MARKING SCHEME

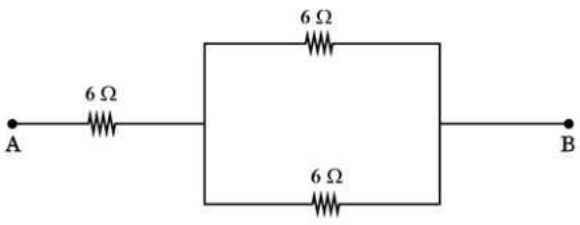
Secondary School Examination, 2024

SCIENCE (Subject Code–086)

[Paper Code: 31/1/1]

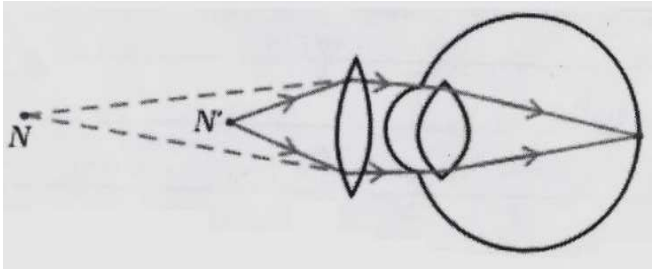
Maximum Marks: 80

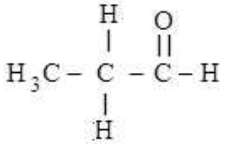
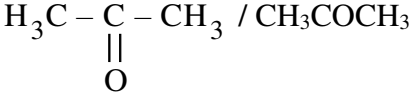
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(b) / $2\ NaOH + \ Zn \longrightarrow \ Na_2ZnO_2 \ + \ H_2$	1	1
2	(c) / $2\ AgBr \longrightarrow 2\ Ag + Br_2$	1	1
3	(c) /Mercury and Bromine	1	1
4	(c) / (ii) and (iv)	1	1
5	(d) / Na_2CO_3	1	1
6	(c) /amphoteric	1	1
7	(d) / MnO_2 is reduced and HCl is oxidised	1	1
8	(b) / (ii) and (iv)	1	1
9	(d) / (i) and (iv)	1	1
10	(c) /Neuromuscular junction	1	1
11	(c) / (ii) and (iii)	1	1
12	(c) /At twice the focal length of the lens	1	1
13	(d) /Retina	1	1
14	(a) / 	1	1
15	(c) /Tiger, grass, snake, frog	1	1
16	(d) / Plasmodium	1	1
17	(a) /Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
18	(b) / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
19	(c) /Assertion (A) is true, but Reason (R) is false.	1	1
20	(c) /Assertion (A) is true, but Reason (R) is false.	1	1
	SECTION B		
21	Combination reaction – Single product is formed (or any other) $CaO(s) + H_2O(l) \longrightarrow Ca(OH)_2(aq) + Heat$ Quick lime Slaked lime/Calcium hydroxide	½ +½ 1	2
22	Role of: (i) Hydrochloric acid: Creates an acidic medium for facilitating the action of enzyme / kills microorganisms. (ii) Villi: Increases the surface area for absorption of digested food. (iii) Anal Sphincter: Exit of waste material from anus is regulated.	½ ½ ½	

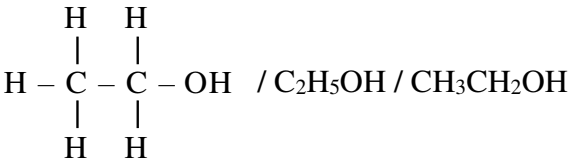
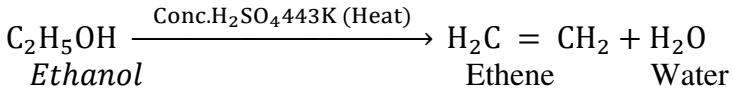
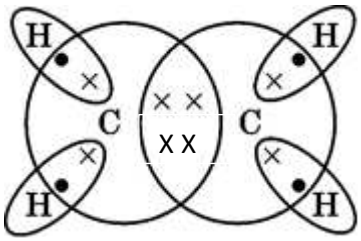
	(iv) Lipase: Breakdown / digestion of emulsified fats or lipids	½	2
23	(A) **Movement of leaves of sensitive plant** / **Downward movement of roots** (i) Stimulus is touch. / Stimulus is gravity. (ii) No growth is involved in the movement. / Growth is involved in the movement (iii) Non directional / Directional **(Any two)** **(Any other suitable difference)** **OR** (B) • Thyroxine • Thyroid gland • Iodine is necessary for thyroid gland to make thyroxine hormone. Deficiency of iodine in our diet causes goitre.	1+1 ½ ½ 1	2
24	u = - 10cm; f = +15 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{15} = \frac{1}{v} + \frac{1}{-10\ cm}$ $\frac{1}{v} = \frac{1}{15\ cm} + \frac{1}{10\ cm}$ $v = +6\ cm$ Image is formed behind the mirror.	½ ½ 1	2
25	(A) When two 6 Ω resistances are connected in parallel and the third resistance of 6Ω is connected in series combinations to this, then equivalent resistance will be 9 Ω /  	1	

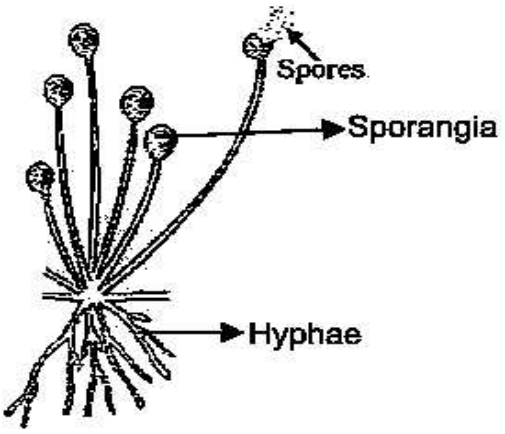
	[Award marks for writing the statement or drawing the diagram] $\frac{1}{R_P} = \frac{1}{6\,\Omega} + \frac{1}{6\,\Omega}$ $\therefore\ R_P = 3\,\Omega$ Rs = 6 + 3 = 9Ω **OR** (B) Equivalent resistance = $R_1 + R_2 = 1\,\Omega + 2\,\Omega = 3\,\Omega$ $I = \frac{V}{R}$ $= \frac{6\text{ V}}{1\,\Omega + 2\,\Omega} = \frac{6\text{ V}}{3\,\Omega} = 2\text{ A}$ Electric power, $P = I^2R$ $= (2A)^2 \times 2\,\Omega = 4 \times 2\text{ W} = 8\text{ W}$	1 ½ ½ ½ ½	2
26	(i) If they intersect then at the point of intersection, there would be two directions of magnetic field or compass needle would point towards two directions, which is not possible. (ii) Uniform magnetic field is represented by equidistant parallel straight lines → → → →	1 ½ ½	2
	SECTION C		
27	(i) Change in colour: The solution will become green in colour. $Fe(s) + CuSO_4(aq) \longrightarrow FeSO_4 + Cu(s)$ Blue Green (**or any other reaction** which shows change in colour) (ii) Change in temperature: The temperature will increase. $NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2O(l) + Heat$	½ ½ ½ ½	

	(**or any other reaction** which shows change in temperature) (iii) Formation of precipitate: Yellow precipitate of PbI_2 is formed. $Pb(NO_3)_2\ (aq) + 2\ KI(aq) \longrightarrow PbI_2(s) + 2\ KNO_3(aq)$ Yellow (**or any other reaction** which shows formation of precipitate)	½ ½	3
28	(i) The taste of tomato juice will be slightly **sour**; The pH 4.6 indicates that tomato juice is **an acid** and acids are sour in taste. (ii) Acids that give **more H^+ ions / H_3O^+** are Strong Acids Bases that give **less OH^- ions** are Weak Bases. (iii) Living animals can survive within a **pH range of 7·0 to 7·8**. So, if the pH of river water becomes low due to **acid rain (pH < 5·6)**, then survival of aquatic animals becomes difficult.	½ ½ ½ ½ 1	3
29	(i) **Diffusion /Diffusion pressure** alone **cannot take care of oxygen** delivery to all parts of the body. (ii) Reasons: (a) To ensure that the air-passage **does not collapse**. (b) There is **sufficient time for oxygen** to be **absorbed** and for the **carbon dioxide** to be **released**. (c) **Chest cavity** becomes **larger**. (d) Because **exchange of gases** takes place in the alveoli.	1 ½ ½ ½ ½	3
30	Reflex action is a **sudden/spontaneous/immediate** action **in response to** the **environment/stimulus** e.g. sneezing. Stimulus → Receptors (Nose) → Sensory neuron → Spinal cord → Motor neuron → Effector (Muscles) → Response (Relay neuron) **(any other example)**	1 2	3
31	(i) Hypermetropia or Far-sightedness. Reason – Image is formed behind the retina. / Near point for the person is farther away from the normal near point (25 cm)	½ ½	

	(ii) • Focal length of the eye lens is too long. • The eyeball has become too small. (iii)  N = Near point of a hypermetropic eye N'= Near point of a normal eye	½ ½ 1	3
32	(i) • Right - Hand Thumb Rule • If the wire carrying current is held in our **right hand** such that the **Thumb** points towards the **Direction of Current**, then the **fingers wrap around the conductor** in the **direction of field lines of the magnetic field.** (ii) • Fleming's Left - Hand Rule • Stretch the thumb, forefinger and middle finger of **left hand mutually perpendicular** to each other, such that **first finger** points in the direction of **Magnetic Field**, **second finger** in the direction of **Current,** then **thumb** in the **direction of motion or force** acting on the conductor.	½ 1 ½ 1	3

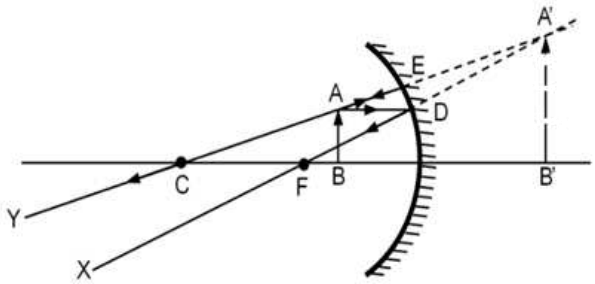
33	(A) • Number of **plants/organisms** of **first trophic level** will **increase.** • Number of **lions/ organisms** of **third trophic level** will **decrease**. • No • As the organisms of that level will **find alternative foods** and will **not starve** to death / food web is more stable where other animals as prey may be available. **OR** (B) • Gas 'X' is **Ozone** • Ozone **shields** the surface of the earth from **ultra-violet (UV) radiations** from the sun. • CFCs (Chlorofluorocarbons) • Succeeded in forging an agreement to freeze CFC production at 1986 levels / Manufacturing of CFC free refrigerators	1 1 ½ ½ 1 1 ½ ½	3
	SECTION D		
34	(A) (i) A series of carbon compounds in which the same functional group substitutes for hydrogen in a carbon chain / Series of compounds having same functional group and similar chemical properties. (ii) Because melting point and boiling point increase with molecular mass. (iii) Because chemical properties of organic compounds are solely determined by their functional group which remains same in a homologous series. (iv) (i) Aldehyde: Propanal  / CH_3CH_2CHO (ii) Ketone: Propanone  **OR**	1 1 1 ½ ½ ½ ½	

	(B) (i) Ethanol Structure:  / C_2H_5OH / CH_3CH_2OH (ii) Ethene is formed  **[Note: Deduct ½ mark if the conditions required are not mentioned in the equation]** • Concentrated Sulphuric acid acts as a dehydrating agent. (iii) Ethene 	½ 1 ½ 1 ½ ½ 1	5
35	(A) (i) • Chemical Method/Oral pills Side effects: Change the hormonal balance of the body. • Barrier method / Loop / Copper–T Side effects: Irritation in uterus. • Surgical method / Fallopian tube in female is blocked; Side effects – may cause infections. (ii) (a) Fertilized egg/zygote gets implanted in the lining of uterus and starts dividing. (b) If the egg is not fertilized, the thick and spongy lining of the uterus breaks and comes out through the vagina as blood and mucous. **OR**	½ ½ ½ ½ ½ ½ 1 1	

	(B) (i)  (a) Reproductive part – Sporangia (b) Non-reproductive part – Hypha/Hyphae. • Dry slice of bread does not provide moisture and nutrients necessary for the germination and multiplication of Rhizopus. (ii) • Budding: • Hydra uses regenerative cells for reproduction. A bud develops as an outgrowth due to repeated cell division at one specific site and develop into tiny individuals. On maturation, these buds detach from the parent and become new individuals. ***Alternate answer:*** • Regeneration: • It is carried out by specialised cells. If hydra is cut or broken into many pieces, many of these pieces grow into separate individuals. **[Note: Award marks for either of the processes and its explanation]**	1 ½ ½ 1 1 1	5
36	(A) (i) • Electric power : Rate at which electrical energy is dissipated or consumed / Rate of supplying energy to maintain the flow of current through a circuit. • $P = \frac{V^2}{R}$ (ii) (a) (1 unit = 1kWh) Power, $P = \frac{Electrical\ energy\ consumed}{Time}$ $= \frac{11kWh}{5h} = 2.2kW$ **or** 2200 W (b) $I = \frac{P}{V}$	1 1 ½ ½ ½	

	$= \frac{2200}{220} = 10A$	½	
	(c) $R = \frac{V^2}{P}$	½	
	$= \frac{(220)^2}{2200} = 22\ \Omega$	½	
	(Alternate formula can be used)		
	OR		
	(B)		
	(i) $R = \rho \frac{l}{A}$	1	
	$\rho = \frac{R \times A}{l}$		
	$= Ohm \times \frac{(metre)^2}{metre}$		
	= ohm metre/ Ωm	1	
	(ii) Here l = 3 m, A = 4×10^{-7} m^2, R = 60 Ω		
	$\rho = \frac{R \times A}{l}$		
	$= \frac{60 \times 4 \times 10^{-7}}{3}$		
	$= 80 \times 10^{-7}$ Ωm	1	
	(iii)		
	• Resistivity will not change.	1	
	• because Resistivity does not depend on the dimension of the conductor / It only depends on the nature of the material.	1	
			5
	SECTION E		
37			
	(i) Cathode – Pure copper	½	
	Anode – Impure copper	½	
	(ii) Acidified Copper Sulphate; $CuSO_4$	½ + ½	

	(iii) (A) • Pure copper from the anode dissolves into electrolyte and an equivalent amount of pure metal from the electrolyte is deposited on cathode / At anode : $Cu \longrightarrow Cu^{++} + 2e^-$ At cathode : $Cu^{++} + 2e^- \longrightarrow Cu$ Pure • The soluble impurities go into the solution whereas insoluble impurities settle down at the bottom of the anode. **[Note: Award marks if explained with a suitable labelled diagram]** **OR** (iii) (B) In Beaker A : • The blue colour of the solution fades (or becomes colourless) • Reason – Zn is more reactive than copper In Beaker B: • No change in colour. • Reason – Silver is less reactive than Copper	1 1 ½ ½ ½ ½	4
38	(i) • In F_1 generation, all plants were tall / No short plants were observed • No medium height plants / No halfway characteristics were observed / Only dominant parental traits were seen and not the mixture of the two. (ii) **Dominant trait** / **Recessive trait** Single copy of dominant trait is enough to get it expressed/always expressed / Only expressed when present in pair. **(Any other point)** (iii) (A) • Self-pollination / Self-fertilisation / Selfing of F_1 plants • Ratio – Round Yellow : Wrinkled Green 9 : 1 • Traits are inherited independently.	½ ½ 1 ½ ½ 1	

	OR (iii) (B) If pea plants with yellow seeds are crossed with plants of green seeds, it is found that in F_1 generation all the plants have yellow seeds. When F_1 plants are self-pollinated, it is found that in F_2 generation, plants with yellow seeds and plants with green seeds are obtained. This shows that both the traits are inherited but only one trait is visible in F_1 progeny while the other remains unexpressed. **[Note: Award marks if explained by taking one characteristic / Or explained the same diagrammatically]**	2	4
39	(i) • Mirror A. • as the object is placed beyond the centre of curvature of the mirror. (ii) Same size/ Real / Inverted (Any two) (iii) (A) Nature-Virtual and erect Size-magnified  **(Deduct ½ mark if direction of rays are not marked)** **OR** (iii) (B) Here $f = -12$ cm, $u = -18$ cm, $v = ?$ Mirror formula $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ or $\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$ $\frac{1}{v} = \frac{1}{-12} - \frac{1}{-18}$ $v = -36$cm In front of the mirror at a distance of 36 cm from the pole of the mirror.	½ ½ ½ + ½ ½ ½ 1 ½ ½ 1	4

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