MARKING SCHEME

Secondary School Examination, 2024

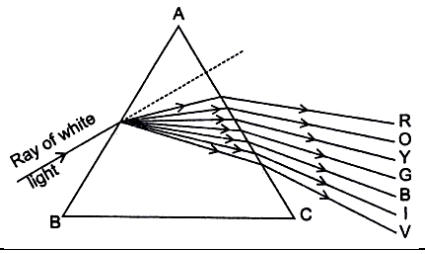
SCIENCE (Subject Code–086)

[Paper Code: 31/5/2]

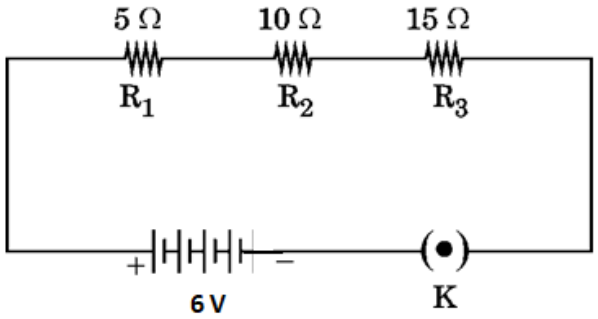
Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(C)/ $2AgCl \rightarrow 2Ag + Cl_2$	1	1
2	(D) / Translocation	1	1
3	(A) / Nose	1	1
4	(C)/ It has a very small area for glucose and oxygen to pass from mother to the embryo	1	1
5	(D) / $Fe_2O_3 + 3\ CO \rightarrow 2\ Fe + 3\ CO_2$	1	1
6	(A) /Calcium Phosphate	1	1
7	(C)/Regular beating of heart	1	1
8	(C)/ 7	1	1
9	(B) / Al, Al_2O_3	1	1
10	(D)/ Cropland ecosystem	1	1
11	(A) / both pointing into the plane of the paper.	1	1
12	(C) / A solenoid	1	1
13	(A) / (i) and (ii)	1	1
14	(C) / The brightness of the image will reduce	1	1
15	(B) / Refraction, Dispersion and internal reflection	1	1
16	(A) / Red	1	1
17	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
18	(A) / Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A).	1	1
19	(D) / Assertion (A) is false, but Reason (R) is true.	1	1
20	(B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A).	1	1
	SECTION B		
21	(a) • Formation of lactic acid in muscles causes cramps. •Aerobic respiration takes place in the presence of oxygen whereas the respiration taking place above is due to lack of oxygen. / End products of aerobic respiration are $CO_2 + H_2O$ + Energy whereas in the above case, Lactic acid + Energy is formed. **OR**	1 1	

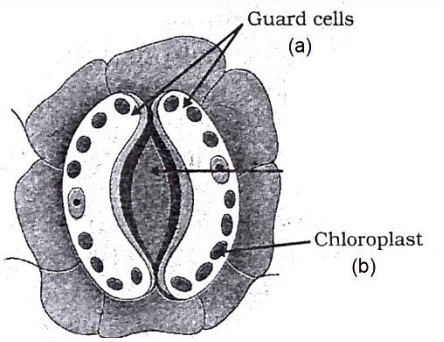
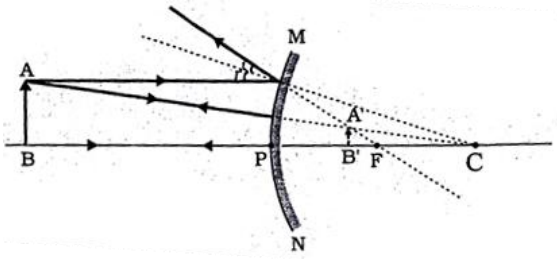
	(b) • Tissue fluid / Extracellular fluid Functions : i. Carries digested and absorbed fats from the intestine. ii. Drains excess fluid from extracellular space back into the blood. iii. Fight against infections. **(any 2)**	1 ½ ,½	2
22	(a) Carboxylic group • Ethanoic acid (b) Aldehyde • Methanal	½ x 4	2
23	(a) • Copper Oxide • Black $2Cu + O_2 \xrightarrow{Heat} 2CuO$ **OR** (b) $BaCl_2\,(aq) + Na_2SO_4\,(aq) \rightarrow BaSO_4\,(s) + 2NaCl\,(aq)$ Ba^{2+}, SO_4^{2-}	½ ½ 1 1 ½, ½	2
24	• Parents produce germ cells in specialised organs which have only half the number of chromosomes as compared to non-reproductive body cells. When these germ cells from two parents combine during sexual reproduction to obtain a progeny/ zygote, it restores the original number of chromosomes as in the parents. • Meiosis	1 ½ ½	2
25	• Power of a lens is the reciprocal of focal length in metre./ It is the degree of convergence or divergence of light rays achieved by a lens. • $P = \frac{1}{f} = \frac{100}{50} = 2\ D$	1 1	2
26	• $Q = I \times t \Rightarrow t = \frac{Q}{I}$ • $\therefore\ t = \frac{750}{\frac{15}{1000}} = \frac{750X1000}{15} = 50000\ s$	1 1	2
	SECTION C		
27	(a) (i) • Hypermetropia • Ciliary muscles/ eye lens (ii) • Focal length of the eye lens is too long. • Eyeball becomes too small.	 ½ ½ ½ ½	

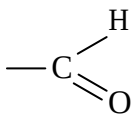
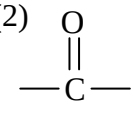
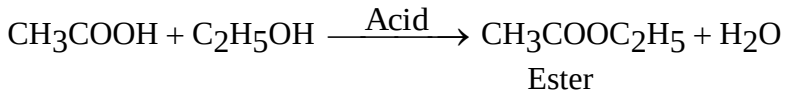
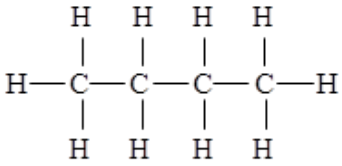
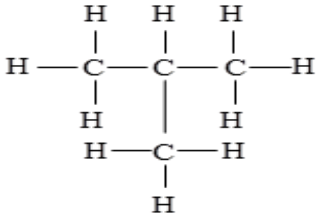
	(iii) Converging lenses/ convex lens They provide the additional focussing power required for forming the image on the retina./ Decrease the focal length of the eye lens **OR** (b) The splitting of white light into its constituent colours is called dispersion. Cause: Different colours of white light bend through different angles with respect to incident ray.  	½ ½ 1 1 1	3
28	• Activity – Magnesium Burn magnesium ribbon ↓ Collect the ashes ↓ Dissolve in water Add blue Litmus solution — Remains blue Add red Litmus solution — Turns blue Inference : Metalic oxides are basic in nature Sulphur Burn sulphur ↓ Collect the fumes ↓ Add water Add blue Litmus solution — Turns red Add red Litmus solution — Remains red Oxides of non – metals are acidic in nature	 1 1 1	3
29	• $Fe(s) + CuSO_4(aq) \rightarrow FeSO_4(aq) + Cu(s)$ • Displacement reaction – A reaction in which a more reactive metal displaces a less reactive metal from its salt solution. • Zinc, Aluminium, Calcium, Magnesium **(Any two)**	1 ½ +½ ½+ ½	3

30	(a) Violet flowers Violet colour dominates over white colour of flowers. (b) 25%, It could not express itself in the presence of dominant gene/white colour is a recessive gene. (c) V V : V v 1 : 2	½ ½ ½ ½ 1	3
31	(i) •Growth hormone •Secreted by pituitary gland. •It stimulates growth in all organs. (ii) •Thyroxin •Secreted by thyroid gland. •It regulates carbohydrate, protein and fat metabolism for body growth.	½ x 3 ½ x 3	3
32	• Earthing is used as a safety measure, especially for those appliances that have a metallic body which is connected to the earth wire. • It provides a low-resistance conducting path for the current. •Thus, it ensures that any leakage of current to the metallic body of the appliance keeps its potential to that of the earth, and the user may not get a severe electric shock.	1 1 1	3
33	<table><tr><td>Food chain</td><td>Food web</td></tr><tr><td>It is a series of organisms feeding on one another at various levels</td><td>It is a network of interconnected food chains/series of branching lines which provides a number of feeding connections amongst different organisms.</td></tr></table> • Population of grass/ first trophic level will increase. • Population of tiger/ third trophic level will decrease.	1+1 ½ ½	3
	SECTION C		
34	(a)• Chlor-akali process – When electricity is passed through aqueous solution of sodium chloride (brine), it decomposes to form sodium hydroxide, chlorine and hydrogen. • $2NaCl\ (aq) + 2H_2O\ (l) \rightarrow 2NaOH + Cl_2 + H_2$ • Anode – Chlorine gas / Cl_2 Cathode- Hydrogen gas/ H_2 • Cl_2 – 1. Used in the preparation of bleaching powder. 2. To make drinking water free from germs or any other.	1 1 ½ ½ ½ ½	

	• H_2 – 1. Used in the manufacture of ammonia fertilisers. 2. Used in fuels and margarine. **OR** (b)• Concentrated solution of sodium chloride reacts with ammonia and carbon dioxide to obtain sodium hydrogen carbonate and ammonium chloride. $NaCl + NH_3 + CO_2 + H_2O \rightarrow NaHCO_3 + NH_4Cl$ • When sodium hydrogen carbonate is heated strongly, sodium carbonate is obtained. $2NaHCO_3 \xrightarrow{Heat} Na_2CO_3 + CO_2 + H_2O$ • Sodium carbonate is dissolved in water to obtain washing soda. $Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3 \cdot 10H_2O$ Uses : • In glass, soap and paper industries • Manufacture of borax • As cleaning agent for domestic purposes. •For removing permanent hardness of water.	½ ½ 1 1 1 ½ x 4	5
35	(a) (i) • Current becomes one-third of its initial value. • Ohm's Law The potential difference across the ends of a conductor is directly proportional to the current flowing through it, provided its temperature remains the same. (ii)  Total Voltage = V = 4 × 1·5 V = 6 V Total resistance, R(s) = $R_1 + R_2 + R_3$ = 5 Ω + 10 Ω +15 Ω = 30 Ω (I) Current, $I = \frac{V}{R} = \frac{6\ V}{30\ \Omega} = 0{\cdot}2\ A$ (II) V = IR = 0·2 A × 10 Ω = 2 V	½ ½ 1 1 1 1	

	OR (b) (i) When 1 joule of work is done to move a charge of 1 coulomb from one point to the other. d = 0·2 mm = 2×10^{-4} m; R = 14 Ω $\rho = 1{\cdot}6 \times 10^{-8}$ Ω m; A = $\pi d^2/4$ R = $\frac{\rho l}{A} = \frac{4\rho l}{\pi d^2}$ or $l = \frac{\pi d^2 R}{4\rho}$ $l = \frac{22}{7} \times \frac{(2\times10^{-4})^2}{4\times1{\cdot}6\times10^{-8}} \times 14$ $= \frac{22\times14}{7\times1{\cdot}6} = 27{\cdot}5$ m When the diameter is doubled, d' = 2d A' = 4A $\frac{R'}{R} = \frac{A}{A'}$ or $R' = \frac{RA}{A'} = \frac{RA}{4A}$ $R' = \frac{R}{4} = \frac{14\ \Omega}{4} = 3{\cdot}5\ \Omega$ Change (14·0 – 3·5) = 10·5 Ω	1 ½ ½ 1 ½ 1 ½	5
36	(a) • Take two healthy potted plants, A and B of nearly the same size. • Keep them in darkness for three days. (Destarch the plant) • Place a watch glass containing potassium hydroxide by the side of potted plant A but not in potted plant B. • Cover both the plants with separate bell jars and seal the bottom of the jars with Vaseline. • Keep both the plants in sunlight for two hours. • Pluck one leaf each from both the plants and test for the presence of starch with iodine solution. • Observation: The leaf of the potted plant A with KOH did not turn blue – black. The leaf of the potted plant B turns blue. • Conclusion: KOH absorbs CO_2 so photosynthesis did not occur in potted plant A. **OR** (b) (i) In set up (I) lime water turns milky in more time as compared to set up (II) because the air we exhaled contains high percentage of CO_2 as compared to atmospheric air.	½ x 6 1 1 1,1	

	(ii)  Open Stomatal Pore Two labellings: (I) Guard Cells (II) Chloroplast Two functions performed by stomata : • Gaseous exchange • Transpiration	1 ½ ½ ½ ½	5
37	(a) It is straight line passing through the pole and centre of curvature of a concave mirror. (b) Radius of curvature ,R= 20 cm (c) (i) u = –10 cm, f = +15 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{15} - \frac{1}{-10}$ $\frac{1}{v} = \frac{1}{6}$ $\Rightarrow$ v = + 6 cm **OR** (c) (ii) Convex mirror / Diverging mirror  **[Note: Deduct ½ mark if direction of rays is not shown]**	1 1 ½ ½ 1 ½ 1 ½	4

38	(a) Compounds formed by carbon and hydrogen only. (b) Tetravalency and Catenation (c) (i) (1)  (2)   Ester **OR** (c) (ii) Compounds with identical molecular formula but different structures Two isomers of butane C_4H_{10}  	1 1 ½ +½ 1 1 ½ +½	4
39	(a) **Self-pollination**: Transfer of pollen grains from anther to the stigma of the same flower. **Cross-pollination**: Transfer of pollen grains from the anther of one flower to the stigma of another flower. (b) Petals, they dry and fall off. (c) (i) Fusion of male and female gametes to form a zygote Ovule – Seed, Ovary – fruit **OR** (c) (ii) Future shoot – Plumule, Future root – Radicle Cotyledon – Stores food.	1 ½ +½ 1 ½ ½ ½ ½ 1	4

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