Delhi Public School R.K. Puram
Sample Paper III (Preboard), 2024-2025
Class- X
Subject - Science

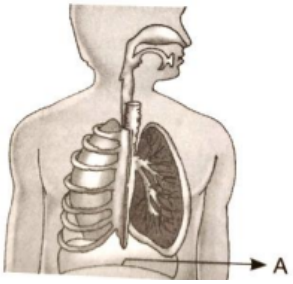
Time Duration: 3 hours **M.M. 80**

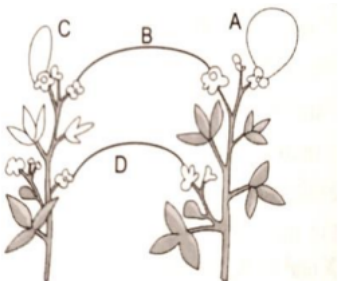
1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A would have 16 MCQs and 04 Assertion-Reasoning type questions carrying 1 mark each.
4. Section B would have 6 Very Short Answer type questions carrying 02 marks each.
5. Section C would have 7 Short Answer type questions carrying 03 marks each.
6. Section D would have 3 Long Answer type questions carrying 05 marks each.
7. 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.

Q.No.	Type of question	Marks per Q
	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	In the electrolysis of water, if the mass of the gas collected at the anode is m_a and the mass of the gas collected at the cathode is m_c, the value of (m_c/m_a) is: (a) 8 (b) 16 (c) 1/16 (d) ⅛	1
2	Which one of the following metals is malleable and a poor conductor of electricity? (a) Copper (b) Zinc (c) Lead (d) Silver	1
3	In an aqueous solution, hydronium ions conduct electricity. They will be formed by the reaction between : (a) Sodium hydroxide and water (b) Glucose and water	1

<table>
<tr><td></td><td>(c) Hydrogen chloride gas and water
(d) Ethanol and water</td><td></td></tr>
<tr><td>4</td><td>Observe the following table. Two salts A and B are dissolved in water separately. When phenolphthalein is added to these two solutions, solution A turns pink and solution B does not show any change in colour. Identify A and B from the table.
<table>
<tr><th>Options</th><th>A</th><th>B</th></tr>
<tr><td>a</td><td>K_2SO_4</td><td>KCl</td></tr>
<tr><td>b</td><td>NH_4Cl</td><td>Na_2SO_4</td></tr>
<tr><td>c</td><td>$(NH_4)_2SO_4$</td><td>$NaNO_3$</td></tr>
<tr><td>d</td><td>Na_2CO_3</td><td>NH_4Cl</td></tr>
</table></td><td>1</td></tr>
<tr><td>5</td><td>Study the following chemical reaction. The reducing agent in this reaction is:
$2\,Na\,(s) + 2\,H_2O\,(l) \longrightarrow 2\,NaOH\,(aq) + H_2\,(g) \uparrow$
(a) Na
(b) H_2O
(c) NaOH
(d) H_2</td><td>1</td></tr>
<tr><td>6</td><td>The number of electrons in the outermost shell of the atom of a metal can be:
(a) 1, 2 or 3
(b) 3, 4 or 5
(c) 5, 6 or 7
(d) 5, 6 or 8</td><td>1</td></tr>
<tr><td>7</td><td>A metal ribbon ‘X’ burns in oxygen with a dazzling white flame forming a white ash ‘Y’. The correct description of X, Y and the type of reaction is :
(a) X = Ca ; Y = CaO ; Type of reaction = Decomposition</td><td>1</td></tr>
</table>

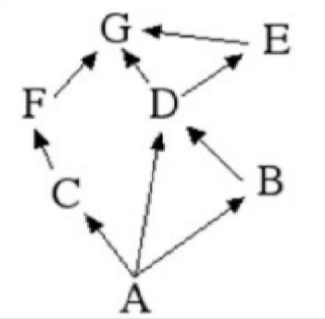
<table>
<tr><td></td><td>(b) X = Mg ; Y = MgO ; Type of reaction = Combination
(c) X = Al ; Y = Al2O3 ; Type of reaction = Thermal decomposition
(d) X = Zn ; Y = ZnO ; Type of reaction = Endothermic</td><td></td></tr>
<tr><td>8</td><td>During which of the following events of the circulation of blood in a normal human being, the oxygenated blood is pumped to all parts of the body?
a. contraction of the left atrium
b. contraction of left ventricle
c. relaxation of the right atrium
d. relaxation of the right ventricle</td><td>1</td></tr>
<tr><td>9</td><td>The blood leaving the tissues becomes richer in
a. Oxygen b. Hemoglobin c. Water d. Carbon dioxide</td><td>1</td></tr>
<tr><td>10</td><td>A student decides to study the impact of removing certain flower parts on fruit formation in plant species X. He chooses three separate plants that are growing in the same plot under uniform conditions. The data is given in the table below.
<table><tr><td>Plant</td><td>Part removed</td><td>Impact on formation</td></tr><tr><td>1</td><td>Anther</td><td>30% less fruit formed than average plan in the plot</td></tr><tr><td>2</td><td>Stigma</td><td>No fruit formed</td></tr><tr><td>3</td><td>Petal</td><td>No significant impact</td></tr></table>
Which of the following cannot be inferred from the above data?
a. Anthers and stigmas are crucial in sexual reproduction in species X.
b. Species X relies completely on cross pollination.
c. Species X is likely to be wind-pollinated.
d. Pollen grains are probably unable to germinate if they land on other parts of the carpel besides the stigma</td><td>1</td></tr>
<tr><td>11</td><td>Which of the two sets belong to the same trophic level a) Rabbit : Tiger b) Vulture: Rat
c) Grasshopper : Hawk d) Frog: Lizard</td><td>1</td></tr>
<tr><td>12</td><td>Which of the following statements are correct in reference to the role of A(shown in the given diagram)
during a breathing cycle in human beings ?</td><td>1</td></tr>
</table>

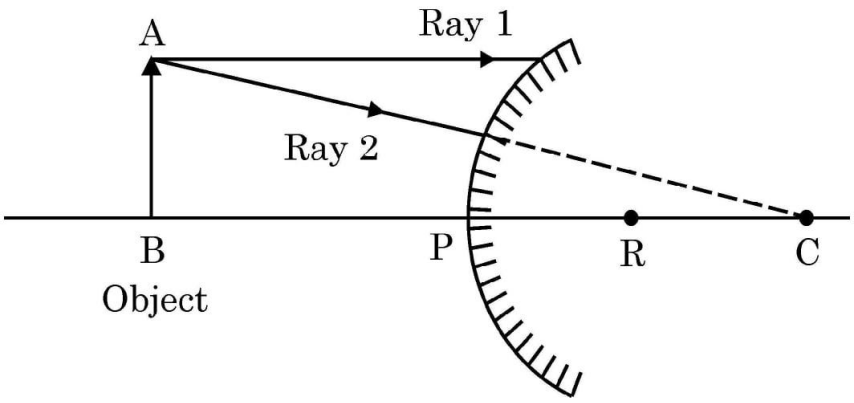
	 (i) It helps to decrease the residual volume of air in lungs. (ii) It flattens as we inhale. (iii) It gets raised as we inhale. (iv) It helps the chest cavity to become larger. (a) (ii) and (iv) (b) (iii) and (iv) (c) (i) and (ii) (d) (i) , (ii) and (iv)	
13	Consider the following statements in the context of human eye : (a) The diameter of the eyeball is about 2.3 cm. (b) Iris is a dark muscular diaphragm that controls the size of the pupil. (c) Most of the refraction for the light rays entering the eye occurs at the crystalline lens. (d) While focusing on the objects at different distances the distance between the crystalline lens and the retina is adjusted by ciliary muscles. The correct statements are - (A) (a) and (b) (B) (a), (b) and (c) (C)(b), (c) and (d) (D) (a), (c) and (d)	1
14	In case of four wires of same material, the resistance will be minimum if the diameter and length of the wire respectively are (A) D/2 and L/4 (B) D/4 and 4L (C) 2D and L (D) 4D and 2L	1
15	The diagram shown below depicts pollination . Choose the options that will show a maximum variation in the offspring .	1

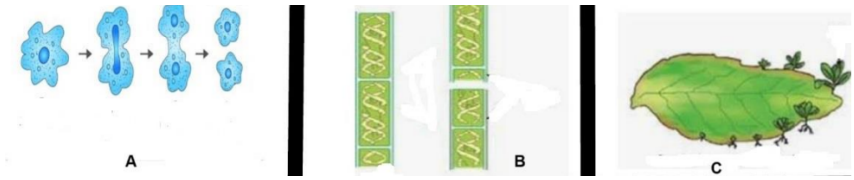
	 (a) A , B and C (b) B and D (c) B , C and D d) A and C	
16	In plants “auxin” is used for (a) closure of stomata (b) ripening of fruits (c) root growth inhibition (d) elongation and division of cell.	1
Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions 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) :** In the reaction between lead and copper chloride, lead chloride and copper are formed. **Reason (R) :** Lead is a less reactive element than copper.	1
18	**Assertion (A):** The concentration of harmful chemicals is least in human beings. **Reason (R):** Man is at the apex of the food chain	1
19	**Assertion(A) :** The strength of the magnetic field produced at the centre of a current carrying circular coil increases on increasing the number of turns of the circular coil. **Reason (R) :** Magnetic field strength is directly proportional to the number of turns of the circular coil.	1
20	**Assertion (A):** A geneticist crossed a pea plant having violet flowers	1

	with a pea plant with white flowers, he got all violet flowers in first generation. **Reason (R):** White colour gene is not passed on to next generation	
SECTION B **Question No. 21 to 26 are very short answer questions**		
21	Name the type of the following reaction. Give reasons for your answer: $MnO_2 + 4HCl \rightarrow MnCl_2 + 2H_2O + Cl_2$	2
22	A pea plant is heterozygous for both seed shape and seed color. a) Represent the types of gametes formed in such an individual? b) Which Mendelian law is applicable in formation of different types of gametes in such a pea plant? c) Mention the phenotypic ratio of the progeny obtained from self - fertilization of such a plant.	2
23	***Attempt either option A or B*** **A.** How is ozone formed in the upper atmosphere? Why is the damage of the ozone layer a cause of concern to us? State a cause of this damage. **OR** **B.**If all the waste we generate is biodegradable, will this have no impact on the environment?	2
24	Two lamps, one rated 100W at 220V , and the other 60 W at 220V , are connected in parallel to the electric mains supply. What current is drawn from the line if the supply voltage is 220V.	2
25	***Attempt either option A or B*** **A.** As shown in the diagram an aluminium rod 'AB' is suspended horizontally between the two poles of a strong horseshoe magnet in such a way that the axis of rod is horizontal and the direction of the magnetic field is vertically upward. The rod is connected in series with a battery and a key. State giving reason:	2

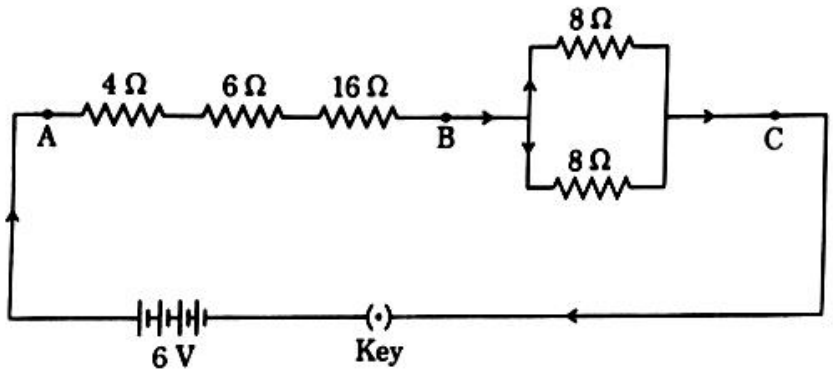
	(a) What is observed when a current is passed through the aluminium rod from end B to end A? (b) What change is observed in a situation in which the axis of the rod 'AB' is moved and aligned parallel to the magnetic field and current is passed in the rod in the same direction? **OR** **B.** "Magnetic field is a physical quantity that has both direction and magnitude." How can this statement be proved with the help of magnetic field lines of a bar magnet?	
26	Draw neat and well labelled diagram of human excretory system.	2
SECTION C **Question No. 27 to 33 are short answer questions**		
27	A metal 'M', on reacting with dilute acid liberates a gas 'G'. The same metal also liberates gas 'G' when it reacts with a base. i) Write the name of the gas G. ii) How will you test the presence of this gas? iii) Write the chemical equations for the reactions of the metal with: a) An acid b) A base	3
28	***Attempt either option A or B*** **A.** i. Sometimes the pH of our mouth gets lower than 5.5. Why? ii. A basic salt 'X' is obtained by heating baking soda followed by crystallisation. Identify 'X' and state its two industrial uses. iii. Why do copper sulphate crystals turn white on heating? **OR** **B.** i) The pH of a sample of tomato juice is 4.6. How is this juice likely to be in taste? Give reason to justify your answer.	3

	ii) How do we differentiate between a strong acid and a weak base in terms of ion formation in aqueous solutions? iii) The acid rain can make the survival of aquatic animals difficult. How?	
29	The genotype of green stemmed tomato plant is denoted as GG and that of purple stemmed tomato plant is gg. When these two are crossed: (a) What colour of stem would you expect in their F1 progeny? (b) Give the percentage of purple stemmed plants in F1 plants are self pollinated. (c)In what ratio would you finish the genotypes GG and Gg in F2. Support your answer with the help of genetic cross.	3
30	Answer the questions based on the figure given below .  a) Which of the following organisms is an omnivore?Specify the two trophic levels it attains in this food web . b) Which organism's energy will be the least?Why ? c)Explain removal of which organism will cause the most ecological imbalance	3

31	a) Complete the following ray diagram to show the formation of image :  (b) Mention the nature, position and size of the image formed in this case. (c) State the sign of the image distance in this case using the Cartesian sign convention.	3
32	Draw the pattern of the magnetic field produced around a vertical current carrying straight conductor passing through a horizontal cardboard. Mark the direction of current and the magnetic field lines. Name and state the rule which is used to determine the direction of magnetic field associated with a current carrying conductor.	3
33	Draw a ray diagram to show the formation of a rainbow in the sky. On this diagram mark A - where dispersion of light occurs, B where internal reflection of light occurs and C - where refraction of light occurs. List two necessary conditions to observe a rainbow.	3
SECTION D **Question No. 34 to 36 are long answer questions.**		
34	***Attempt either option A or B*** **A.** i. Draw the structures of : a. Ethanoic acid	5

	b. Hexanal ii. A detergent cannot be used to check if water is hard. Justify this statement. iii. Give the number of covalent compounds present in ethane. iv. Draw the electron dot structure for H_2S. **OR** **B.** Carry out the following conversions, stating the condition(s) for each: i. Ethanol —–> Ethene ii. Ethene —–> Ethane iii. Methane —–> Chloromethane iv. Ethanol —–> Ethanoic acid v. Ethanol —–> Sodium ethoxide	
35	***Attempt either option A or B*** **A.** (i)Draw a neat diagram of germinating seed of bean seed and label the part which- (a) forms shoot (b) forms root (c) stores food. Identify the organism and the mode of reproduction shown in figures A,B,C  **OR** **B.** (i) "The chromosomal number of the sexually producing parents and their offspring is the same". Justify how is it possible? (ii) List two preparations shown every month by the uterus in anticipation of pregnancy in humans (iii) State the role of fallopian tubes in the female reproductive system.	5
36	***Attempt either option A or B*** **A.** (a) Upper half of a convex lens is covered with a black paper. Draw a ray diagram to show the formation of an image of an object placed at a distance of 2 F from such a lens. Mention the position and nature	5

	of the image formed. State the observable difference in the image obtained if the lens is uncovered. Give reason to justify your answer. (b) An object is placed 30 cm from the optical centre of a concave lens of focal length 15cm. Use the lens formula to determine the distance of image from the optical centre of the lens. **OR** **B.** (a)Draw a ray diagram for showing the convergence of a parallel beam of light by a concave mirror and mark the positions of the pole and the centre of curvature in it. (b) An object 4 cm in size is placed at 25 cm in front of a concave mirror of focal length 15 cm. At what distance from the mirror should a screen be placed in order to obtain a sharp image ? Find the nature and size of the image. (c) List any two uses of a concave mirror.	
SECTION E **Question No. 37 to 39 are case-based/data -based questions.**		
37	***Attempt either subpart D or E.*** An acid 'X' and an alcohol 'Y' react with each other in the presence of conc. H_2SO_4 to form a sweet smelling substance 'Z'. The substance 'Z' on treatment with sodium hydroxide produces back the alcohol 'Y' and sodium ethanoate. A. Identify X, Y, Z. B. Name the reaction. C. Write the chemical equation for the reaction involved in the formation of Z. D. State the role of conc. H_2SO_4 in this reaction. **OR** E. Write the chemical equation for the reaction involved in the conversion of Z to Y..	4
38	In animals the control and coordination is provided by nervous and muscular tissues. Nervous tissue is made of an organized network of nerve cells or neurons. In human beings, thinking is a complex activity which involves more complex mechanisms and neural connections. These are concentrated in the brain which is the main	4

	coordinating centre of the human body. The brain and spinal cord constitute the central nervous system which receives information from all parts of the body and integrates it. a) How is the brain protected from shocks and injuries? b) Write the main functions of (i) sensory neuron and (ii) motor neuron in a reflex arc. c) Which part of the brain is involved in activities like (i) picking a pencil and (ii) vomiting ? ***Attempt either subpart A or B.*** A.a) How is the central nervous system protected from shocks and injuries? OR B. Write the main functions of (i) sensory neuron and (ii) motor neuron in a reflex arc C. Which part of the brain is involved in activities like (i) picking a pencil and (ii) vomiting ? D. Identify the master endocrine gland present in the brain	
39	***Attempt either subpart B or C.*** On the basis of this circuit, answer the following questions :  (a) Find the value of total resistance between the points A and B. (b) Find the resistance between the points B and C (c)Calculate the current drawn from the battery, when the key is closed. **OR** (c) In the above circuit, the 16Ω combination of two resistors of 8Ω have more potential difference across its two ends ? Justify your answer.	4