MARKING SCHEME
SCIENCE (Subject Code-086)
(PAPER CODE : 31/4/2) (10-04-86K)

Q.No.	EXPECTED OUTCOMES/VALUE POINTS	Marks	Total Marks
	SECTION – A **BIOLOGY**		
1.	(C) / Formation of fruit	1	1
2.	(B) / (iv)	1	1
3.	(A) / (i), (ii) and (iii)	1	1
4.	(B) / (i) and (iv)	1	1
5.	(D) / Contraction of Left Ventricle.	1	1
6.	(B) / Grass and tree	1	1
7.	(A) / Entry of water into guard cells.	1	1
8.	(A) / Both, Assertion (A) and Reason (R)are true, and Reason (R) is correct explanation of Assertion (A).	1	1
9.	(D) / Assertion (A) is false and Reason (R) is true.	1	1
10.	(A) • As his pancreatic duct is blocked, enzymes for digestion will not be transported to small intestine / The blockage will cause difficulty in digestion of proteins, carbohydrates and fats. • Insulin secretion is already affected. **OR** (B) • Reflex action • An automatic and quick response to a stimulus which does not involve thinking. • Stimulus → Receptor → sensory neuron → relay neuron (spinal cord) → Motor neuron → effector (muscle) response.	1 1 ½ ½ 1	2
11.	• Necessary- It helps in transport of water and minerals from roots to leaves / It helps in temperature regulation. • Evil - It results in loss of water.	1 1	2

12.	(a) $O_2 \xrightarrow{uv} O + O$ $O + O_2 \longrightarrow O_3$ / (Ozone) UV radiations split molecular oxygen into free oxygen and these atoms combine with oxygen to form ozone. (b) It can cause diseases like skin cancer in human beings. (or any other harmful effect)	1 1	 2
13.	(a) Parents : R R × r r (Red flowers) (White flowers) Gametes : R r F_1 R r (All red) Rr × Rr Gametes : R r R r F_2 RR Rr Rr rr Red White (b) Phenotypic ratio/ Showing external look of plants : 33 : 11 3 : 1 (Red) (White) Genotypic Ratio : 1 : 2 : 1 RR : Rr : rr	½ ½ ½ ½ ½ ½	½ ½ ½ ½ ½ ½ 3
14.	(a) Some waste is stored in leaves that fall off/wastes may be stored in cellular vacuoles/other wastes are stored as resins and gums in old xylem/ may excrete some waste into soil via roots. (b) Mammals and birds have high energy needs to maintain their body temperature. Therefore, mixing of blood is prevented by separation of right and left side of heart and thus they have double circulation.	1 2	 3

3

15.

(a) Due to hydrotropism, the roots grow towards area of water availability so that they can absorb water and minerals. — 1

(b) Auxins promote cell elongation / Auxin regulates the tropic responses like bending (growth) of stem towards light. — 1

(c)

Movement by sensitive plants	Tropic Movements by plants
Non-directional	Directional
Fast	Slow
Growth independent movement	Growth related

(Any two points and any other difference) — 1 + 1

OR

(c)

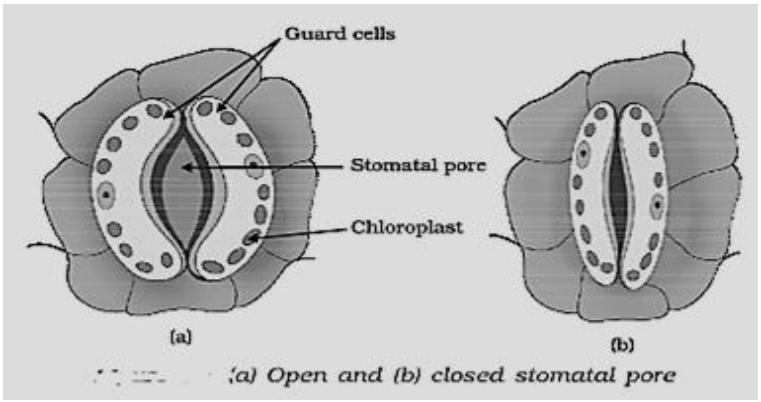
Movement of Roots	Movement of Shoots
Gravity: Grows towards gravity / Positive geotropism	Gravity: Grows away from gravity / Negative geotropism
Light: Grows away from light / Negative phototropism	Light: Grows towards light/ Positive phototropism

1 + 1 — 4

16.

(A)

(a)

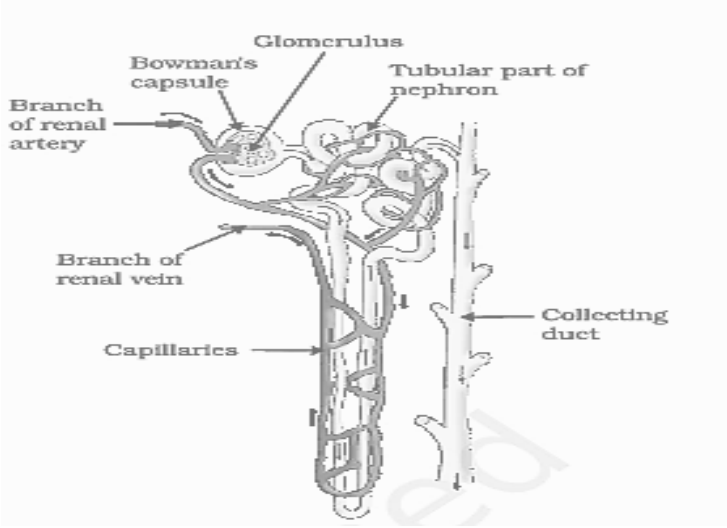


(a) Open and (b) closed stomatal pore

(b)

- Absorption of light energy by chlorophyll.
- Conversion of light energy to chemical energy and splitting of water molecule into hydrogen and oxygen.
- Reduction of carbon dioxide to carbohydrates

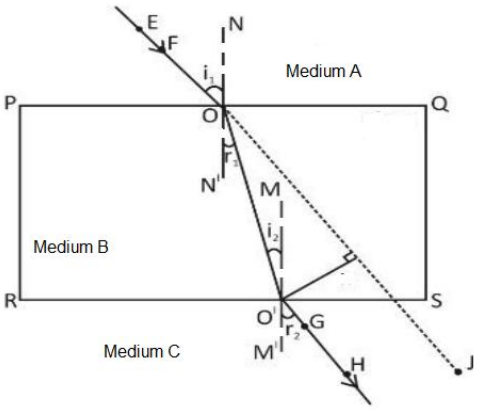
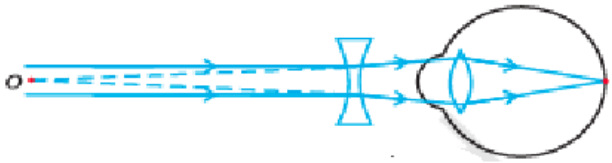
2

	(c) $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \underset{\text{(Glucose)}}{C_6H_{12}O_6} + 6O_2 + 6H_2O$ **OR** (B) (a)  Diagram Labelling of any 4 parts (b) Filtration of blood to remove wastes. (c) It is a process by which useful substances like glucose, amino acids, vitamins, salts and most of water are reabsorbed from filtrate, back into the blood.	1 1 ½ x 4 1 1	5
	SECTION-B **CHEMISTRY**		
17.	(D)/ Brown fumes of NO_2	**1**	**1**
18.	(A) / The hydrophobic tail of the soap molecule is in the interior of the cluster, whereas hydrophilic end is on the surface of the cluster.	**1**	**1**
19.	(C) / Exothermic Reaction	**1**	**1**
20.	(B) / Hydrochloric acid	**1**	**1**
21.	(C) / Iron	**1**	**1**
22.	(A) / By adding acid to water with constant stirring.	**1**	**1**

23.	(D) / Steel	**1**	**1**
24.	(A) / Both A and R is true and R is correct explanation of A.	**1**	**1**
25.	(a) $Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$ / $2Ca(OH)_2 + 2Cl_2 \rightarrow Ca(ClO)_2 + CaCl_2 + 2H_2O$ (Bleaching powder) (b) $NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$ (Baking soda)	**1** **1**	**2**
26.	(a) • Substance oxidised = Na • Substance reduced = O_2 (b) Double displacement/Precipitation reaction (c) Silver chloride decomposes into silver and chlorine by sunlight.	 **½** **½** **1** **1**	**3**
27.	(A) (i) (a) Carbonate ore: Calcination / $ZnCO_3(s) \xrightarrow{Heat} ZnO(s) + CO_2(g)$ (b) Sulphide ore : Roasting / $2ZnS(s) + 3O_2(g) \xrightarrow{Heat} 2ZnO(s) + 2SO_2(g)$ (ii) $Fe_2O_3(s) + 2Al(s) \rightarrow 2Fe(l) + Al_2O_3(s) + Heat$ (iii) • Anode: Impure copper rod. • Cathode: Pure copper strip. **OR** (B) (i) $2ZnS(s) + 3O_2(g) \xrightarrow{Heat} 2ZnO(s) + 2SO_2(g)$ $ZnO(s) + C(s) \rightarrow Zn(s) + CO(g)$ (ii) Nitric acid is a strong oxidising agent and oxidises H_2 gas produced to water.	 ½ ½ 1 ½ ½ 1 1 1	3

28.	(a) Universal indicator (b) A/ (pH = 3) (c) • Strong acids give more H^+ ions in water. • Weak acids give less H^+ ions in water. **OR** (c) (i) When pH < 5.6 (ii) Weak acid: acetic acid, formic acid	1 1 1 1 1 ½+½	4
29.	(A) (i) Carbon cannot form C^{4+} cation because removal of four electrons is energetically not possible. Carbon cannot form C^{4-} anion because nucleus with six protons cannot hold ten electrons. (ii) • A series of compounds in which the same functional group substitutes for hydrogen in carbon chain is called a homologous series. • Because of higher molecular mass of C_4H_{10} than C_3H_8 or C_2H_6. (iii) Ethanoic acid / acetic acid / CH_3COOH is formed / $CH_3\text{-}CH_2OH \xrightarrow{\text{acidifiedK2Cr2O7 +Heat}} CH_3COOH$ **OR** **(B)** (i) I. Propanal II. Propyne (ii) I. Ester group II. $CH_3-COOH + CH_3-CH_2OH \rightleftharpoons[\text{Acid}]{} CH_3-\underset{\underset{O}{\|}}{C}-O-CH_2-CH_3 + H_2O$ (iii) Soaps reacts with calcium and magnesium salts present in hard water to form scum (insoluble substance).	2 1 1 1 1 1 1 1 1	5
	SECTION-C **PHYSICS**		
30.	(C) / Presbyopia	1	1
31.	(A) / Iris and pupil	1	1

32.	(A) / Both Assertion (A) and Reason (R) both are true, and Reason (R) is the correct explanation of Assertion	1	1
33.	(A) • $I = \frac{P}{V}$ $I = \frac{2000}{200}$ I = 10 A • Current passing through electric heater is 10A which is much more than rated value (4A) of fuse. Hence fuse will melt and break the circuit. So, it cannot be used. **OR** (B) • An electromagnet is formed by wrapping a current carrying insulated copper wire in the form of coil around a magnetic material like soft iron core. / By placing a magnetic material like soft iron as a core material inside the current carrying solenoid. • Strength of electromagnet can be increased by increasing the (i) Number of turns of coil (ii) Current flowing through the coil.	½ ½ 1 1 ½ ½	**2**
34.	(i) • Voltmeter • Used to measure potential difference (ii) • Variable resistance / Rheostat • Used to change the resistance in the circuit. / Regulates current without changing the voltage source.	½ ½ ½ ½	**2**
35.	(a) • The rod AB gets displaced from its original position • Because it experiences a force when placed in external magnetic field (b) • Fleming's Left Hand Rule • Stretch the thumb, fore finger and middle finger of your left hand such that they are mutually perpendicular. If forefinger points in the direction of magnetic field, second finger in the direction of current, then the thumb will point in the direction of motion or force acting on the conductor.	½ ½ 1 1	3

36.	(a) (i) Speed of light in medium A > Speed of light in medium B. (ii) Media B and C both have same optical density. (b)  (Deduct ½ mark for not showing direction of ray of light)	½ ½ 2	3
37.	(i) • Myopia • Excessive curvature of eye lens / Elongation of eye ball (ii)  	1 1 1	3
38.	(a) Real / magnified. (b) Converging / Concave mirror, Plane mirror (c) • Convex lens • It magnifies the image formed by the curved mirror **OR** (c) The plane mirror redirects/ reflects the light rays coming from the curved mirror towards eyepiece.	1 1 1 1 2	4

39.	(A) (i) • Since V-I graph is a straight line passing through the origin / V ∝ I, it follows Ohm's Law. • R = Slope of V-I graph $R = \frac{0.8-0.4}{0.2-0.1} = \frac{0.4}{0.1} = 4\Omega$ (Note: Resistance can be calculated by taking any other two points from the graph. For the point 2.2V and 0.6A answer will vary)	1 1	
	(ii) (I) 3Ω and 7Ω resistors are in series, $R_s = 3 + 7 = 10\Omega$ R_s is in parallel combination with 10Ω $\frac{1}{Rp} = \frac{1}{10} + \frac{1}{10}$ $Rp = 5\Omega$ Other two 5Ω resistors are in series with Rp. Net $R = 5 + 5 + 5 = 15\Omega$	 1 1	
	(II) Total current, $I = \frac{V}{R}$ $I = \frac{5}{15}$ $I = \frac{1}{3}A$	½ ½	
	OR		
	(B) (i) • Power consumed by a device that carries 1 A of current when operated at a potential difference of 1 V / If one joule energy is consumed in one second then power of instrument is said to be 1 watt / 1 W = 1 volt × 1 ampere • P = VI (ii) E = P x t Energy (3 bulbs) = 3 × 100 × 5 = 1500 = 1.5 kWh Energy (electric heater) = 1.0 × 0.5 = 0.5 kWh Total energy consumed (1 day) = 1.5 + 0.5 = 2 kWh Total energy consumed (30 days) = 30 × 2	1 1 ½ ½	

	= 60 kWh = 60 units Total cost = Units × Rate = 60 × 3.60 = ₹ 216	1	
	(ii) 1 kW h = 1000 watt × 3600 second = 3.6×10^6 watt second = 3.6×10^6 joule (J)	1	5
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