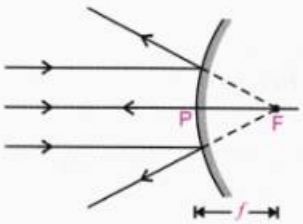
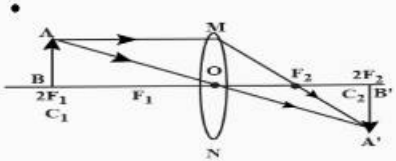
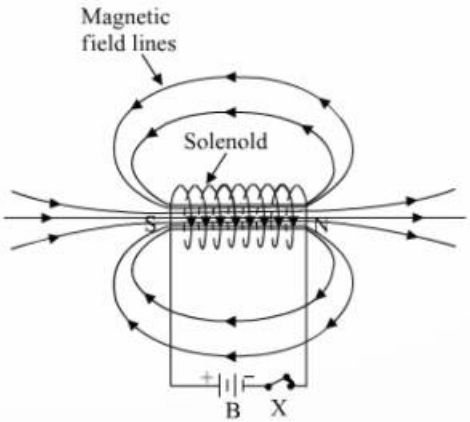
MARKING SCHEME
Secondary School Examination, 2023
SCIENCE (Subject Code–086)
[Paper Code:31/4/1]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1.	(c)	1	1
2.	(b)	1	1
3.	(b)	1	1
4.	(d)	1	1
5.	(b)	1	1
6.	(c)	1	1
7.	(c)	1	1
8.	(b)	1	1
9.	(b)	1	1
10.	(a)	1	1
11.	(a)	1	1
12.	(d)	1	1
13.	(b)	1	1
14.	(c)	1	1
15.	(b)	1	1
16.	(d)	1	1
17.	(a)	1	1
18.	(d)	1	1
19.	(c)	1	1
20.	(b)	1	1
	SECTION B		
21.	(A) (i) • Copper (II) chloride / Copper chloride / Cupric chloride / $CuCl_2$ • colour- blue-green. (ii) $CuO + 2HCl \rightarrow CuCl_2 + H_2O$ **OR** (B) X : Sodium Chloride / NaCl Y : Hydrogen /H_2 Z : Chlorine / Cl_2 B : Bleaching powder / $CaOCl_2$	½ ½ 1 ½ ½ ½ ½	2
22.	(A) (i) Cerebellum / Hind brain (ii) Medulla / Hind brain (iii) Cerebrum / Forebrain (iv) Medulla / Hind brain **OR** (B) Tip of shoot / tip of root (i) Shoot / stem (ii) Shoot / stem (iii) Roots	½ ½ ½ ½ ½ ½ ½ ½	2

23.	(i) Brings the blood containing nitrogenous waste into the kidney. (ii) Removal of urine / passing out of urine (iii) Filtration of blood (iv) Selective reabsorption of useful materials.	½ ½ ½ ½	2
24.	• The plant kept in dark is unable to carry out photosynthesis and due to absence of oxygen it cannot respire. • But the plant kept in light is able to photosynthesize converting CO_2 into oxygen which it can use for respiration.	1 1	2
25.	(A) (i) Myopia / Short Sightedness (ii) • Excessive curvature of eye lens • Elongation of eye ball (iii) Concave lens /Diverging Lens **OR** (B) • Size of particles in the atmosphere is smaller than the wavelength of visible light, so they scatter light of shorter wavelengths i.e. blue. • In space, there is no scattering of light due to absence of particles. (no atmosphere)	½ ½ ½ ½ 1 1	2
26.	As these pesticides are non biodegradable so they get concentrated at each subsequent trophic level progressively & ultimately result in Biomagnification.	2	2
	SECTION C		
27.	(i) • To increase the conductivity of water • Hydrogen – cathode Oxygen – anode • Anode : Cathode 1 : 2 /Volume of hydrogen liberated at cathode is twice that of oxygen liberated at anode. (ii) • White silver chloride turns grey • Decomposition reaction / Photolytic Decomposition	½ ½, ½ ½ ½ ½	3
28.	(i) The acid must always be added slowly to water with constant stirring. (ii) Sodium sulphate / Na_2SO_4 pH = 7 (iii) Dry HCl is unable to ionise / Due to absence of hydrogen ion or hydronium ion	1 ½ ½ 1	3
29.	(A) (i) Food enters through a specific spot with the help of movement of cilia. (ii) (a) Creates an acidic medium which facilitates the action of enzyme / kills microorganisms ingested with the food. (b) Digestion of proteins (c) Mixing the food thoroughly with digestive juices. / pushes food forward by peristalsis. (d) Conversion of starch into sugar **OR** (B) (i) Blood goes through the heart twice during each cycle. (ii) • To prevent oxygenated and deoxygenated blood from mixing for	1 ½ ½ ½ ½ 1	

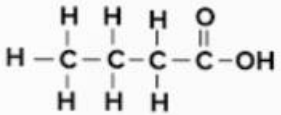
	efficient supply of oxygen to the body. • It helps birds and mammals who have high energy needs and constantly use energy to maintain their body temperature.	1 1	3
30.	(A) (i) It is a point on the principal axis of a diverging mirror from where the rays parallel to principal axis appear to diverge after reflection. (ii) The distance between the pole and the principal focus of a mirror.  **OR** (B) $\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$ $\frac{1}{v}=\frac{1}{f}+\frac{1}{u}$ f=15 cm, u=-25 cm, h=10 cm $\frac{1}{v}=\frac{1}{15cm}+\frac{1}{-25cm}=\frac{2}{75}=+\frac{1}{37\cdot5}$ $v = 37\cdot5$ cm height of the image $=\frac{v}{u}\times$ height of the object $=\frac{37\cdot5}{-25\text{ cm}}\times 10$ cm h' = -15 cm	1 1 1 ½ ½ 1 ½ ½	3
31.	• Focal length of lens, $f(m)=\frac{1}{P}$ P = +4·0 D $\Rightarrow f=\frac{1}{+4\,D}=0.25$ m = 25 cm • Real and inverted • Magnification = -1 •  **[Deduct ½ mark if direction of rays is not marked]**	½ ½ ½ ½ 1	3

32.	(A) (i) Alternating current can be transmitted over long distances without much loss of electric energy. (ii) Household supply – Alternating current (AC) Battery of Dry cell – Direct current (DC) (iii) It melts and breaks the circuit when a current of higher value than its rating flows through it. **OR** (B) •  **[Deduct ½ mark if direction of current or magnetic field is not marked]** • Maximum at A Magnetic field lines are crowded. / Magnetic field adds up due to 'n' number of turns of a solenoid. • Minimum at B Magnetic field lines are far apart.	1 ½ ½ 1 1 ½ ½ ½ ½	3
33.	• **Biodegradable**: Biodegradable wastes can be broken down by biological processes. **Non-biodegradable**: Non-biodegradable wastes cannot be broken down by biological processes. • Impact of accumulated biodegradable wastes: (i) Foul smell (ii) Breeding place for carriers of diseases **(or any other)** • Impact of accumulated non-biodegradable wastes: (i) Biological Magnification (ii) Affect soil fertility. **(or any other)**	1 ½ ½ ½ ½	3

	SECTION D		

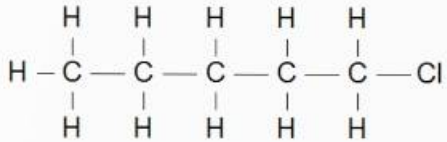
34. (A) (i)

(a)



1

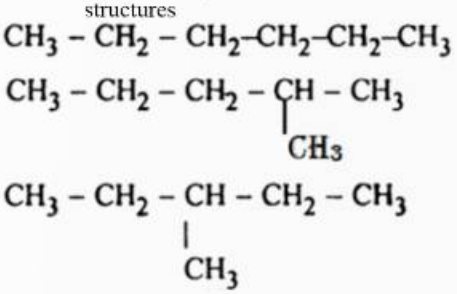
(b)



1

(ii) • Isomers ½

• Because they have same molecular formula but different structures ½



1

[any one]

(iii)

Saturated Compounds	Unsaturated Compounds
• C_nH_{2n+2}	• C_nH_{2n} and C_nH_{2n-2}
• The number of H atoms is more than twice of 'C' atoms	• The number of H atoms is either equal to or less than twice of C atom **(Any one)**

1

OR

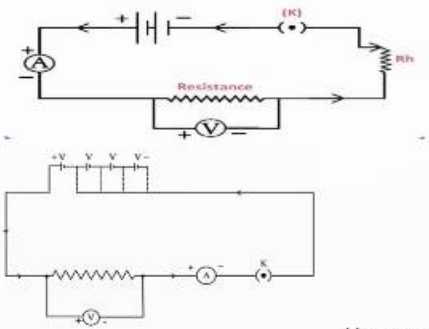
(B) (i) H_2 gas is evolved and Sodium ethoxide is formed. ½

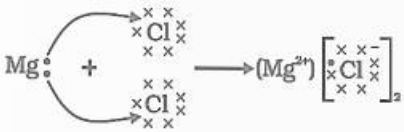
$2CH_3CH_2OH + 2Na \rightarrow 2CH_3CH_2ONa + H_2\uparrow$ 1

(Do not deduct marks for unbalanced equation)

(ii) The melting point of pure ethanoic acid is low (290K) and hence it freezes during winters in cold climates. 1

(iii) • Ethene is formed /

	$CH_3CH_2OH \xrightarrow[H_2SO_4]{\text{Hot Conc.}} CH_2 = CH_2 + H_2O$ Ethene	1	
	• H_2SO_4 – Dehydrating agent / removes water from Ethanol	½	
	(iv) $CH_3COOCH_2CH_3 \xrightarrow{NaOH} CH_3COO^-Na^+ + CH_3CH_2OH$	1	5
35.	(i) The two modes of asexual reproduction observed in hydra are: • Budding: A bud develops as an outgrowth. These buds develop into tiny individuals. When fully matured it detaches from the parent body and become new independent individual. • Regeneration: Hydra can be cut into any number of pieces and each piece grows into a complete organism.	½ , 1 ½ , 1	
	(ii)• Definition: When any vegetative part of plants like root, stem or leaf is used to grow new plants. • Advantages: - 1. Plants can bear flowers and fruits earlier than those produced from seeds. 2. It enables the propagation of plants such as banana, orange, rose and jasmine which have lost the capacity to produce seeds. 3. The plants produced are genetically similar enough to the parent plant to have all the characteristics. **(Any two)**	1 ½, ½	5
36.	(i) Current flowing through a conductor is directly proportional to the potential difference. / $V \alpha I$ / $I \alpha V$	1	
	 **(Any one diagram)**	1	
	(ii)Since ammeter is connected in series, it should not increase the resistance of the circuit. / should allow maximum current to flow through the circuit.	1	
	(iii) • Series combination - Graph A Less slope and more resistance • Parallel combination - Graph B More slope and less resistance	½ ½ ½ ½	5

	SECTION E		
37.	(i)  	1	
	(ii) • They are hard solids • They are soluble in water • They conduct electricity in aqueous solution or molten state **[Any other]** **[Any two]**	½, ½	
	(iii) (A) • Sodium atom has one electron in its outermost shell • It attains its nearest noble gas configuration by losing this electron forming Na^+ ion / **Na** → **$Na^+ + e^-$** 2,8,1 2,8 stable **OR**	1 1	
	(iii) (B) (i) Because movement of ions in the solid is not possible due to their rigid structure. (ii) H_2 gas is liberated at cathode.	1 1	4
38.	(i) Sexual reproduction involves the fusion of male and female gametes, which combines to the characters of both parents and cause variation.	1	
	(ii) **F_1 generation**: • In F_1 generation only the dominant traits are expressed. • It refers to the offspring/ plants resulting immediately from a cross between the first set of parents. **F_2 generation**: • In F_2 generation both dominant and recessive traits are expressed. • It refers to the offspring/plants resulting from a cross among the plants of F_1 generation. **[Any one]**	1	
	(iii) (A) Because if a niche of population of organisms is altered, the whole population could be wiped out. However, if variations are present in this population they have some chance of survival. **[Alternate answer]** If there is a population of bacteria living in temperate waters and if water temperature were to be increased by global warming, most of the bacteria would die, but a few variants resistant to heat would survive and grow further. Thus, variations are useful for survival of species over time. **OR**	2	

	(iii) (B) • Wrinkled, yellow Round, green • If two or more traits are involved, their genes are independently inherited irrespective of the combination present in parents.	½ ½ 1	4
39.	(i) Refractive index of diamond = $\frac{\textit{Speed of light in vacuum}}{\textit{Speed of light in diamond}}$ Speed of light in diamond = $\frac{3\times10^8 \text{ m/s}}{2\cdot42} = 1\cdot23\times10^8$ m/s (ii) $\angle$r in carbon disulphide < $\angle$r in glass < $\angle$r in water (iii) (A) (a) • Glass • The speed of light in water is more than the speed of light in glass. / Refractive index of glass is more than the refractive index of water. (b) Light will enter from water to glass without bending (undeviated / straight) because in this case $\angle i = 0$; $\angle r = 0$. **OR** (iii) (B) $n_{glass} = \frac{3}{2}$ $n_{water} = \frac{4}{3}$ $v_{glass} = 2 \times 10^8 m/s$ $n_{glass} = \frac{speed\ of\ light\ in\ vacuum(c)}{speed\ of\ light glass(v_g)}$ $c = n_{glass} \times v_{glass}$ $= \frac{3}{2} \times 2 \times 10^8 m/s$ $= 3 \times 10^8 m/s$ $v_{water} = \frac{c}{n_{water}} = \frac{3\times10^8 m/s}{\frac{4}{3}}$ $= \frac{9}{4} \times 10^8$ m/s **or** 2.25×10^8 m/s	½ ½ 1 ½ ½ 1 1 1	4

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