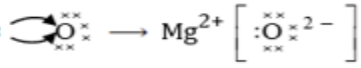
SECONDARY SCHOOL EXAMINATION, 2025

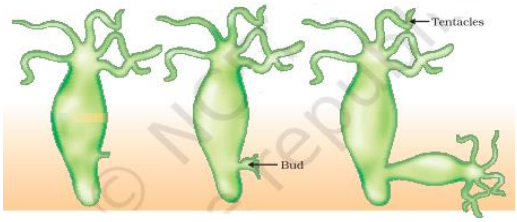
SOLUTIONS

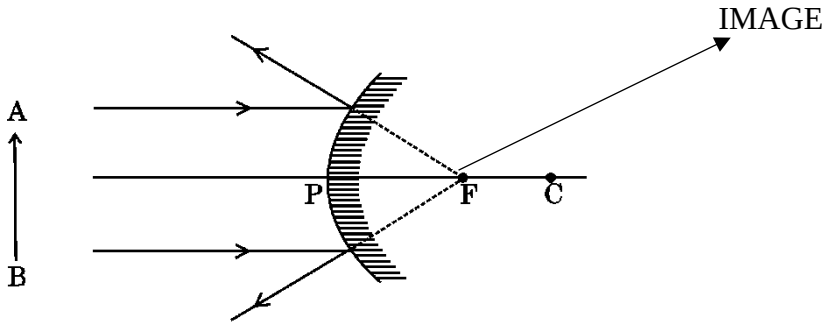
CLASS: X [SCIENCE (Subject Code–086)]

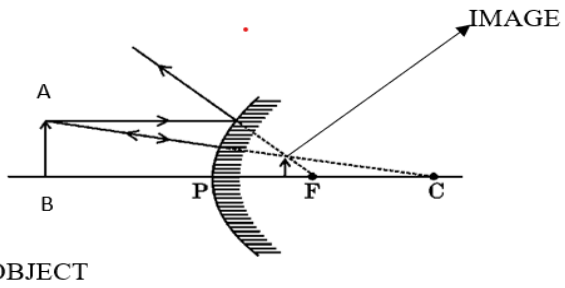
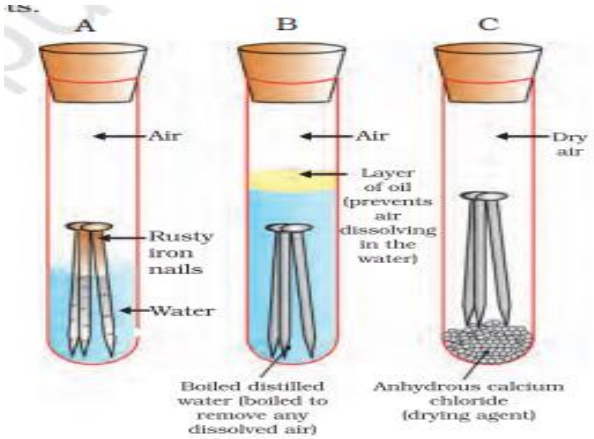
[Paper Code: 31/1/2]

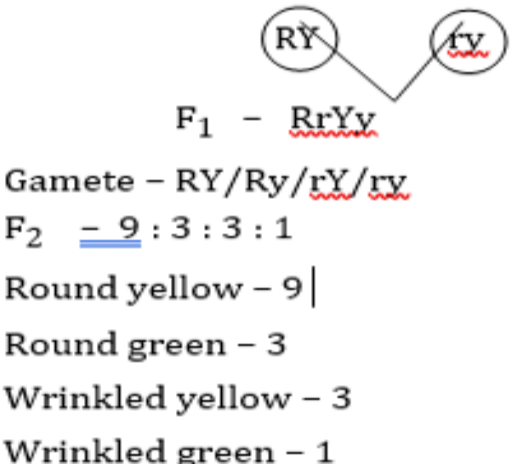
Maximum Marks: 80

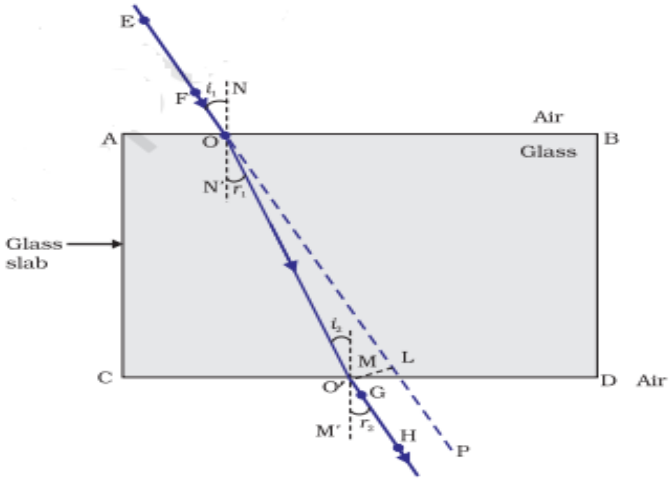
Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A		
1.	A/ 	1	1
2.	B / Calcium and Magnesium	1	1
3.	C/$FeSO_4$	1	1
4.	C / It has weak electrostatic forces of attraction between its oppositely charged ions.	1	1
5.	D / 1 : 8	1	1
6.	A / Salt and water is formed	1	1
7.	B / Al_2O_3 and MgO	1	1
8.	D / Auxins	1	1
9.	C / starch into simple sugars	1	1
10.	C / 100% round and yellow	1	1
11.	C / (i) and (iii)	1	1
12	D / Cytoplasm and Oxygen deficient muscle cells	1	1
13.	D/Green light deviates more than the orange light	1	1
14.	A / (i) and (ii)	1	1
15.	D / 99%	1	1
16.	D / (ii) and (iv)	1	1
17.	C / Assertion (A) is true, but Reason (R) is false.	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.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is ***not*** the correct explanation of Assertion (A).	1	1
20.	A / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
	SECTION B		
21.	Chemicals/pesticides used by farmers get washed down into the soil or water bodies and affect biotic and abiotic components of the ecosystem. These chemicals are mostly non-biodegradable and get accumulated progressively at each trophic level (Biological magnification). Thus, the health of the organisms of all trophic levels is affected.	2	2
22.	• (a) Power dissipated will be: • (I) minimum in circuit (ii) and • (II) maximum in circuit (iii) • • Justification : Power dissipated = $\frac{V^2}{R}$ • Since voltage is same in three cases, the power dissipation	½ ½	

	• will be inversely proportional to the resistance of the • circuit. • • (Award marks if explained through calculations) • • OR • (b) Voltage V = 220V • P=V x I • Power P_1 = 100 W P_2 = 60 W • ∴ $I_1 = \frac{P_1}{V} = \frac{100\ W}{220\ V}$ = 0·45 A • ∴ $I_2 = \frac{P_2}{V} = \frac{60\ W}{220\ V}$ = 0·27 A • ∴ Total current drawn $I = I_1 + I_2$ = 0·45 + 0·27 = 0·72 A	1 ½ ½ ½ ½	2
23.	f = – 20 cm ; u = – 30 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{-20} - \frac{1}{-30}$ $\frac{1}{v} = \frac{1}{-20} + \frac{1}{30}$ v = -60 cm Position of image is 60 cm in front of the mirror.	½ ½ 1	2
24.	(a) • Plugging of the leak in blood vessels prevents lowering of the blood pressure / maintains the efficiency of the pumping system • Platelets • Help to clot the blood at the site of injury. **OR** (b) (i) Plants have low energy needs because have a large proportion of dead cells in many tissues / Plants have low energy needs as they do not move (ii) Translocation of soluble products of photosynthesis from leaves to other parts of the plant / It transports amino acids and other substances to storage organs of roots, fruits and seeds and to growing organs.	1 ½ ½ 1 1	2
25.	 diagram	1	

	labelling	1	2
26.	(a) $2\,Pb(NO_3)_2 \xrightarrow{heat} 2\,PbO + 4\,NO_2 + O_2$	1	
	(b) $CH_4 + 2\,O_2 \longrightarrow CO_2 + 2\,H_2O + Heat + light$	1	2
	SECTION C		
27.	(a) When 1 coulomb of charge flows through any cross section of a conductor in 1 second, then the electric current flowing through it is 1 ampere. / 1A = $\frac{1C}{1s}$	1	
	• (b) Radius of wire = 0·01 cm = $0{\cdot}01 \times 10^{-2}$ m		
	• $\rho = 44 \times 10^{-8}\ \Omega$ m		
	• R = 14 Ω	½	
	• $R = \rho \frac{l}{A}$	½	
	• $l = \frac{R \times A}{\rho} = \frac{14 \times 22 \times (0{\cdot}01 \times 10^{-2})^2}{7 \times 44 \times 10^{-8}}$		
	• $= \frac{10^{-8}}{10^{-8}}$ = 1·0 m	1	3
28.	(a) $\frac{1}{R_1} = \frac{1}{10\,\Omega} + \frac{1}{15\,\Omega} = \frac{1}{6\,\Omega} \Rightarrow R_1 = 6\ \Omega$		
	$\frac{1}{R_2} = \frac{1}{60\,\Omega} + \frac{1}{40\,\Omega} = \frac{100}{2400\,\Omega} \Rightarrow R_2 = 24\ \Omega$		
	∵ R_1 and R_2 are in series		
	∴ $R_{total} = R_1 + R_2 = (6 + 24) = 30\ \Omega$	1	
	(b) V = IR ⇒ $I = \frac{V}{R} = \frac{15\,V}{30\,\Omega}$ = 0·5 A	1	
	(c) V = IR = 0·5 A × 6 Ω = 3·0 V	1	3
29.	(i)  OBJECT	1 ½	

	(ii)  OBJECT (**Note: Deduct ½ mark if arrows are not drawn.)**	1 ½	3
30.	(a) ➢ Take three test tubes and place clean iron nails in each of them. ➢ Label these test tubes A, B and C. ➢ Pour some water in test tube A and cork it. ➢ Pour boiled distilled water in test tube B, add about 1 mL of oil and cork it. The oil will float on water and prevent the air from dissolving in the water. ➢ Put some anhydrous calcium chloride in test tube C and cork it. Anhydrous calcium chloride will absorb the moisture, if any, from the air. Iron nails rust in test tube A, but they do not rust in test tubes B and C. Rusting of iron takes place when exposed to both air and water. /  Iron nails rust in test tube A, but they do not rust in test tubes B and C. Rusting of iron takes place when exposed to both air and water. **(Note: if a student explains activity through description or through labelled diagram, give full marks.)** **OR** (b) (i)	3	

	• Sodium, Potassium, Lithium **(any two)** • Observations: ➢ A violent reaction occurs. ➢ Large amount of heat is evolved. ➢ Evolved gas catches fire. (ii) The gas (bubbles) burns with a pop sound	½,½ 1 ½ ½	3
31.	(a) $3\,MnO_2(s) + 4\,Al(s) \longrightarrow 3\,Mn(l) + 2\,Al_2O_3(s) + heat$ $Fe_2O_3(s) + 2\,Al(s) \longrightarrow 2\,Fe(l) + Al_2O_3(s) + heat$ **(Award marks if explained through statement or any other reaction)** (b) Metals towards the top of the reactivity series (Na, Mg, Ca) have more affinity for oxygen than carbon.	1 1 1	3
32.	• Calculation of ratio of Seeds as per data given. • Round and yellow – $\frac{800}{90}$= 9, • Round and green – $\frac{275}{90}$= 3 • Wrinkled and yellow – $\frac{268}{90}$= 3 Wrinkled and green – $\frac{90}{90}$= 1 • • Parents – • Round and Yellow Wrinkled and Green • RRYY × rryy Gametes  **(Award marks if explained through Mendel's cross using two separate characters)** • Appearance of new combinations of characteristics show that traits for Round/Wrinkled and Yellow/Green seeds are independently inherited/ Independent inheritance of two separate traits.	1 1 1	3

33.	• (a) Gland that secretes • (i) Adrenal gland • (ii) Thyroid gland • (b) If the sugar level in blood rises it is detected by cells of pancreas which responds to produce more insulin to lower blood sugar level. • As the blood sugar level falls it is detected by cells of pancreas and insulin secretion is reduced.	½ ½ 2	3
	• SECTION D		
34.	(a) (i) • Concave lens • P = $\frac{1}{f(m)}$ $-2{\cdot}5 = \frac{1}{f}$ f = $\frac{10}{-2{\cdot}5}$ = – 0·4 m = – 40 cm • Myopia (ii) (I) Real and inverted (II) magnified image /size of image is double the size of object (III) beyond 2F/ on the other side as that of object (IV) Negative (iii) • The lens with focal length 10 cm • less focal length, more converging/diverging power **OR** (b) (i)  **(if arrows not marked, deduct half mark)** (ii) The ratio of sine of angle of incidence to the sine of angle of refraction is a constant, for the light of a given colour and for a given pair of media. /	½ ½ ½ ½ ½×4 ½ ½ 2 1	

$\frac{\sin i}{\sin r} = constant$

Convex Lens	Concave Lens
(I) Object to be placed between O and F	Object can be placed anywhere in front of the lens
(II) Magnified image	Diminished/smaller image

1
1

5

35.

- (a) (i) A = Ethanol /Ethyl alcohol / C_2H_5OH
  B = Ethanoic acid /Acetic acid / CH_3COOH
  C = Ethene / C_2H_4/$CH_2=CH_2$

½
½
½

- (ii) Molecular mass of ethene (C_2H_4)
  $12 \times 2 + 1 \times 4 = 24 + 4 = 28$ u

1

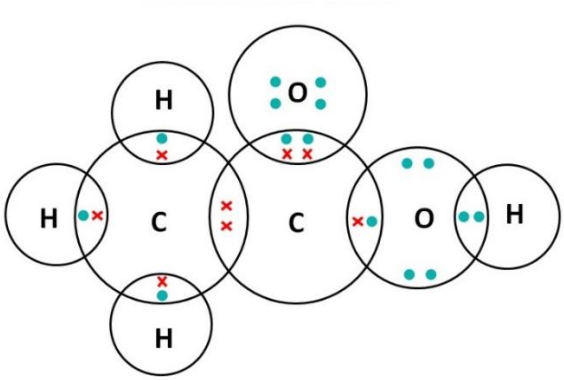
- (iii) Brisk effervescence is observed.

½

$$CH_3COOH + Na_2CO_3 \longrightarrow CH_3COONa + H_2O + CO_2$$

1

(iv) (Ethanoic acid)



1

OR

(b) (i)

- • Homologous series: A series of organic compounds in which the same functional groups or hetero-atom substitutes for hydrogen in a carbon chain/A sequence of a carbon compound with same general formula and similar chemical properties.

1

- $HCOOH$, CH_3COOH, C_2H_5COOH

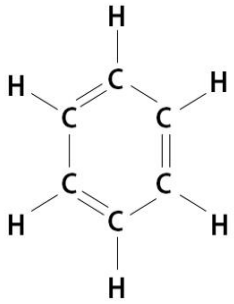
1

- Methanoic acid, Ethanoic acid, Propanoic acid
  (any other 3 successive members)

1

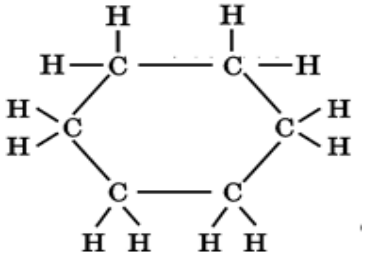
- (ii) (I) Benzene
  (II) Cyclohexane

½
½



Benzene

OR



Cyclohexane (any other example) — 1

5

36. a) (i)

(I) Ovary: Produces female gamete (egg) and female hormones(oestrogen). — ½,½

(II) Fallopian tube: Site of Fertilization — 1

(III) Uterus: Site of Implantation and embryonic development. — 1

(ii) Methods of contraception used by males:

- Mechanical barrier - Condoms — 1
- Surgical method – blocking the vas deferens in males (Vasectomy) — 1

OR

(b) (i)

Self-pollination	Cross-pollination
Pollen grains are transferred from stamen to the stigma of the same flower.	Transfer of pollen grains from stamen of one flower to the stigma of another flower of same species.

2

(ii)

A – Stigma: Receives pollen and provides suitable environment for its germination. — ½,½

B –Pollen tube: Carries males germ cells (gametes) to the female gamete situated in the ovary. — ½,½

C – Egg Cell: (Female germ cell): Fuses with male gamete and forms zygote. — ½,½

5

SECTION E

37. (a) Live wire- Red — ½

Neutral wire- Black — ½

	(b) Power, P = 1 kW = 1 × 1000 W = 1000 W Voltage, V = 220 V Current drawn I =? P = V × I $I = \frac{1000\ W}{220\ V} = 4{\cdot}54$ A Current rating should be of 5A. (c) (i) • The earth wire provides a low resistance conducting path for the current which ensures that any leakage of current to flow to the metallic body of the appliances, keeps its potential to that of the earth. • The user will not get an electric shock. **OR** (c) (ii) • Fuse wire • Earth wire • A fuse in a circuit prevents damage to the circuit due to overloading. • Earth wire prevents electric shock due to leakage of current.	½ ½ 1 1 ½ ½ ½ ½	4
38.	(a) Photosynthesis A process by which green plants capture sunlight and convert it to chemical energy with the help of chlorophyll / Process by which carbon dioxide and water is converted into carbohydrates in the presence of sunlight chlorophyll and water. (b) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$ (c) (i) • Absorption of light energy by chlorophyll • Conversion of light energy to chemical energy. • Reduction of carbon dioxide to carbohydrates. • Desert plants take up CO_2 at night and prepare an intermediate, which is acted upon by the energy absorbed by the chlorophyll during the day. **OR** (c) (ii) (I) Decrease the rate of photosynthesis due to low amount of sunlight. (II) Decreases the rate of photosynthesis due to reduced gaseous exchange	½ ½ 1 2 1 1	4
39.	(a) $2\ NaCl + 2\ H_2O \xrightarrow{electricity} 2\ NaOH + H_2 + Cl_2$ (b) Uses of NaOH : Degreasing metals/ Soaps and Detergents/ paper making/ artificial fibres/ preparation of bleach	1 ½ ,½	

	Uses of H_2: As fuel/ Margarine/ Preparation of ammonia for fertilizers/preparation of HCl Uses of Cl_2 : Disinfectant/ PVC/ water treatment/ in swimming pools/ CFC's/ preparation of bleach/ preparation of HCl/ pesticides **(Any two uses of anyone product)**	½ ½	
	(c) (i) A – $NaHCO_3$/ Sodium Hydrogen Carbonate/Baking soda B – Na_2CO_3 / Sodium Carbonate $2\,NaHCO_3 \xrightarrow{heat} Na_2CO_3 + H_2O + CO_2$ A B	1 1	
	OR (c) (ii) • The fixed number of water molecules present in one formula unit of a salt. • $CuSO_4.5H_2O$/ Copper Sulphate pentahydrate/Blue vitriol • $CaSO_4.2H_2O$/Gypsum/Calcium sulphate dihydrate • $Na_2CO_3.10H_2O$/Washing Soda/Sodium carbonate decahydrate • $FeSO_4.7\,H_2O$ / Green Vitriol/Ferrous sulphate heptahydrate • $CaSO_4$. ½ H_2O /Calcium Sulphate hemihydrate/POP **(Any two examples)**	½,½	4