MARKING SCHEME

Secondary School Examination, 2024

SCIENCE (Subject Code–086)

[Paper Code: 31/4/2]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(C)/ Double Displacement reaction	1	1
2	(C)/46	1	1
3	(A)/Cotyledon	1	1
4	(A)/Sugarcane, roses, grapes	1	1
5	(C)/Abscisic acid	1	1
6	(D)/ HCl and NH_4OH	1	1
7	(D)/Hydrochloric acid and Sulphuric acid	1	1
8	(C)/Copper and Silver	1	1
9	(B)/9 and 3	1	1
10	(B)/ (i)Amino acid, (ii)glucose, (iii)fatty acid and glycerol	1	1
11	(B)/(ii) and (iii)	1	1
12	(B)/move towards the side AB of the loop	1	1
13	(A)/9/4 x 10^{8} m/s	1	1
14	(C)/Blue	1	1
15	(C)/I and II	1	1
16	(A)/15000 J	1	1
17	(B) Both Assertion (A) and Reason (R) are true, but Reason (R) is **not** the correct explanation of Assertion (A).	1	1
18	(A)/ Both Assertion (A) and Reason (R) are true and Reason (R) is 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	(a) When water is lost through stomata in the leaves by transpiration, it creates a suction force/transpiration pull. Due to which water is pulled up through xylem of the roots to the leaves. **OR** (b) • Heterotrophic /Holozoic Nutrition • Amoeba takes in food using temporary finger-like projections/pseudopodia of the cell which fuse over the food particle forming a food vacuole. Inside the food vacuole complex substances are broken down into simpler substances. / (a**ward marks if explained diagrammatically**)	2 1 1	2
22	(a) $2\ CH_3COOH + Na_2CO_3 \longrightarrow 2\ CH_3COONa + H_2O + CO_2$ (b) Pass the gas/CO_2 in lime water. It turns lime water milky.	1 1	2
23	(a) (i) • HCl gas was evolved (ii) (I) No change in colour	 ½ ½	

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	(II) Wet blue litmus turns red • HCl gas is acidic in nature **OR** (b) •$Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$ (g) **(Any other example)** •Hydrogen burns with a pop sound when a burning matchstick is brought near it.	½ ½ 1 1	2
24	• Wrinkled and yellow, Round and green • Traits are independently inherited.	½ + ½ 1	2
25	• Scattering of light. • Example − When sunlight passes through a canopy of dense forest/ when a fine beam of sunlight enters a smoke filled room through a small hole. **(or any other)**	1 1	2
26	• Joule's Law − Heat produced in a resistor is directly proportional to: -Square of current for a given resistance -Resistance for a given conductor and -Time for which the current flows though the resister, • If any unduly high electric current flows through the circuit, the temperature of the fuse wire increases. This melts the fuse wire and breaks the circuit.	1 1	2
	SECTION C		
27	• Copper Chloride; Blue- green • $CuO + 2HCl \longrightarrow CuCl_2 + H_2O$ • CuO is basic.	½ ; ½ 1 1	3
28	•Ability of the eye lens to adjust its focal length. • Image distance remains unchanged • Ciliary muscles – While focusing on distant objects ciliary muscles relax, eye lens becomes thin and its focal length increases.	1 1 ½ ½	3
29	(i) •Terrestrial /Grassland / cropland •Aquatic /Pond (ii) First trophic level are always producers or autotrophs as they can capture the solar energy and convert it into chemical energy. • 1% energy is captured. (iii)Because energy flows in one direction only. Justification: when energy passes from one trophic level to other it cannot revert back.	½ ½ ½ ½ ½ ½	3
30	Three examples: • In some animals, the temperature at which the fertilized eggs are kept determines whether the animals developing in the eggs will be male or female. • In snails, individuals can change sex. • In human beings, the sex of the individual is genetically determined i.e. genes inherited from parents decide whether the child will be a boy or a girl.	 1 1 1	3
31	• Oxygen is added to ethanol to produce ethanoic acid. • Alkaline potassium permanganate or Acidified potassium dichromate. $CH_3 - CH_2OH \xrightarrow[\text{Or acidified } K_2Cr_2O_7 + \text{Heat}]{\text{Alkaline } KMnO_4 + \text{Heat}} CH_3COOH$ •	½ ½ 1	

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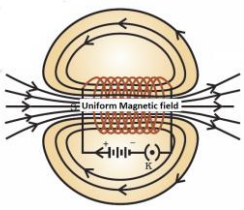
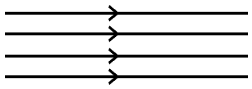
<table>
<tr><td></td><td>• It is oxidation reaction while other is combustion reaction/ burning of ethanol is exothermic while other is endothermic.</td><td>1</td><td>3</td></tr>
<tr><td>32</td><td>(a) A solenoid is made by winding insulated copper wire over a non-conducting cylindrical tube closely and tightly wound in the shape of a cylindrical spring.
<table>
<tr><td>Solenoid</td><td>Circular coil</td></tr>
<tr><td>Length of solenoid is much greater as compared to its diameter.</td><td>Its diameter is much greater as compared to its length.</td></tr>
<tr><td>Strong magnetic field</td><td>Weak magnetic field</td></tr>
</table>
(b)
 

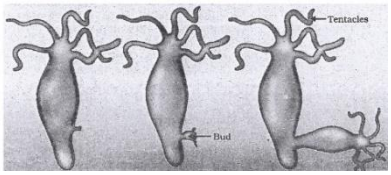


• Field lines are in the form of parallel straight lines which indicates that the field is uniform.</td><td>1

1

½

½</td><td>

3</td></tr>
<tr><td>33</td><td>(a) In hydra, a bud develops as an outgrowth due to repeated cell division at one specific site. These buds develop into tiny individuals and when fully mature, detach from the parent body and become new independent individuals.
 

• Regenerative cells.

OR
• (b)
(i)Seminal vesicles and prostate glands:
• Secrete a fluid for nourishment of sperms.
• Secrete a fluid which makes the transport of the sperms easier
(ii) Oviduct:
• Egg is carried from ovary to the womb or uterus.
• Site of Fertilization
• (iii) Testis:
• Produces sperms
• Secretion of hormone – testosterone</td><td>1

1 ½

½

½ + ½

½ + ½

½ + ½</td><td>

3</td></tr>
<tr><td></td><td>SECTION D</td><td></td><td></td></tr>
</table>

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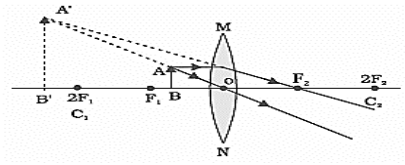
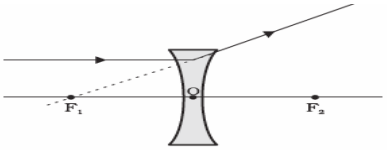
34	(a) (i) • Decomposition reaction • A reaction in which a single reactant breaks down to simpler products. (ii) Nitrogen dioxide, NO_2 (iii) $2Pb(NO_3)_2(s) \xrightarrow{Heat} 2PbO(s) + 4NO_2(g) + O_2(g)$ (Lead nitrate) (Lead oxide) (Nitrogen dioxide) (Oxygen) (iv) Residue left − Lead oxide. • Dissolve the residue in water and test the solution using litmus paper/Universal indicator. The colour of the litmus paper changes to blue indicating that lead oxide is basic in nature. **OR** (b) (i) $Pb(NO_3)(aq) + 2\,KI(aq) \longrightarrow PbI_{2(ppt)} + 2\,KNO_{3(aq)}$ • Yes, it is a double displacement reaction. • In this reaction, exchange of ions between the reactants (Lead nitrate and potassium iodide) is taking place. • Lead iodide; $[Pb^{2+}]\,[I^-]$ (ii) Calcium hydroxide is prepared on adding water to quicklime (calcium oxide) / $CaO(s) + H_2O(l) \rightarrow Ca(OH)_2(aq) + Heat$ (Quick lime) (Slaked lime) • When CO_2 is passed through $Ca(OH)_2$ It turns milky white/ calcium carbonate is formed. • $Ca(OH)_2(aq) + CO_2(g) \rightarrow CaCO_3(s) + H_2O(l)$ (Calcium hydroxide) (Calcium carbonate)	½ ½ ½ , ½ 1 1 1 1 ½ ½ ½ + ½ ½ ½ 1	5
35	(a) (i) S. No. 3, 2f is 50 cm. ∴ 2f = 50 cm, or f = 25 cm. Justification: Object distance(u) and image distance (v) are same so it implies that object is placed at 2F. (ii) S. No. 6, is not correct. Reason: For u = −15 cm, sign of v **must** be – ve (as the image is formed on the same side of the lens as the object)  ***(deduct ½ mark if the direction of the rays are not shown)*** (iii) Magnification : $m = \frac{v}{u}$ $= \frac{+150\ cm}{-30\ cm} = -5\ cm$ **OR** (b) (i) Principal axis : It is an imaginary line passing through the two centres of curvatures of a lens.  	1 1 ½ ½ 1 1 1 1	

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	(ii) f = − 20 cm; h = 5 cm; v = −15 cm $\frac{1}{v}-\frac{1}{u}=\frac{1}{f}$ *or* $\frac{1}{u}=\frac{1}{v}-\frac{1}{f}=\frac{1}{(-15)}-\frac{1}{(-20)}$ $=\frac{-1}{60\ cm}$ or u = − 60 cm object is at a distance of 60 cm from the lens • Size of the image(magnification): m = $\frac{h'}{h}=\frac{v}{u}$ $h'=\frac{v}{u}\times h=\frac{(-15)}{(-60)}\times 5$ = 1·25 cm	½ ½ 1 1	5
36	(a) (i) • The pathway in which impulses travel during the reflex action is called a reflex arc. • Because the thinking part of the brain is not fast enough/for quick response to avoid injury. • Reflex arc : (ii) Peripheral Nervous System Components : Cranial Nerves; Spinal Nerves **OR** (b) (i) •Touch • The shape of the leaves changes by changing the amount of water in them. • No (ii) Growth of a part of plant in response to the pull of earth or gravity is called geotropism. • Positive geotropism − Movement of plant part towards the earth gravity. Example − Roots grow downwards • Negative geotropism − Movement of plant part away from the force of gravity. Example − Shoots grow upwards.	1 ½ 1+½ 1 ½; ½ ½ 1 ½ 1 ½+½ ½+½	5
	SECTION E		
37	(a) R_S = 4 Ω + 6 Ω + 16 Ω = 26 Ω (b) $\frac{1}{R_P}=\frac{1}{8\ \Omega}+\frac{1}{8\ \Omega}=\frac{1}{4}\ \Omega$ R_p = 4 Ω (c) (i) Total resistance = 26 Ω + 4 Ω = 30 Ω Potential difference = V = 6V Current I = $\frac{V}{R}$ $\frac{6}{30}=\frac{1}{5}\ A$ or 0·2 A.	1 1 1 ½ ½	

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	OR (c) (ii) 16 Ω Justification: According to Ohm's law when same current flows, the potential difference across a higher resistance is always higher./ Potential difference across 16 Ω =V=IR = 0.2x16=3.2V Potential difference across 8 Ω =V=$IR_{(total)}$ = 0.2x4 =0.8V	1 1	4
38	(a) In the test tube containing magnesium. (b) All three metals react with HCl because they are more reactive than hydrogen. **(Award marks if student write any less reactive metal with reason)** (c) (i)Because HNO_3 is a strong oxidizing agent and oxidizes the H_2 produced to water. • Ultimate products are water, oxides of nitrogen. **OR** (c) (ii) • Displacement Reaction • If metal X displaces metal Y from its salt solution it is more reactive than Y or vice versa.	1 1 1 1 1 1	4
39	(a) (i) Renal Artery (ii) Glomerulus (b) • Urinary bladder • Nervous control (c) (i) Filtration: Nitrogenous wastes such as urea or uric acid are removed Reabsorption: Glucose, amino acids, salts/some useful materials and major amounts of water reabsorbed **OR** (c) (ii)Tubular part of nephron. • The amount of water absorbed depends on : - how much water is there in the body. - how much dissolved waste is there to be excreted.	½ ½ ½ ½ ½+½ ½+½ 1 ½ ½	4

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