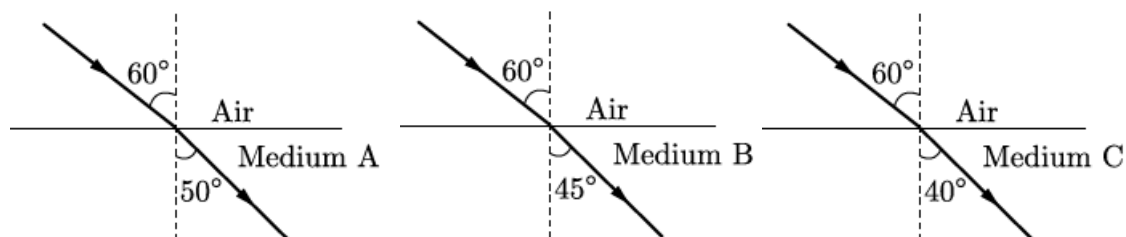
34	Attempt either option A or B. A. An organic compound A, containing two carbon atoms, is commonly used in medicines and as a good solvent. On heating with concentrated H_2SO_4, it forms a compound B. Compound B, on the addition of one mole of hydrogen in the presence of a nickel catalyst, forms compound C, which on combustion produces CO_2 and H_2O. (i) Identify compounds A, B, and C, and write the chemical equations involved. (ii) Draw the electron dot structure of compound B. OR B. (a) What are isomers? Draw the structures of two isomers of butane (C_4H_{10}). (b) Why can't we have isomers of the first three members of the alkane series? (c) An atom of an element contains five electrons in its valence shell. This element is a major component of air and exists as a diatomic molecule. (i) Identify the element. (ii) Show the bond formation between two atoms of this element. (iii) Write the nature of the bond between the two atoms.	5
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35	<u>Attempt either option A or B.</u> A. A student is comparing regeneration, fragmentation, and budding in different organisms. The student wants to know how each method works in different environments and how it benefits the species. (i) Compare the processes of fragmentation and budding. (1) (ii) How the process of regeneration is different from reproduction? (1) (iii) Complex organisms cannot give rise to new individuals through regeneration. Give reasons. (2) (iv) How can these asexual methods be disadvantageous to these organisms? (1) OR B. A medical student is studying the process of nutrient and gas exchange between the mother and fetus during pregnancy. She learns that a special tissue plays a crucial role in this process. (i) Name the mentioned tissue and describe its structure. (2) (ii) Name two substances exchanged between mother and fetus through this tissue. (1) (iii) Name the region where the embryo develops inside the female body. Explain how this region is adapted for nourishing the baby. (1) (iv) Some of the fetal cells fall off into the amniotic fluid and can be collected by careful procedure. The cells were screened and found to contain XX chromosome. What is the sex of the fetus? (1)	5
36	P and Q represent two straight wires carrying equal current (I) in a direction perpendicular to the plane of the paper outwards. K is the midpoint of the line joining P and Q. The image shows the magnetic field lines around the wire. But the direction of the magnetic field is not marked.  (a) Draw the above image and mark the direction of the magnetic field. (b) If the current in the wires is increased, how will the strength of the magnetic field around P and Q change? (c) What will be the magnetic field due to P and Q at the midpoint K? Give a reason. (d) If the current in wire Q is reversed, what will be the magnetic field at midpoint K? OR (a) Complete the following ray diagram: 	5

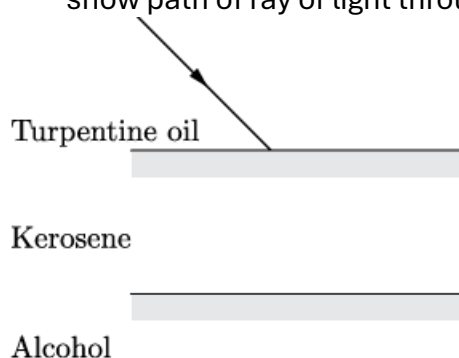
	(b) Use the mirror formula to find the nature, position, and size of the image formed. (c) Determine the magnification in this case. What will be the nature and size of the image if a convex mirror is used instead of a concave mirror?	
SECTION – E		
Question No.37 to 39 are case-based /data-based questions.		
37	The International Union of Pure and Applied Chemistry (IUPAC) system of nomenclature is a standardised method for naming organic compounds. It ensures that each compound has a unique and systematic name, which avoids confusion in scientific communication. According to IUPAC rules, organic compounds are named based on the number of carbon atoms in the parent chain, the functional groups present, and the position of substituents. For example, ethanol ($\text{CH}_3\text{CH}_2\text{OH}$) has the "hydroxyl group" (-OH), and its name reflects the two carbon atoms (eth-) and the presence of the alcohol functional group (-ol). By following IUPAC rules, chemists can deduce structures, identify functional groups, and understand chemical properties. Answer the following questions based on the above data: A. Draw the structures of the following compounds: (a) 2-Methylpentane (b) 1-Chlorohexane <u>Attempt either subpart B or C.</u> B. Write the IUPAC names of the following compounds: (a) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{CH}_2\text{CHO}$ (b) $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}_2\text{COOH}$ OR C. What will happen if the second member of the alcohol series undergoes oxidation in the presence of alkaline potassium permanganate? Write the reaction involved.	4
38	Plants, like all living organisms, need to respond to changes in their environment in order to survive and thrive. They exhibit different types of movements in response to various stimuli, a phenomenon known as tropic movements. These movements are controlled by chemical coordination, a system of internal communication that involves plant hormones. These hormones are produced in small quantities but have a large impact on plant growth and development. <u>Attempt either subpart A or B. (2)</u> A. Explain the role of auxins in phototropism and geotropism. OR B. Give one example of a plant growth promoter and one example of a plant growth inhibitor. C. Compare the movement of growth of the pollen tube towards ovule with the growth of roots of a plant towards water in soil. (1) Compare the movement in folding of leaves of 'Touch me not' plants with the movement of body parts in the animals. (1)	4
39	Snell's Law, also known as the Law of Refraction, is an equation that relates the angle of the incident light and the angle of the transmitted light at the interface of two different	4

mediums. The many facets of the cut diamond combined with a high index of refraction give diamonds the brilliance that they are known for. Snell's Law states that the ratio of the sine of the angles of incidence and transmission is equal to the ratio of the refractive index of the materials at the interface.

- (a) The refractive index of diamond is 2.42. What is the meaning of this statement?
 (b) The diagram below represents the path of a light ray through three different media A, B and C. In which of the following media is the speed of light maximum?



- (c) Refractive index of turpentine oil, kerosene and alcohol are 1.47, 1.44 and 1.36 respectively. On the basis of this information, complete the following ray diagram to show path of ray of light through each medium.



OR

- (d) The refractive index of a medium x with respect to a medium y is $\frac{2}{3}$ and the refractive index of medium y with respect to medium z is $\frac{4}{3}$. Find the refractive index of medium z with respect to medium x . If the speed of light in medium x is $3 \times 10^8 \text{ m/s}$, calculate the speed of light in medium y .
