अनुक्रमांक/ROLL NO **सेट / SET: 01**

केंद्रीय विद्यालय संगठन, जयपुर संभाग

KENDRIYA VIDYALAYA SANGATHAN, JAIPUR REGION

प्रथम प्री बोर्ड परीक्षा/ 1ST PRE BOARD EXAMINATION :2024-25

कक्षा / CLASS: 10th

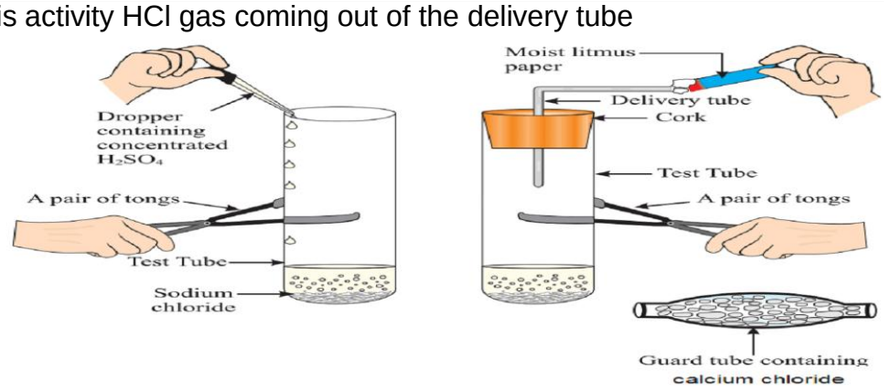
विषय /SUB: Science (कोड / CODE: 086)

अधिकतम आवधि / Time Allowed: 3 Hours

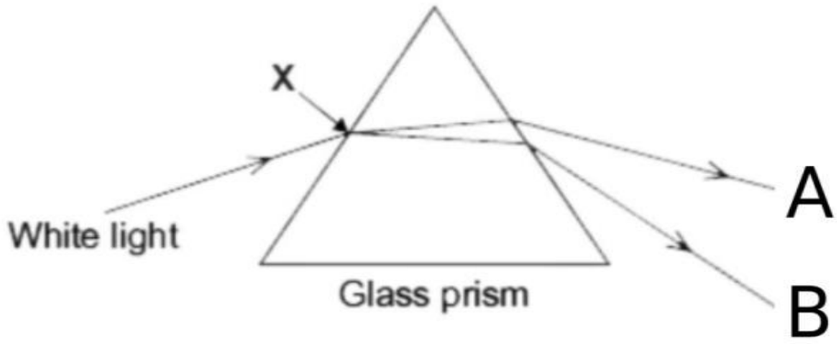
अधिकतम अंक/ Maximum Marks: 80

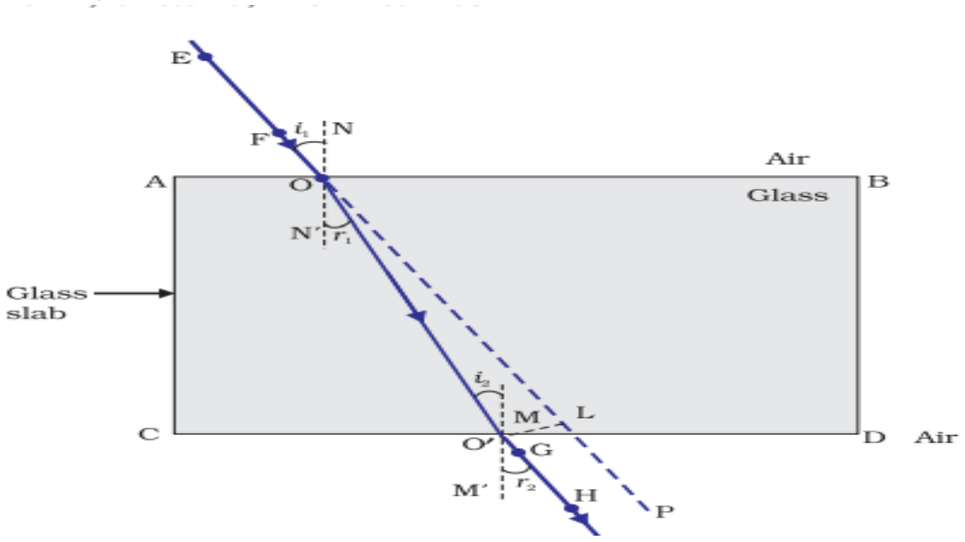
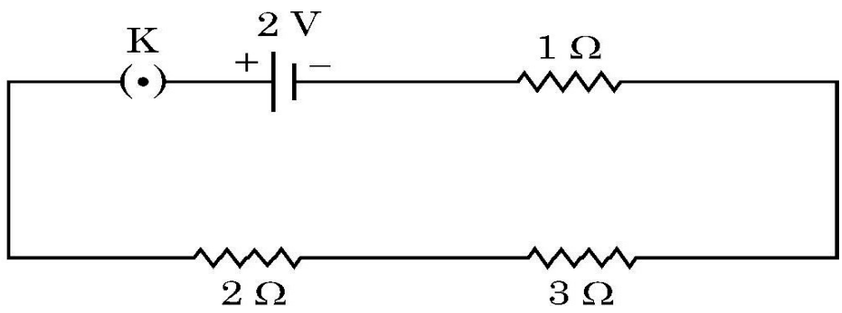
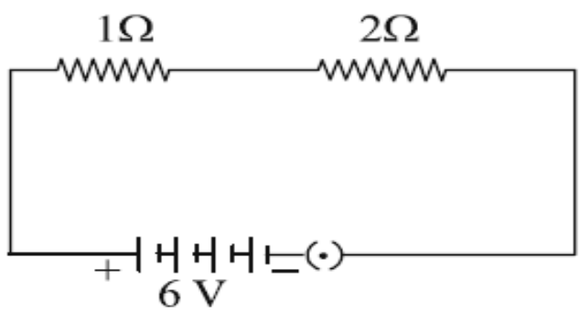
सामान्य निर्देश / General Instructions:

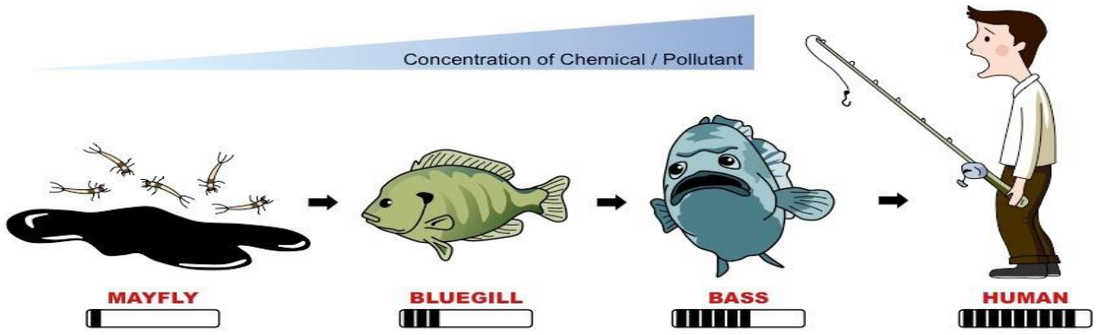
1. All questions would be compulsory. However, an internal choice of approximately 33% would be provided. 50% marks are to be allotted to competency-based questions.
2. Section A would have 16 simple/complex MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
3. Section B would have 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.

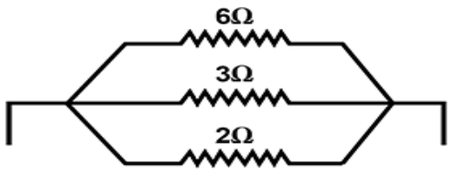
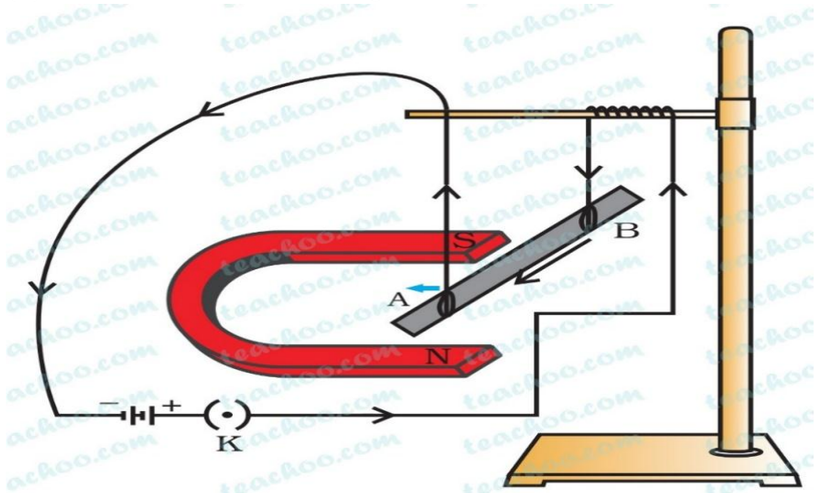
<table>
<tr><th>Q no.</th><th>Questions</th><th>Marks</th></tr>
<tr><td></td><td>SECTION – A
Question 1 to 16 are multiple choice questions. Only one of the choices is correct. Select and write the correct choice as well as the answer to these questions.</td><td></td></tr>
<tr><td>Q1.</td><td>A student observes that a solution of zinc sulphate remains unchanged when a strip of copper metal is added to it. What conclusion can the student draw?
a) Copper is less reactive than zinc
b) Copper is more reactive than zinc
c) Zinc is less reactive than copper
d) Both metals are equally reactive</td><td>1</td></tr>
<tr><td>Q2.</td><td>Match column I with column II and select the correct option using the given codes.
<table>
<tr><td>Column I</td><td>Column II</td></tr>
<tr><td>1. Metal used in galvanization</td><td>a) Mercury</td></tr>
<tr><td>2. Metal which is liquid at room temperature</td><td>b) Aluminium</td></tr>
<tr><td>3. Amphoteric metal</td><td>c) Zinc</td></tr>
<tr><td>4. Good conductor of electricity</td><td>d) Silver</td></tr>
</table>
a) 1-c, 2-d, 3-b, 4-a
b) 1-b, 2-a, 3-d, 4-c
c) 1-c, 2-a, 3-b, 4-d
d) 1-c, 2-d, 3-a, 4-b</td><td>1</td></tr>
<tr><td>Q3.</td><td>In this activity HCl gas coming out of the delivery tube
 
</td><td>1</td></tr>
</table>

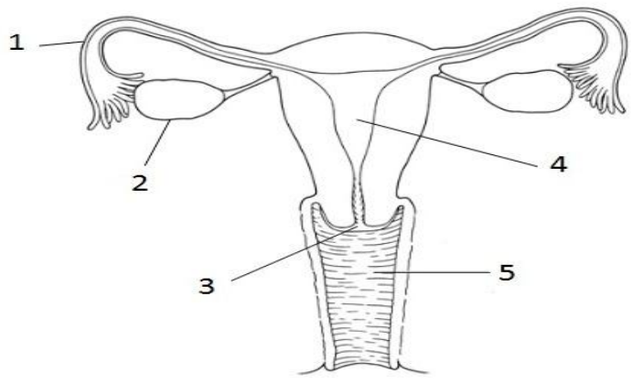
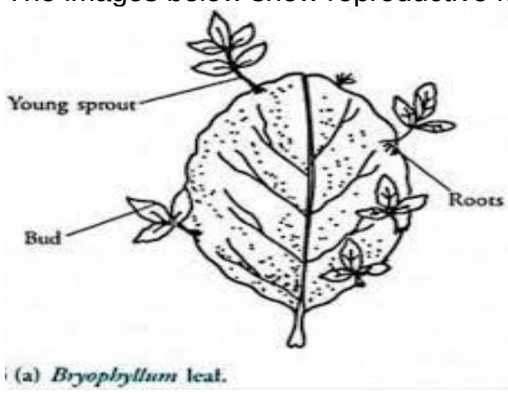
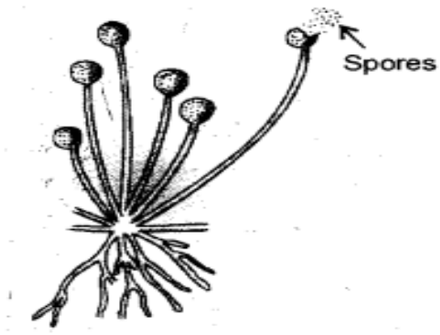
	What is the primary reason dry HCl gas does not change the colour of dry litmus paper? a) Dry HCl gas is a weak acid and cannot change litmus colour. b) HCl gas needs water to ionize and release H^+ ions. c) Litmus paper is only reactive with basic gases. d) HCl gas reacts with litmus paper only at high temperatures.	
Q4.	Rahul was performing an experiment to study the nature of different substances. He tested the pH of lemon juice, baking soda solution, and vinegar using a pH paper. The pH of lemon juice was found to be around 2, the pH of baking soda solution was 9, and vinegar had a pH of 3. Based on the pH values, which of the following is correct? a) Lemon juice is basic, and vinegar is acidic. b) Baking soda solution is acidic, and lemon juice is basic. c) Vinegar is acidic, and baking soda solution is basic. d) All the given substances are neutral.	1
Q5.	A shiny silver-colored metal 'X' reacts with dilute hydrochloric acid to produce a gas that burns with a 'pop' sound. What will happen if metal 'X' is dropped into a solution of copper sulphate ($CuSO_4$)? a) Copper will be displaced, and the solution will turn blue. b) Copper will be displaced, and the solution will turn colorless. c) No reaction will occur. d) The metal will dissolve, and the solution will remain blue.	1
Q6.	Why do ionic compounds have high melting points? a) They are composed of small molecules that are weakly held together. b) They have strong covalent bonds between the atoms. c) They consist of large, charged ions held together by strong electrostatic forces of attraction. d) They are made up of non-metallic elements that have low intermolecular forces.	1
Q7.	Which of the following combinations of reactants will result in a double displacement reaction? a) Zinc (Zn) and sulfuric acid (H_2SO_4) b) Iron (Fe) and copper sulfate ($CuSO_4$) c) Sodium chloride (NaCl) and silver nitrate ($AgNO_3$) d) Magnesium (Mg) and hydrochloric acid (HCl)	1
Q8.	During cellular respiration, glucose is broken down to release energy. What is the main difference between aerobic and anaerobic respiration? a) Aerobic respiration occurs in the absence of oxygen, while anaerobic respiration occurs in its presence. b) Aerobic respiration produces more energy than anaerobic respiration. c) Anaerobic respiration occurs in plants, while aerobic respiration occurs in animals. d) Anaerobic respiration requires glucose, while aerobic respiration does not.	1
Q9.	In the human circulatory system, oxygen-rich blood is transported from the lungs to the heart via: a) Pulmonary arteries b) Pulmonary veins c) Aorta d) Coronary arteries	1
10.	During the process of digestion, which enzyme is primarily responsible for breaking down proteins into amino acids? a) Amylase b) Lipase c) Pepsin d) Maltase	1
11.	If a person suffers damage to the medulla oblongata, which of the following would be most affected? a) Thought process and decision making b) Heart rate and breathing c) Balance and coordination d) Memory and learning	1
12.	A tall pea plant (TT) is crossed with a short pea plant (tt). If the F1 generation is allowed to self-pollinate, what fraction of the F2 generation will be homozygous tall? a) ½ b) ¼ c) ¾ d) 1/3	1

13.	An object is placed 10 cm in front of a concave mirror with a focal length of 20 cm. The image formed will be: a) Real, inverted, and magnified b) Virtual, erect, and diminished c) Real, inverted, and diminished d) Virtual, erect, and magnified	1
14.	Choose the correct option for the color of rays for A to B.  a) Blue, Indigo, Green, Yellow, Orange, Red b) Red, Orange, Yellow, Green, Blue, Indigo, Violet c) Violet, Indigo, Blue, Green, Yellow, Orange, Red d) Orange, Red, Yellow, Green, Blue, Violet, Indigo	1
15.	Which of the following statements best explains why energy flow in an ecosystem is unidirectional? a) Energy is continuously recycled by decomposers b) Energy is lost as heat at each trophic level and cannot be reused c) The energy used by plants is returned to the sun d) Organisms at higher trophic levels produce their own energy	1
16.	What would happen to an ecosystem if decomposers like bacteria and fungi were completely removed? a) The nutrient cycle would remain unaffected, as plants can still grow without decomposers b) Dead plants and animals would accumulate, leading to a disruption in the nutrient cycle c) Herbivores would adapt by consuming decomposing matter to gain nutrients d) Producers would increase rapidly, as no organisms would consume dead matter	1
	Question No. 17 to 20 consist of two statements – **Assertion** (A) and **Reason** (R). Answer these questions by 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, and 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):** Metal compound ‘A’ reacts with dilute hydrochloric acid to produce effervescence. The gas evolved extinguishes a burning candle. **Reason (R):** Metal carbonates and hydrogen carbonates react with acids to give a corresponding salt, carbon dioxide and water.	1
18.	**Assertion (A):** In humans, the sex of the offspring is determined by the father’s sperm. **Reason (R):** Males have two X chromosomes (XX), while females have one X and one Y chromosome (XY).	1
19.	**Assertion (A):** A concave mirror can form both real and virtual images depending on the position of the object. **Reason (R):** A concave mirror converges light rays coming from an object, and the nature of the image depends on the object’s distance from the mirror.	1
20.	**Assertion (A):** The food chain represents a linear flow of energy from one trophic level to another. **Reason (R):** Food webs, which consist of multiple interconnected food chains, provide a more realistic representation of ecosystem dynamics.	1

	SECTION – B Question No. 21 to 26 are very short answer questions	
21.	Magnesium ribbon burns with a dazzling white flame when heated in air. (i) What happens to magnesium when it burns? Name the product formed. (ii) Write the balanced chemical equation for the reaction.	2
22.	(a) How are alveoli designed to maximize the exchange of gases? (b) How does the nephron in the kidney contribute to excretion?	2
23.	*Attempt either option A or B.* A. what are the raw materials required for photosynthesis? How do plants obtain the raw materials required for photosynthesis? **OR** B. Explain the role of the following structures in the excretory system: (i) Kidneys (ii) Ureters (iii) Urinary bladder (iv) Urethra	2
24.	Referring to the diagram, the light ray undergoes two refractions—one at point **O** and the other at point **G**.  **(a)** What is the relation between the angle of incidence $\mathbf{i_1}$ and the angle of emergence **e($\mathbf{r_2}$)** for this light ray? **(b)** Why does the light ray bend towards the normal upon entering the glass slab?	2
25.	Attempt either option A or B. A. Use ohm's law to determine the potential difference across the 3 Ω resistor in the circuit shown in the following diagram when key is closed.  **OR** B. In the given circuit calculate the power consumed in watts in the resistor of 2 Ω  	2

26.	The diagram shows the increasing concentration of a chemical or pollutant as it moves through a food chain.  (a) What process is represented in the diagram? Explain its meaning briefly. (b) Why does the concentration of the chemical increase as it moves up the food chain, eventually affecting humans?	2
	SECTION – C Question No. 27 to 33 are short answer questions	
27.	(a) Rekha added a piece of zinc and a piece of copper to separate test tubes containing dilute hydrochloric acid (HCl). She observed bubbles forming in the zinc test tube but no reaction in the copper test tube. Explain why. (b) Shashank placed a piece of sodium in water and observed vigorous reactions. When he placed a piece of aluminum in water, he noticed no reaction at room temperature. Can you explain why there is a difference in the behavior of these metals with water?	3
28.	*Attempt either option A or B.* A. In the given series of reactions: $Ca(OH)_2 + CO_2 \longrightarrow X + H_2O$ $X \xrightarrow{heat} Y + CO_2$ (i) Identify the compounds X and Y. (ii) What type of reaction is involved in the conversion of X to Y? (iii) You are given three solutions D, E, and F with pH values of 3, 8, and 10, respectively. In which solution will the maximum concentration of hydronium ions be present? Arrange these solutions in increasing order of their hydroxide ion concentration. **OR** B. (i) The pH of a sample of tomato juice is 4.6. How is this juice likely to be in taste? Give a reason to justify your answer. (ii) How do we differentiate between a strong acid and a weak base in terms of ion formation in aqueous solutions? (iii) Acid rain can make the survival of aquatic animals difficult. How?	3
29.	Plants absorb nutrients from the soil along with water, which are required for their growth. Explain how these nutrients are transported to different parts of the plant. (i) Which tissue is responsible for the transport of water and nutrients? (ii) What is the role of transpiration in the movement of water and minerals?	3
30.	A. In fruit flies, red eyes (R) are dominant over white eyes (r). If a homozygous red-eyed male (RR) is crossed with a white-eyed female (rr), calculate the genotypic and phenotypic ratios of the F1 generation with suitable cross. B. If the F1 generation is crossed with a white-eyed fly, what would be the expected ratio of offspring phenotypes? Explain your reasoning.	3
31.	A person is unable to see distant objects clearly, but can see nearby objects without any difficulty. Identify the defect of vision and explain how it can be corrected using lenses. With the help of ray diagram show the (i) Image formation by the defective eye and (ii) Correction of defect by using appropriate lens.	3

32.	A. Derive the expression for the equivalent resistance R_{eq} when three resistors R_1, R_2, R_3 are connected in parallel. B. Calculate the equivalent resistance if three resistors of 6 Ω, 3Ω, 2Ω are connected in parallel. 	
33.	(a) (i) A straight cylindrical conductor is suspended with its axis perpendicular to the magnetic field of a horse-shoe magnet. The conductor gets displaced towards left when a current is passed through it. What will happen to the displacement of the conductor if the (1) current through it is increased? (2) horse-shoe magnet is replaced by another stronger horse-shoe magnet? (3) direction of current through it is reversed? 	3
	SECTION – D Question No. 34 to 36 are long answer questions.	
34.	*Attempt either option A or B.* A. (a) A saturated organic compound 'X' belongs to the homologous series of alcohols. On heating 'X' with concentrated sulfuric acid at 443 K, it forms an unsaturated compound 'Y' with a molecular mass of 28 u. The compound 'Y' on addition of one mole of hydrogen in the presence of nickel changes to a saturated hydrocarbon 'Z'. (i) Identify X, Y, and Z. (ii) Write the chemical equations showing the conversion of X into Y and Y into Z. (iii) What happens when compound Z undergoes combustion? (iv) State one industrial application of hydrogenation reaction. (v) Name the products formed when compound X reacts with sodium. **OR** B. (i) Explain the structure of a soap molecule with the help of a diagram. Discuss how its hydrophilic and hydrophobic parts help in cleaning. (ii) Two test tubes, P and Q, each contain 10 mL of hard water. • In test tube 'P', add a few drops of detergent solution. • In test tube 'Q', add a few drops of soap solution. After shaking both test tubes: 1. Which test tube will show better foam formation? Explain why. 2. What will be observed in test tube Q? Explain why soap solution reacts differently in hard water compared to detergent.	5

35.	Attempt either option A or B. A. (1). Identify the given diagram. Name the parts 1 to 5  (2). What is contraception? List three advantages of adopting contraceptive measures. **OR** B. The images below show reproductive methods. Answer the following questions  (a) *Bryophyllum* leaf.  (i) What are spores? On which structures are they formed? How do they overcome unfavourable conditions? Name the organism which multiplies with the help of these structures. (ii) Give two reasons why some plants are grown by the method of vegetative propagation. List two methods used to grow plants vegetatively.	5
36.	Attempt either option A or B. A). Although an electric heater and an electric iron were used simultaneously in the house, the two devices could work efficiently due to a 'fuse' used in the electric circuit. (i) What is a fuse? Write the material used in fuse wires. How is a fuse connected in an electric circuit? (ii) State the ratings of fuses used in electric circuits. (iii) What is the function of a fuse? How does it perform its function? (iv) A device uses 1.5 kW of electric power when operated at 220 V. Calculate the rating of the fuse to be used. **OR** B. (i) Draw a labelled circuit diagram of the circuit used to show the variation of potential difference across the ends of a resistor with current flowing through it. If you use this circuit, what relationship would you find between the voltmeter reading, V, and the ammeter reading, I? (ii) A wire of a given material has a length L and an area of cross-section A. It has a resistance of 5 Ω. Find the resistance of another wire of the same material having length L/3 and area of cross-section 3A.	5
	SECTION – E Question No. 37 to 39 are case-based/data -based questions.	
37.	A group of students conducted an experiment to investigate the properties of different substances. They were given the following materials: vinegar (acetic acid), baking soda (sodium bicarbonate), litmus paper (both blue and red), phenolphthalein, sodium hydroxide solution, and a dilute solution of hydrochloric acid. **Experiment Steps:** 1. First, they tested the vinegar with both blue and red litmus paper. The blue litmus paper turned red, but the red litmus paper did not change colour. 2. Next, they added a small amount of baking soda to the vinegar. A bubbling reaction occurred, and a gas was produced, which they passed through lime water. The lime water turned milky.	4

	3. The students then added phenolphthalein to a solution of sodium hydroxide, and the solution turned pink. 4. Finally, they added hydrochloric acid to the sodium hydroxide solution with phenolphthalein, and the pink colour gradually disappeared. *Answer the following questions (Attempt either subpart C or D)* A. What does the change of blue litmus to red indicate about the nature of vinegar? (1) B. Explain why lime water turns milky when the gas produced from the reaction between baking soda and vinegar is passed through it. C. What is the process of neutralization? Using the reaction between sodium hydroxide and hydrochloric acid, explain how neutralization takes place. Write the balanced chemical equation for the reaction. **OR** D. Discuss the importance of indicators in determining the nature of a solution (acidic or basic). Compare the action of three different indicators: litmus paper, phenolphthalein, and methyl orange, and describe their color changes in both acidic and basic media.	
38.	Rahul was playing in the park when he accidentally touched a hot iron rod. Immediately, he withdrew his hand and started feeling pain. Later, he noticed that whenever he saw something coming toward his eyes, he would automatically blink. The next day in class, his teacher explained how organisms respond to different stimuli, how the nervous system coordinates these responses, and how hormones help in internal coordination.  Based on the above case, answer the following questions: (Attempt either subpart C or D) A. What type of action is it when Rahul immediately withdrew his hand after touching the hot rod? B. Which part of the brain is responsible for maintaining posture and balance while Rahul was walking? C. Describe the pathway followed by a reflex action in Rahul's case of touching the hot object. Which parts of the nervous system are involved? **OR** D. Differentiate between voluntary and involuntary actions. Give an example of each from Rahul's situation and explain how the brain controls these actions.	4
39.	A student is performing an experiment using a concave mirror to focus light. He places an object at different distances from the mirror and observes the position and nature of the image formed. When the object is placed far from the mirror, he notices a smaller, inverted image close to the focus. However, as he brings the object closer to the mirror, the image becomes larger and eventually turns erect when the object is very close to the mirror. He also notices the importance of the mirror's focal length in determining the position of the image. Based on the above case, answer the following questions: (Attempt either subpart C or D) A. What type of mirror is the student using in the experiment? B. What is the nature of the image formed by this mirror when the object is placed beyond the center of curvature? C. A concave mirror has a focal length of 20 cm. An object is placed 40 cm from the mirror. Use the mirror formula to determine the position and nature of the image formed. **OR** D. Draw ray diagrams to show the nature of the image formed by a concave mirror when an object is placed (i) beyond the center of curvature, (ii) at twice the focal length	4