COMMON PRE-BOARD EXAMINATION 2024-25

Subject: SCIENCE -086

MARKING SCHEME

Date: 12/12/2024

Max. Marks: 80 Time Allowed: 3 hours

General Instructions:

Read the following instructions very carefully and strictly follow them:

1. This question paper comprises 39 questions. All questions are compulsory.

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.

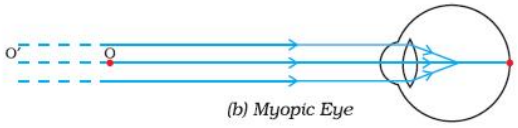
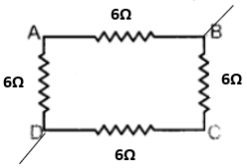
4. Section C would have 7 Short Answer (SA) type questions carrying 03 marks each.

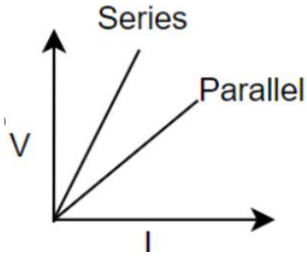
5. Section D would have 3 Long Answer (LA) type questions carrying 05 marks each.

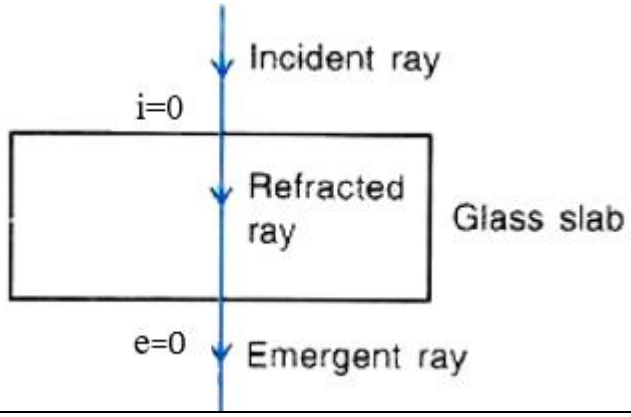
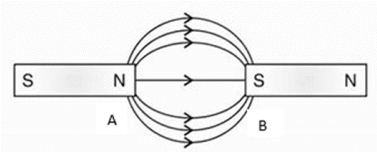
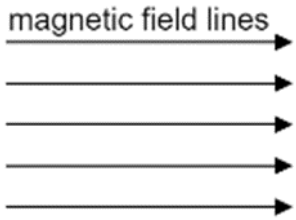
6. Section E would have 3 source based/case based/passage based/integrated units of assessment (04 marks each) with sub-parts of the values of 1 & 2 marks.

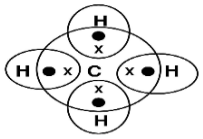
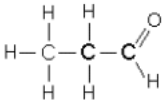
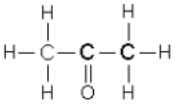
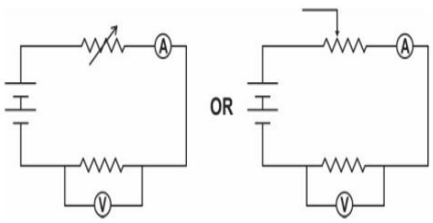
7. Draw neat figures wherever required.

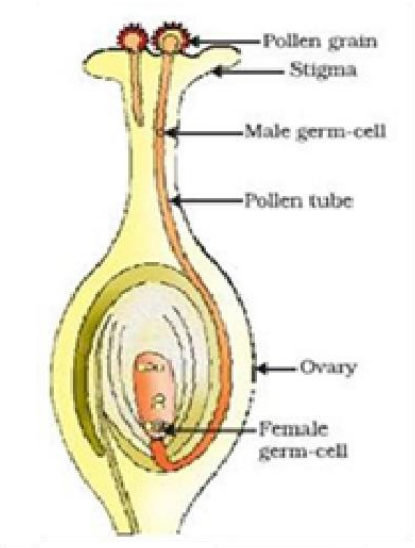
Section-A		
1	C. the reaction of a metal with an acid	1
2	A.X-Calcium, Y-copper, Z-potassium	1
3	C. X-non-metal, Y-metal	1
4	B. (ii) only	1
5	D. (i) and (iv)	1
6	D. Q and S	1
7	C. Student-3	1
8	B. 1:1	**1**
9	B. i, iii, iv	**1**
10	C. Major amount of carbon dioxide produced is used up for photosynthesis during daytime.	1
11	B. The distance for oxygen to diffuse increases with body size, leading to insufficient oxygen levels in deeper tissues.	1
12	B. It helps the plant to maintain temperature on hot sunny days.	1
13	A. Reflex arcs allow immediate response to stimuli without involving the brain, preventing injury.	1
14	B. The altered gene reduces the enzyme's efficiency, resulting in less hormone production and a shorter plant.	1
15	C. Energy flows in one direction from producers to consumers, with some energy lost as heat at each trophic level.	1
16	C. E/1000	1
17	D. A is false and R is true	1
18	A. Both A and R are true, and R is the correct explanation of A.	1
19	A. Both A and R are true and R is the correct explanation of A.	**1**

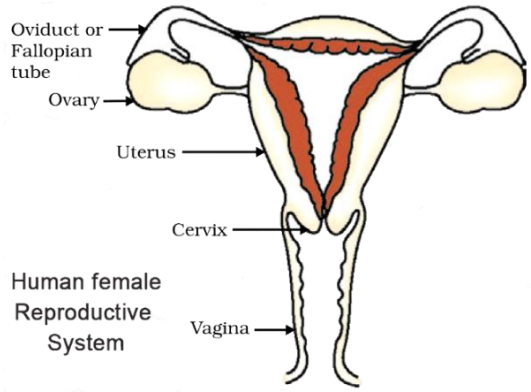
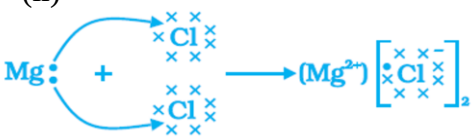
20	A. Both A and R are true, and R is the correct explanation of A.	1
	Section-B	
21	$CaCO_3+2HCl \rightarrow CaCl_2+H_2O+CO_2$. $Zn + 2HCl \rightarrow ZnCl_2 + H_2$	1 1
22	A. $f=\frac{1}{P} = \frac{1}{-2.5D}$ = -0.4m Nature of the lens- concave lens B.  (b) Myopic Eye	½ ½ **1**
23	*Students to attempt either option A or B* A. Sides of square are equal so each side will have same resistance of 6Ω.  Explanation or diagram (½ mark) So total resistance will be $\frac{1}{Req} = \frac{1}{12} + \frac{1}{12} = \frac{2}{12} = \frac{1}{6}$ R_{eq}=6Ω **OR** B. An 18 Ω resistor is cut into three equal parts, all the 3 parts would be of equal resistance that is 6Ω. These resistors are connected in parallel $\frac{1}{Req} = \frac{1}{R} + \frac{1}{R} + \frac{1}{R}$ $\frac{1}{Req} = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$ R_{eq}=2Ω	½ 1 ½ ½ 1 ½
24	A- Glomerulus- The process of filtration of blood from the glomerulus into the Bowman's capsule because of increased glomerular blood pressure is called as Ultrafiltration. C-Tubular part of nephron- Some substances in the initial filtrate, such as glucose, amino acids, salts and a major amount of water, are selectively re-absorbed as the urine flows along the tube.	2
25	*Students to attempt either option A or B* A. (i) Portion A will be green before experiment and blue black after experimenting. (ii) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$ (Glucose) **OR** B. (i) Q- Trachea, Rings of cartilage are present in the throat. These ensure that the air-passage does not collapse	1+1 1+1

	(ii) S- Diaphragm- Upon exhalation, the diaphragm relaxes and returns to its domelike shape, and air is forced out of the lungs.	
26	Any terrestrial food chains Biomagnification- definition	1 +1
	Section C	
27	A. The metal is Copper The ore is Cu_2S $2Cu_2S + 3O_2(g) \xrightarrow{Heat} 2Cu_2O(s) + 2SO_2(g)$ $2Cu_2O + Cu_2S \xrightarrow{Heat} 6Cu(s) + SO_2(g)$ B. (i) Sodium reacts with water to form sodium hydroxide and hydrogen gas. The reaction of sodium metal with water is highly exothermic and the heat released is sufficient for hydrogen gas to catch fire. (ii) Calcium reacts with water less violently to release hydrogen gas. These gas bubbles stick to the surface of calcium metal pieces	½ ½ ½ + ½ ½ ½
28	*Students to attempt either option A or B* A. (i)Calcium sulphate hemihydrate $CaSO_4.\frac{1}{2}H_2O + 1\frac{1}{2}H_2O \rightarrow CaSO_4.2H_2O$ (ii) Acidic- Ammonium chloride Basic- S**o**dium carbonate Neutral- Potassium sulphate OR B. (i) (a)Solution M Solution M is acidic in nature as it gives red colour with universal indicator. Acids contain more hydrogen ions. (b) The salt formed is neutral. Neutral substances give green colour with universal indicator. (ii) $3Fe(s) + 4H_2O(g) \rightarrow Fe_3O_4(s) + 4H_2(g)$	½ 1 ½ ½ ½ ½ + ½ ½ + ½ 1
29	A.  B. **Circuit II** has less resistance, hence more current will pass through it C. **Circuit I** D. More heat will be produced in R_1 **in Circuit II** as compared to other two resistors. Because in circuit I, less current will flow due to increase in resistance of the circuit and potential difference across each resistor will be less than applied potential. While in Circuit II, for the same potential, $I \alpha \frac{1}{R}$, so more current will flow through R_1. Hence from Joule's law of heating, $H=I^2Rt$, heat produced in R_1 in parallel combination will be ore compared to series.	½ ½ ½ ½+½

	E. **Voltmeter**	½
30	A. Given, f=-20cm m=2 $-\frac{v}{u}=2$ v=-2u $\frac{1}{f}=\frac{1}{v}+\frac{1}{u}$ $\frac{1}{-20}=\frac{1}{-2u}+\frac{1}{u}$ $\frac{1}{-20}=\frac{-1}{-2u}$ u=-10cm B.  	**1** **1** **1**
31	**A.**  **B.**  C. i. direction of current ii. direction of magnetic field	**1** **1** ½+½
32	A. Gastric glands present in the inner wall of stomach produces mucus which protects the inner lining of the stomach from the acidic effect of HCl. If mucus is not released, it will lead to erosion of the inner lining of the stomach leading to acidity and ulcers. B. Excess glucose is stored as glycogen.	1+1+1
33	A. Tall stem with white flowers and short stem with purple flowers. B. 150 plants, Law of independent assortment-when there are two pairs of characters, the distribution of the alleles of one character into the gametes is independent of the distribution of the alleles of the other character.	1+2 (show the working)

	Section-D	
34	*Student to attempt either option A or B* A. (i)  , Methane (ii) (a) x-2, y-4 (b) A- Ethyne, B- Propyne (iii)   Propanal Propanone **OR** **B.** (i) (a) Alcohol (-OH) (b) Carboxylic acid(-COOH) (ii) Name- Alkenes General formula- C_nH_{2n} (iii) X is ester (Ethyl ethanoate)  (Ethanoic acid) (Ethanol) (Ester)	½ + ½ ½ + ½ ½ + ½ ½ + ½ ½ + ½ 1+1 ½ + ½ 1 1
35	*Student to attempt either option A or B* A. (i) Meter 1 is showing voltmeter as they are connected in parallel across the conductor. (ii) Electric current flowing through a metallic conductor is directly proportional to the potential difference across the conductor provided the temperature should remain the same. (iii)  Correct connection for the cell, the unknown resistor and the rheostat in the diagram (½ marks) Correct connections of voltmeter and ammeter (½ marks) Use of correct symbols for all components (½ mark) (iv)Using Ohm's law, V=IR	½+½ **1** **1½**

	For constant potential difference IR= constant $I_1R_1 = I_2R_2$ $I_2/I_1 = R_1/R_2$ $=R/3R = 1/3$ $I_2 = \frac{1}{3} I_1$ So, current will reduce to 1/3rd of its initial value. **OR** **B.** (i) Silver is a better conductor of electric current. This is because silver has low electrical resistivity than tungsten and hence the good conductor of electricity. (ii) Resistivity is independent of the length of the wire, so it will be same. (iii)Nichrome is the material that can be used as heating element in electric heating device. Because resistivity of Nichrome is higher than that of its constituent metals and it does not get oxidized /burn easily at high temperature. (iv)Length becomes one-fourth of the original length and area of cross section becomes four times that of original. $l_2 = \frac{1}{4} l_1$ and $A_2 = 4 A_1$ $\frac{R2}{R1} = \frac{l2}{l1} \times \frac{A1}{A2} = \frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$ $R_2 = \frac{1}{16} R_1$	½ ½ ½ **1** **1** ½+½ **1** **1**
36	***Attempt either option A or B.*** **A.** (i) New Bryophyllum plants are produced by vegetative propagation which is an asexual method of reproduction. Only one parent is involved and there is no mixing of gametes. (ii)  *Germination of pollen on stigma* Humans reproduce through sexual reproduction involving two parents and the mixing of male and female gametes, which results in the offspring having the genes of both parents.	2 3 (Diagram-1½ M and 1½ M for 3 parts)

	OR **B.** (i) Sperms will have either 22 + X or 22+Y chromosomes whereas the female egg contains 22+ X chromosomes. (ii) a) Oviduct and b)- uterus  	2 3(Diagram- 1 M and 2 M for correct labelling)
	Section – E	
37	A. **At cathode** $Na^+ + e- \rightarrow Na$ **At anode** $2Cl^- \rightarrow Cl_2 + 2e-$ carbon cannot reduce the oxides of sodium because it has more affinity for oxygen than carbon *Student to attempt either B or C* B. Sodium ethoxide Ethanol is a covalent compound, while sodium chloride is an ionic compound. Covalent compounds have weaker intermolecular forces of attraction between molecules compared to ionic compounds. Therefore, ethanol has lower melting and boiling points compared to sodium chloride. **OR** C. (i)Ionic compounds are highly soluble in water but insoluble in oil, petrol and kerosene Ionic compounds are good conductors of electricity in the molten state and in the solution form. (ii)  	1+1 1+1 1 1
38	A. (i)Maximum- Water (1.33) (ii)Minimum- Sapphire (1.77) B. The ratio of speed of light in air to the speed of light in Ruby is 1.71. *Student to attempt either B or C* C. Refractive index $= \frac{Speed\ of\ light\ in\ air}{speed\ of\ light\ in\ medium}$ Speed of light in Sapphire$= \frac{Speed\ of\ light\ in\ air}{Refractive\ index\ of\ Sapphire}$	½+½ **1** **1** **1**

	$=\frac{3\times108}{1.77}$ = 1.69× 10^8 m/s **OR** D. Refractive index of water, n_w=1.33 Refractive index of crown glass, n_g=1.52 Refractive index of crown glass with respect to water= n_g/n_w $= \frac{1.52}{1.33} = 1.14$	**1** **1** **1**
39	<u>*Student to attempt either A or B*</u> A. -roots grows downwards- stimulus: gravity, phenomenon: positive geotropism -shoot grows upwards-stimulus: sunlight, phenomenon: positive phototropism. **OR** B. When the light comes from one side of the plant, then the plant hormone auxin gets diffused towards the side of the shoot that is away from sunlight. C. The light source should be at side X for the shoot tip to bend. D. Auxin in the plant promotes: -cell growth -cell elongation.	 1+1 2 1 1