



# COMMON PRE-BOARD EXAMINATION

## SCIENCE –Code No. 086

### MARKING SCHEME

### CLASS-X-(2025-26)

**SET: 3**



Q. No.	SECTION A	Marks
1	C. (iii), (iv), (v)	1
2	C. Respiration	1
3	B. Conditioned reflex	1
4	A. Adrenaline	1
5	B. Both parents carry recessive 'i' allele	1
6	B. Decrease in oxygen level	1
7	A. Amoeba	1
8	A. Both A and R are correct, and R is the correct explanation of A.	1
9	C. A is true but R is false	1
10	Algae → Producer / 1st trophic level Small fish → Primary consumer / 2nd level Big fish → Secondary consumer / 3rd level Kingfisher → Tertiary consumer / 4th level	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$
11	<u>Students to attempt either option A or B.</u> A. Heart valves prevent backflow of blood by acting as one-way gates. They open to let blood flow forward and close to stop it from flowing backward. <b>OR</b> B. The septum is the muscular wall that divides the heart into left and right sides, preventing the mixing of oxygen-rich and oxygen-poor blood.	1 1
12	Useful substances are reabsorbed from the filtrate back into the blood through selective reabsorption in the tubules.	2
13	(a) This is a reflex action. (b) Reflex Arc Pathway: Stimulus → Receptor → Sensory Neuron → Spinal Cord → Motor Neuron → Effector → Response	1 1

	(c) The brain doesn't get involved immediately because reflex actions are automatic and rapid, allowing the body to respond quickly to danger before conscious thought occurs. 1	
14	Gametes = RY, Ry, rY, ry (ii) Phenotypic ratio = <b>9 : 3 : 3 : 1</b> 2 → 9 round yellow, 3 round green, 3 wrinkled yellow, 1 wrinkled green (iii) Law of Independent Assortment.	3
15	<u>Attempt either subpart A or B.</u> A. During running, Rahul's muscles need more oxygen. The respiratory system brings in more oxygen and removes carbon dioxide. The circulatory system carries oxygen and glucose to the muscles and takes carbon dioxide back to the lungs. Both systems work together to supply energy to the muscles. 2 <b>OR</b> B. When Rahul's muscles did not get enough oxygen during running, anaerobic respiration occurred in his muscle cells. In this process, glucose is partially broken down to form lactic acid <b>and</b> energy. Chemical equation: <b>Glucose (<math>C_6H_{12}O_6</math>) → Lactic acid (<math>2C_3H_6O_3</math>) + Energy</b> C. Glucose ( $C_6H_{12}O_6$ ) is broken down 1 D. Aerobic respiration produces more ATP because glucose is completely broken down in the presence of oxygen into carbon dioxide and water, releasing much more energy. Anaerobic respiration only partially breaks down glucose, so it releases much less ATP. 1 <u>For visually impaired students</u> D. Rahul's muscles needed more oxygen to produce extra energy, so breathing rate increased to supply more oxygen to body cells.	4
16	<u>Attempt either option A or B.</u> A. (i) Suitable Method: • Potato plants are best grown by vegetative propagation using tubers. 1 • This method is preferred because it is faster, the new plants grow true to the parent, and potatoes usually do not produce seeds or the seeds may not give desirable plants. 1 ½ (ii) Small differences arise due to mutations during DNA replication or environmental factors. 1	5

	<p>These variations can be beneficial, harmful, or neutral, depending on whether they improve survival, affect growth negatively, or have no effect. <span style="float: right;">1 ½</span></p> <p style="text-align: center;"><b>OR</b></p> <p>B. (a) Type of reproduction: Sexual reproduction in flowering plants. <span style="float: right;">½</span></p> <p>Steps:</p> <ol style="list-style-type: none"> <li>1. <b>Pollination:</b> Pollen from the anther is transferred to the stigma by insects.</li> <li>2. <b>Fertilization:</b> Male gamete from pollen fuses with the female gamete in the ovule to form a zygote.</li> <li>3. <b>Seed Formation:</b> Zygote develops into an embryo, and ovary develops into fruit containing seeds. <span style="float: right;">1½</span></li> </ol> <p>(b) Diagram of a Flower: <i>(Draw and label)</i> <span style="float: right;">1</span></p> <p><b>Stamens:</b> Anther + Filament (male part)</p> <p><b>Carpel / Pistil:</b> Stigma, Style, Ovary (female part) <span style="float: right;">2</span></p>	
	<b>SECTION B</b>	
17	B. (i) and (ii)	1
18	B. $2\text{NaOH} + \text{Zn} \longrightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$	1
19	D. $p = 2, q = 2$	1
20	C. The pH will increase.	1
21	A.No change      Turns blue	1
22	B. The pH will increase.	1
23	A. The green solution in the first test tube turns colourless, and the second test tube remains colourless with no change.	1
24	D. A is false but R is true.	1
25	<p>(a) Calcium reacts with water to produce hydrogen gas and calcium hydroxide. The bubbles of the hydrogen gas produced stick to the surface of the calcium metal. This makes the metal less dense than water, causing it to float.</p> <p>(b) The observation that these metals do not react even with steam indicates that they are very unreactive. This places them at the bottom of the reactivity series, well below hydrogen. <span style="float: right;">1 + 1</span></p>	2
26	<p>(a) A yellow precipitate forms <span style="float: right;">½</span></p> <p>(b) Lead iodide – <math>\text{PbI}_2</math> <span style="float: right;">½ + ½</span></p> <p>(c) <math>\text{Pb}(\text{NO}_3)_2 (\text{aq}) + 2\text{KI}(\text{aq}) \longrightarrow \text{PbI}_2 (\text{s}) + 2\text{KNO}_3(\text{aq})</math></p> <p style="text-align: center;">The type of reaction is double displacement and precipitation reaction <span style="float: right;">1 + ½</span></p>	3

27	<p>A.</p> <p>(i) An example of a basic metal oxide is Sodium oxide (<math>\text{Na}_2\text{O}</math>) or Magnesium oxide (<math>\text{MgO}</math>).</p> <p>(ii) An example of an amphoteric oxide is Aluminium oxide (<math>\text{Al}_2\text{O}_3</math>) or Zinc oxide (<math>\text{ZnO}</math>).</p> <p>(iii) Equation: <math>\text{ZnO (s)} + 2\text{HCl(aq)} \rightarrow \text{ZnCl}_2\text{(aq)} + \text{H}_2\text{O (l)}</math> <span style="float: right;">1+1+1</span></p> <p style="text-align: center;">OR</p> <p>B. (i) Sodium (Na) or Potassium (K) reacts violently with cold water. The hydrogen gas evolved immediately catches fire.</p> <p>(ii) A metal that reacts only with steam is Iron (Fe) or Aluminium (Al).</p> <p>(iii) Equation: <math>3\text{Fe(s)} + 4\text{H}_2\text{O(g)} \rightarrow \text{Fe}_3\text{O}_4\text{(s)} + 4\text{H}_2\text{(g)}</math> <span style="float: right;">1+1+1</span></p>	3
28	<p>(a) The substance responsible for tooth decay is acid. <span style="float: right;">1</span></p> <p>(b) Tooth enamel (calcium phosphate) is basic in nature. When the pH in the mouth drops below 5.5 (becomes acidic), the enamel reacts with the acid and gets neutralized. This process of reaction and dissolution is known as corrosion or decay. <span style="float: right;">1</span></p> <p style="text-align: center;">OR</p> <p>Toothpastes are generally basic (alkaline) in nature. When used for brushing, the toothpaste neutralizes the excess acid produced by bacteria in the mouth. This prevents the pH from falling below the critical value of 5.5 and thereby prevents tooth decay</p> <p>(c) A neutralization reaction is a reaction between acid and base to form salt and water Example: Using antacid tablets which contains a base to relieve acidity or indigestion caused by excess acid in the stomach <span style="float: right;">2</span></p>	4
29	<p>A.</p> <p>(a) Name: Butane <span style="float: right;"><math>\frac{1}{2} + \frac{1}{2}</math></span></p> <p>Structure:</p> $\begin{array}{cccc} & \text{H} & \text{H} & \text{H} & \text{H} \\ &   &   &   &   \\ \text{H} & - \text{C} & - \text{C} & - \text{C} & - \text{C} - \text{H} \\ &   &   &   &   \\ & \text{H} & \text{H} & \text{H} & \text{H} \end{array}$ <p>(b) Name: 2-methylpropane (or isobutane) <span style="float: right;"><math>\frac{1}{2} + \frac{1}{2}</math></span></p> $\begin{array}{ccccc} & \text{H} & & \text{H} & \\ &   & &   & \\ \text{H} & - \text{C} & - & \text{C} & - \text{C} - \text{H} \\ &   & &   &   \\ & \text{H} & & \text{H} & \text{H} \\ & & &   & \\ & & & \text{H} & \\ & & & \text{2-methylpropane} & \end{array}$ <p>c) The relationship is called Isomerism.</p>	5

Definition: Isomerism is the phenomenon wherein two or more compounds have the same molecular formula but different structural arrangements of atoms, leading to different physical and chemical properties. ½ + ½

(d) The straight-chain isomer (butane) has a larger surface area than the branched-chain isomer (2-methylpropane). This leads to stronger intermolecular van der Waals forces of attraction between butane molecules, which require more energy (a higher temperature) to overcome. Thus, butane has a higher boiling point. 1

(e) Balanced equation:  $2C_4H_{10}(g) + 13O_2(g) \rightarrow 8CO_2(g) + 10H_2O(l) + \text{Heat}$  1

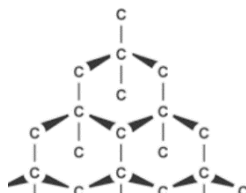
OR

B.

(a) The valency of carbon is 4. The property that allows carbon to form long chains with itself is called catenation. ½ + ½

(b) The different forms of carbon with different physical properties but identical chemical properties are called allotropes. A hard crystalline form is diamond, and a soft crystalline form is graphite. ½ + 1/2

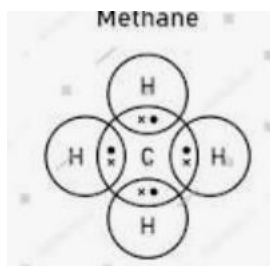
(c) The hard crystalline form is diamond. 1



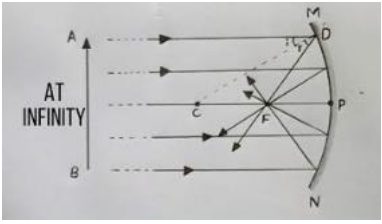
(d) The type of bonds present in compounds of carbon are covalent bonds. These compounds are generally poor conductors of electricity because they do not have free electrons or mobile ions to carry an electric current. ½ + ½

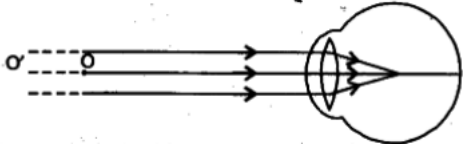
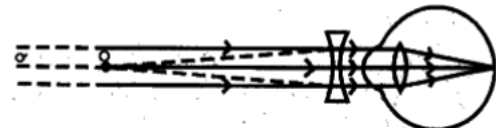
(e) The simplest compound formed between methane. 1

Electron dot structure of methane

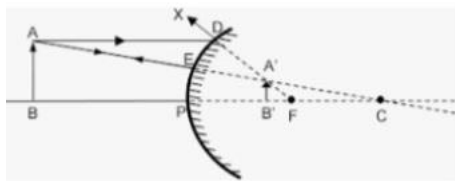


Q. No.	SECTION C	Marks
30	C. I, II and III.	1
31	B. Violet light has a shorter wavelength and is refracted more strongly than red light.	1
32	A. Both A and R are true, and R is the correct explanation of A.	1

33	<p>(a) The principal focus (F) of a concave mirror is the point on the principal axis where rays of light parallel to the principal axis converge after reflecting from the mirror. <math>\frac{1}{2}</math></p> <p>(b) <math>f = \frac{R}{2}</math> <math>\frac{1}{2}</math></p> <p>(c)  <math>1</math></p>	2
34	<p>Top branch – Resistance is connected in series <math>R = 4\Omega + 2\Omega = 6\Omega</math> <math>\frac{1}{2}</math></p> <p>Bottom branch – Resistance is connected in parallel <math>R = 3\Omega + 3\Omega = 6\Omega</math> <math>\frac{1}{2}</math></p> <p>Those <math>6\Omega</math> branches are in parallel</p> $\frac{1}{R_{eq}} = \frac{1}{6} + \frac{1}{6} = \frac{2}{6} = \frac{1}{3} \Rightarrow R_{eq} = 3\Omega$ $\frac{1}{2}$ <p>Total current (ammeter reading), <math>I = \frac{V}{R_{eq}} = \frac{6}{3} = 2\text{ A}</math>. <math>\frac{1}{2}</math></p> <p>(Each branch carries <math>I_{branch} = \frac{6}{6} = 1\text{ A}</math>, so currents split equally.)</p> <p style="text-align: center;">OR</p> <p>Equivalent resistance of the two <math>8\Omega</math> resistors (parallel)</p> $\frac{1}{R_p} = \frac{1}{8} + \frac{1}{8} = \frac{2}{8} = \frac{1}{4}$ $R_p = 4\Omega$ <p>The <math>4\Omega</math> resistor (series) and the <math>4\Omega</math> parallel combination add: <math>1</math></p> $R_{total} = 4 + 4 = 8\Omega$ <p>Total current from the battery (and through the <math>4\Omega</math> resistor)</p> $I = \frac{V}{R_{total}} = \frac{2}{8} = 0.25\text{ A}$ <p>Potential difference across the <math>8\Omega</math>–<math>8\Omega</math> combination</p> <p>That parallel pair together has <math>R_p = 4\Omega</math>.</p> <p>Hence voltage across it: <math>1</math></p> $V_p = I \times R_p = 0.25 \times 4 = 1\text{ V}$	2
35	(i) Myopia or shortsightedness. $1$	3

	<p>(ii) </p> <p>(iii) </p>	1+1
36	<p>(i) To obtain maximum resistance, connect the resistors in series and to obtain maximum current, connect the resistors in parallel. 1</p> <p>(ii) Series Connection (Maximum Resistance):</p> $R_s = R_1 + R_2 = 3 + 6 = 9 \Omega$ <p>Current,</p> $I_s = \frac{V}{R_s} = \frac{6}{9} = 0.67 \text{ A}$ <p>1</p> <p>Parallel Connection (Maximum Current):</p> $\frac{1}{R_p} = \frac{1}{3} + \frac{1}{6} = \frac{2 + 1}{6} = \frac{1}{2}$ $R_p = 2 \Omega$ <p>Current,</p> $I_p = \frac{V}{R_p} = \frac{6}{2} = 3 \text{ A}$ <p>1</p>	3
37	<p>(i) The magnetic field strength at the center of the coil also doubles, because the magnetic field is directly proportional to the current. 1</p> <p>(ii) Place a magnetic compass near the conductor. The deflection of the needle shows the direction of the magnetic field, and using the Right-Hand Thumb Rule, the direction of current can be determined. 1</p> <p>(iii) The strength of an electromagnet can be controlled by changing the amount of current, whereas the strength of a permanent magnet is fixed. 1</p>	3
38	<p>A. Virtual, erect and diminished image. 1</p> <p>B. A convex mirror gives a wider field of view than a plane or concave mirror. That is why it is used as a rear-view mirror. 1</p>	4

C.



OR

D.  $u = -15$ ,  $f = 10\text{cm}$

$$\frac{1}{u} + \frac{1}{v} = \frac{1}{f}$$

$$v = \frac{-15 \times (10)}{-15 - (10)} = \frac{-150}{-25} = 6\text{ cm}$$

2

2

39

A.

(i) When an electric current passes through a conductor, the heat produced (H) is directly proportional to  $H \propto I^2 R t$

or  $H = I^2 R t$  1

It should have high resistivity (to produce more heat). It should have a high melting point and not oxidize easily at high temperatures. 1

Case 1 – Maximum heating (Power = 880 W): 1 ½

$$P = VI \Rightarrow I = \frac{P}{V} = \frac{880}{220} = 4\text{ A}$$

$$R = \frac{V}{I} = \frac{220}{4} = 55\ \Omega$$

Case 2 – Minimum heating (Power = 440 W): 1 ½

$$I = \frac{P}{V} = \frac{440}{220} = 2\text{ A}$$

$$R = \frac{V}{I} = \frac{220}{2} = 110\ \Omega$$

OR

B.

(i) Electric power is the rate at which electrical energy is consumed or converted into other forms of energy in an electric circuit. S.I. unit is watt

$$P = \frac{W}{t}$$

5

	From Ohm's law, $V = IR$	$P = VI$	
	Substituting $I = \frac{V}{R}$ ,	$P = V \times \frac{V}{R} = \frac{V^2}{R}$	2
	(ii) Given: $V = 220 \text{ V}, P = 100 \text{ W}$		
	$I = \frac{P}{V} = \frac{100}{220} = 0.4545 \text{ A}$		1
	(iii) $R = \frac{V}{I} = \frac{220}{0.4545} \approx 484 \Omega$	1	
	(iv) Energy consumed in 5 hours: $E = P \times t = 100 \times 5 = 500 \text{ Wh} = 0.5 \text{ kWh}$		1