MARKING SCHEME

Secondary School Examination, 2023

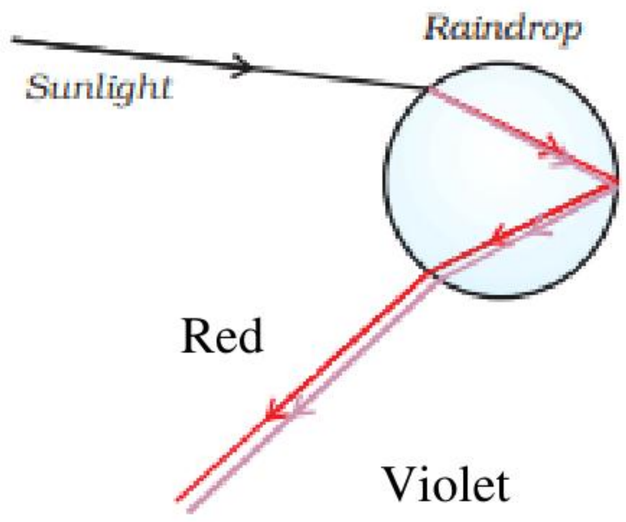
SCIENCE (Subject Code–086)

[Paper Code: 31/2/1]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(c)	1	1
2.	(c)	1	1
3.	(a)	1	1
4.	(b)	1	1
5.	(a)	1	1
6.	(c)	1	1
7.	(c)	1	1
8.	(b)	1	1
9.	(b)	1	1
10.	(c)	1	1
11.	(d)	1	1
12.	(a)	1	1
13.	(d)	1	1
14.	(b)	1	1
15.	(b)	1	1
16.	(c)	1	1
17.	(d)	1	1
18.	(a)	1	1
19.	(c)	1	1
20.	(b)	1	1
	SECTION—B		
21.	(a) • Yellow precipitate of lead iodide is formed. • Double displacement reaction / Precipitation reaction $Pb(NO_3)_2 + 2KI \longrightarrow PbI_2 + 2KNO_3$	½ ½ 1	

**These answers are meant to be used by evaluators.*

	OR (b) (i) • Oxygen is added to copper / Copper is oxidised • copper oxide / CuO (ii) By passing hydrogen gas over it **Alternative answer** (i) $2Cu + O_2 \xrightarrow{\Delta} 2CuO$ (ii) $CuO + H_2 \longrightarrow Cu + H_2O$	½ ½ 1	2
22.	(a) Birds and mammals have high energy needs to maintain their body temperature. The separation of oxygenated and deoxygenated blood allows a highly efficient supply of oxygen to maintain their body temperature. (b) • Amphibians / reptiles; • Temperature of the environment.	1 ½ ½	2
23.	(a) Tt (b) Because only Dominant trait (Tall) is expressed in F1 generation / Tallness is dominant over recessive short trait. (c) F_2 generation – Tall : short 3 : 1	½ 1 ½	2
24.	(a) • It is formed after a rain shower. • It is always formed in a direction opposite to that of the Sun.  **OR** (b) (i) The phenomenon of the change in direction of propagation of light caused by large sized molecules/ caused by colloidal particles. (ii) When sunlight passes through the atmosphere, fine particles in the air scatter blue light (shorter wavelengths) more than the red colour (longer wavelengths).	½ ½ 1 1 1	2
25.	• Wire B. • For the conductors of the same dimensions greater the resistance, greater is the	1	

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<table>
<tr><td></td><td>resistivity.</td><td>1</td><td>2</td></tr>
<tr><td>26.</td><td>• An aquarium is a man-made ecosystem in which natural cleansing agents like decomposers are not present, so needs periodic cleaning;
• ponds and lakes are natural ecosystems which have natural cleansing agents. (Decomposers)</td><td>1

1</td><td>

2</td></tr>
<tr><td></td><td colspan="3">SECTION—C</td></tr>
<tr><td>27.</td><td>(a) White

(b) Decomposition reaction / Photolytic decomposition
$2AgCl \xrightarrow{\text{Sunlight}} 2Ag + Cl_2$

(c) used in black and white photography ; AgBr / Silver Bromide</td><td>½

½
1

½, ½</td><td>

3</td></tr>
<tr><td>28.</td><td>
<table>
<tr><td></td><td>Roasting</td><td>Calcination</td></tr>
<tr><td>1</td><td>It is carried out for sulphide ores.</td><td>It is carried out for carbonate ores.</td></tr>
<tr><td>2</td><td>Ore is heated in excess of air

$2ZnS + 3O_2 \longrightarrow 2ZnO + 2SO_2$
OR
$2HgS + 3O_2 \xrightarrow{\text{Heat}} 2HgO + 2SO_2$
OR
$2Cu_2S + 3O_2 \xrightarrow{\text{Heat}} 2Cu_2O + 2SO_2$</td><td>Ore is heated in absence or limited supply of air.

$ZnCO_3 \xrightarrow{\text{Heat}} ZnO + CO_2$
OR
$CaCO_3 \xrightarrow{\text{heat}} CaO + CO_2$
OR
$PbCO_3 \xrightarrow{\text{heat}} PbO + CO_2$</td></tr>
</table>

Reduction with the help of carbon
$ZnO + C \xrightarrow[\text{Heat}]{} Zn + CO$
Alternate answer
With the help of heat
$2HgO(s) \xrightarrow{\text{Heat}} 2\,Hg\,(l) + O_2(g)$
OR
Auto reduction / Heating with its ore
$2Cu_2O + Cu_2S \xrightarrow{\text{Heat}} 6Cu\,(s) + SO_2(g)$
(or Any other)</td><td>½

½

1</td><td>

3</td></tr>
</table>

**These answers are meant to be used by evaluators.*

29.	(a) (i) Glucose $\longrightarrow$ Pyruvic acid /Pyruvate In the cytoplasm	½ ½	
	(ii) It is used as fuel for all activities in a cell / ATP is broken down giving rise to a fixed amount of energy which drive endothermic reactions in the cell.	1	
	(iii) When air is taken in and let out, the lungs always contain a residual volume of air so that there is sufficient time for the oxygen to be absorbed and for the carbon dioxide to be released / volume of air present in lung after exhalation.	1	
	OR		
	(b) • A potted plant is taken and kept in dark for 24 hrs to destarch it. • Cover a part of a leaf of the plant with black paper to prevent that area from getting sunlight. • Keep the plant in sunlight for 24 hours. • Pluck the leaf, remove the black paper, boil it in alcohol and dipthe leaf in iodine solution for starch test. • The covered part showed no change in colour indicating that starch has not been produced due to the absence of sunlight. • The rest of the leaf turned blue black proving that starch is produced during photosynthesis and sunlight is essential for that.	½ × 6	3
30.	• Adrenaline hormone; Adrenal gland • Response- •Heart beats faster resulting in supply of more oxygen to muscles • Breathing rate increases • Blood supply to digestive system and skin reduced. • Blood supply diverted to skeletal muscles. **(Any 2)**	½, ½ 1 × 2	3
31.	(a) Here h = 3 cm; f = – 12 cm, u = - 18 cm, **(Award full marks if data not written but calculations are correct)** (i) v = ?, h′ = ?	½	
	$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$	½	
	$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{-12\ \text{cm}} - \frac{1}{-18\ \text{cm}}$	½	
	$\therefore$ v = – 36 cm	½	

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	(ii) $h' = -\frac{v}{u} \times h$ $h' = (-)\ \frac{-36\,cm}{-18\ cm} \times 3\ cm = -\ 6\ cm$ **OR** (b)• Power of lens : Ability of a lens to converge or diverge light rays falling on it / Degree of convergence or divergence of light achieved by a lens / Reciprocal of focal length of lens in metre. **(Any one)** • It is diverging/concave lens • $P = \frac{1}{f(m)} = \frac{100}{f(cm)}$ $P = \frac{100}{-10\ cm} = -10\ D$ • Sign of magnification = + or positive	½ ½ 1 ½ ½ ½	3
32.	• Overloading : Overloading of an electrical circuit happens when an excessive amount of electric current flows through the wires. • Two causes : (i) Contact between live and neutral wire/ short circuiting (ii) Connecting too many appliances to a single socket. (iii) Accidental hike in supply voltage **(Any two points) (Any other)** • Preventive measure : (i) To use wires of proper insulation/proper rating (ii) Not connecting too many appliances to a single socket. (iii) fuse wires **(Any one)**	1 ½ ½ 1	3
33.	• Some harmful substances like pesticides are used to protect crops. When these chemicals are washed down in the soil or water bodies, they are absorbed by plants along with water and minerals and by animals from water. When we consume these food items, the pesticides enter our body. (**Alternate answer** : If the child explains the question through food chain, credit marks.) • As human beings occupy the top level in any food chain, maximum concentration of these chemicals get accumulated in them.	2 1	3
	SECTION— D		

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34. (a) 'X' – CH_3COOH / Ethanoic Acid / Acetic Acid — ½

'Y' – C_2H_5OH / Ethanol — ½

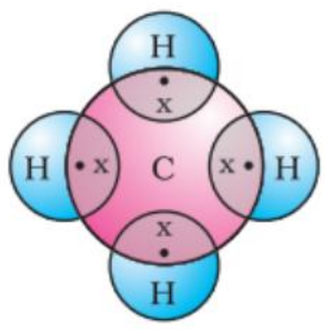
'Z' – $CH_3COOC_2H_5$ / Ethyl Ethanoate — ½

- $CH_3COOH + C_2H_5OH \xrightarrow[\text{catlyst}]{\text{Acid}} CH_3COOC_2H_5 + H_2O$ — 1
- Esterification Reaction — ½

- $CH_3COOC_2H_5 \xrightarrow{NaOH} C_2H_5OH + CH_3COONa$ — 1
- Saponification Reaction — ½
- It is used in the preparation of soap. — ½

OR

(b) (i) • Methane / CH_4 — ½



— 1

• Covalent bond / Single Covalent bond/ Single bond — ½

(ii) Biogas; Compressed Natural gas / CNG — ½, ½

(iii) • Alkanes ; • C_nH_{2n+2} — ½, ½

(iv) Clean flame/blue flame — 1

5

35. (a) (i)

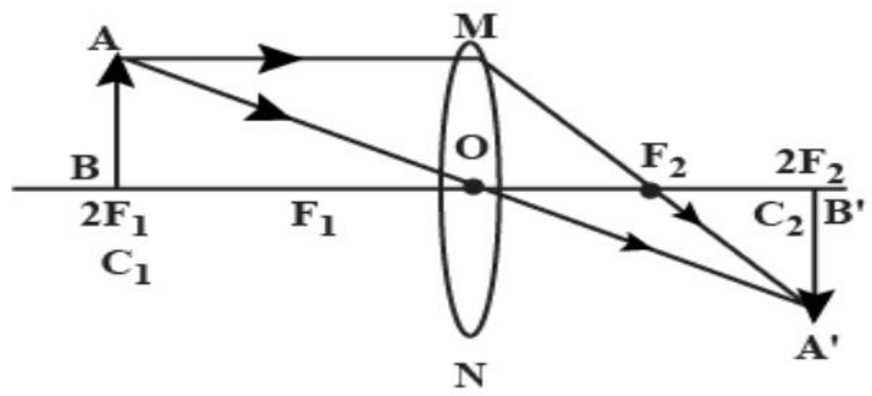
Nervous Control	**Hormonal Control**
1. Messages are sent as an electrical impulse.	1. Messages are carried in the form of chemicals (hormone)
2. It is carried through Neurons.	2. It is carried through blood .
3. Nerve impulses produce rapid responses.	3. Hormones produce slow responses.

**These answers are meant to be used by evaluators.*

	4. Nerve impulses produce short lived responses.	4. Hormones produce long lasting responses. **(or Any other)** **(Any three)**	1×3
	(ii) • When growing shoot is exposed to unidirectional light, it results in auxin shifting towards the shaded side.		1
	• More auxin causes more growth of shoot in the shaded side resulting in the bending of stem towards source of light.		1
	OR		
	(b) (i)		

	Disorder	Gland
(I)	Gigantism	Pituitary
(II)	Delay in Puberty	Ovary
(III)	Goitre	Thyroid

½ × 6

	(ii) The timing and amount of hormone released are regulated by feedback mechanisms.		1
	Example – • If the sugar level in the blood rises more insulin is produced. • As blood sugar level falls, insulin secretion is reduced.		1
36.	(a) •  **(Deduct ½ mark for not marking arrows)**		1½
	• Magnification = -1		½
	(b) (i) u = – 16 cm; f : + 12 cm		½
	Formula $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$		½

**These answers are meant to be used by evaluators.*

	Substitution Result $\frac{1}{v} = \frac{1}{u} + \frac{1}{f} = \frac{1}{-16\ cm} + \frac{1}{12\ cm} + \frac{+1}{48\ cm}$ or V = + 48 cm or v = + 48 cm **(Award full marks if data not written but calculations are correct)** (iv) **hi =** $\frac{v}{u} \times h_0$ $= \frac{+48\ cm}{-16\ cm} \times 2\ cm$ **= – 6 cm** Image is 6 cm in size.	½ ½ ½ ½	5
	SECTION—E		
37.	(a) (i) Groups A and B – less than 7 (ii) Group C – greater than 7 (b) pH paper and universal indicator. (c) • Copper vessel is tarnished due to formation of basic copper oxide. • Lemon juice being acidic react with copper oxide and the salt formed is washed away. **OR** (c) • An optimal pH is required for digestion. • Change in pH can cause tooth decay • Animals and plants defend themselves through change in pH. • Survival of aquatic life becomes difficult when pH of river water becomes low. **(or any other)** **(Any two)**	½ ½ ½, ½ 2 1×2	4
38.	(a) Leishmania – Binary fission ; Plasmodium – Multiple fission (b) Sexual reproduction leads to more variations which are useful for ensuring the survival of a species. (c) (i) sugar solution provides nutrients for growth and multiplication whereas water does not do. (ii) Moisture is required for the growth of Rhizopus. **OR** (c) • Spirogyra • Fragmentation – Spirogyra simply breaks up into smaller pieces upon maturation. Each piece grows into a new individual.	½, ½ 1 1 1 ½ ½, 1	4

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39.	(a) • Both have same reading / $A_1 = A_3$ • Both are connected in series	½ ½	
	(b) Reading of $A_2 = \frac{1}{4}$ A as current is equally divided in the four identical resitors . /Reading of $A_2 = \frac{1}{4}$ times Reading of A_3. / A_2 =0.25 A / $A_2 < A_3$		
	(c) $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$ / $R_p = \frac{R}{n}$	1	
	$\frac{1}{R_p} = \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega}$ $\quad R_p = \frac{3}{2}\ \Omega$	½	
	$V = I\,R$	½	
	$V_1 = 1A \times \frac{3}{2}\ \Omega = \frac{3}{2} V = 1{\cdot}5V$	½	
	OR	½	
	$\frac{1}{R_p} = \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega}$ $\therefore R_p = \frac{3}{2}\ \Omega$		
	$\frac{1}{R_p} = \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega}$	½	
	$\therefore R_{p_2} = 1\ \Omega$	½	
	$\frac{1}{R_p} = \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega} + \frac{1}{3\ \Omega}$ $\therefore R_{p_3} = \frac{3}{4}\ \Omega$		
	$\therefore R = R_{p_1} + R_{p_2} + R_{p_3} = \left(\frac{3}{2} + 1 + \frac{3}{4}\right)\Omega = \frac{13}{4}\ \Omega$ / 3.25 Ω	½ ½	4

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