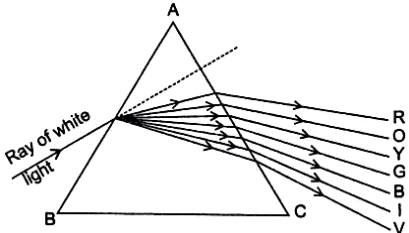


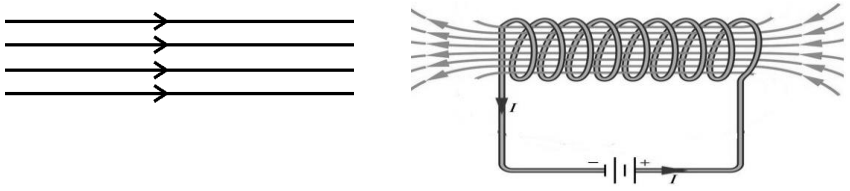
MARKING SCHEME
Secondary School Examination, 2024
SCIENCE (Subject Code-086)
[Paper Code: 31/5/1]

Maximum Marks: 80

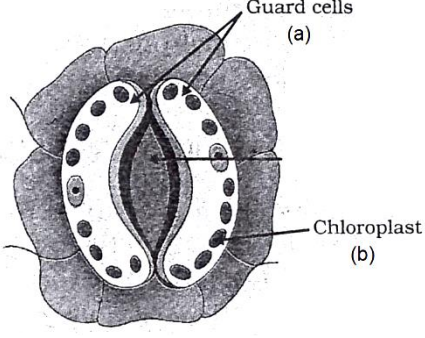
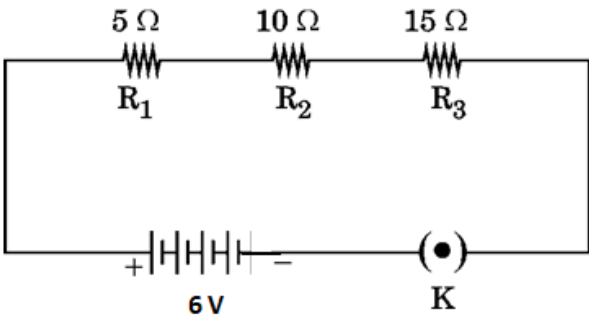
| Q. No. | EXPECTED ANSWER / VALUE POINTS | Marks | Total Marks |
|------------------|--|---|-------------|
| SECTION A | | | |
| 1 | (C) /2,2,4 | 1 | 1 |
| 2 | (D) / $\text{Fe}_2\text{O}_3 + 3 \text{CO} \rightarrow 2 \text{Fe} + 3 \text{CO}_2$ | 1 | 1 |
| 3 | (A) / Calcium Phosphate | 1 | 1 |
| 4 | (C)/ 7 | 1 | 1 |
| 5 | (B) / Al, Al_2O_3 | 1 | 1 |
| 6 | (D) / Translocation | 1 | 1 |
| 7 | (C)/ Receptors in skin \rightarrow Sensory neuron \rightarrow Relay neuron \rightarrow Motor neuron \rightarrow Effector muscle in arm. | 1 | 1 |
| 8 | (A) / Nose | 1 | 1 |
| 9 | (C)/ It has a very small area for glucose and oxygen to pass from mother to the embryo | 1 | 1 |
| 10 | (A) / (i) and (ii) | 1 | 1 |
| 11 | (C) / The brightness of the image will reduce | 1 | 1 |
| 12 | (B) / Refraction, Dispersion and internal reflection | 1 | 1 |
| 13 | (A) / Red | 1 | 1 |
| 14 | (C) / A solenoid | 1 | 1 |
| 15 | (A) / both pointing into the plane of the paper. | 1 | 1 |
| 16 | (D)/ Crop land ecosystem | 1 | 1 |
| 17 | (A) / Both Assertion (A) and Reason (R) are the true and Reason (R) is a correct explanation of Assertion (A). | 1 | 1 |
| 18 | (D) / Assertion (A) is false, but Reason (R) is true. | 1 | 1 |
| 19 | (B) / Both Assertion (A) and Reason (R) are the true , but Reason (R) is not a correct explanation of Assertion (A). | 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) • Copper Oxide • Black $2\text{Cu} + \text{O}_2 \xrightarrow{\text{Heat}} 2\text{CuO}$ <p style="text-align: center;">OR</p> (b) $\text{BaCl}_2(\text{aq}) + \text{Na}_2\text{SO}_4(\text{aq}) \rightarrow \text{BaSO}_4(\text{s}) + 2\text{NaCl}(\text{aq})$ $\text{Ba}^{2+}, \text{SO}_4^{2-}$ | $\frac{1}{2}$ $\frac{1}{2}$ 1 1 $\frac{1}{2} + \frac{1}{2}$ | 2 |

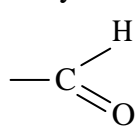
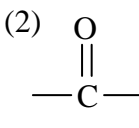
| | | | | | | |
|------------------|--|-----------------------------|-----------------------------|-----------------------------|-----------------------------|---|
| 22 | <ul style="list-style-type: none"> • Low melting points and boiling points – Weak intermolecular forces of attraction. • Non-conductors of electricity – Bonding in these compounds does not give rise to any ions. / Covalent bonds or sharing of electrons do not form any charged particles. | 1 | 1 | 2 | | |
| 23 | <p>(a)</p> <ul style="list-style-type: none"> • 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 $\text{CO}_2 + \text{H}_2\text{O} + \text{Energy}$ whereas in the above case, Lactic acid + Energy is formed. <p style="text-align: center;">OR</p> <p>(b)</p> <ul style="list-style-type: none"> • Tissue fluid / Extracellular fluid <p>Functions :</p> <ol style="list-style-type: none"> Carries digested and absorbed fats from the intestine. Drains excess fluid from extracellular space back into the blood. Fight against infections. <p style="text-align: right;">(Any two)</p> | 1 | 1 | 1 | $\frac{1}{2} + \frac{1}{2}$ | 2 |
| 24 | <ul style="list-style-type: none"> • Plasmodium: Multiple fission- A single cell divides into many daughter cells simultaneously. • Leishmania: Binary fission- Splitting of one cell into two daughter cells in definite orientation. | $\frac{1}{2} + \frac{1}{2}$ | $\frac{1}{2} + \frac{1}{2}$ | 2 | | |
| 25 | <p>(a) The sun light is converged at a point by convex lens which generates heat causing the paper to burn.</p> <p>(b) •Principal Focus</p> <ul style="list-style-type: none"> •Real image of the Sun. | 1 | $\frac{1}{2}$ | $\frac{1}{2}$ | 2 | |
| 26 | $Q = I \times t$ $\therefore t = \frac{500 \text{ C}}{25 / 1000 \text{ A}}$ $= 20000 \text{ s}$ | $\frac{1}{2}$ | $\frac{1}{2}$ | 1 | 2 | |
| SECTION C | | | | | | |
| 27 | <ul style="list-style-type: none"> • $\text{Fe(s)} + \text{CuSO}_4 \text{ (aq)} \rightarrow \text{FeSO}_4 \text{ (aq)} + \text{Cu(s)}$ • Displacement reaction – A reaction in which a more reactive metal displaces a less reactive metal from its salt solution. • Zinc, Aluminium, Calcium, Magnesium <p style="text-align: right;">(Any two)</p> | 1 | $\frac{1}{2} + \frac{1}{2}$ | $\frac{1}{2} + \frac{1}{2}$ | 3 | |

| | | | |
|----|--|--|---|
| 28 | <ul style="list-style-type: none"> • Cinnabar • Sulphide ore • $2\text{HgS} + 3\text{O}_2 \xrightarrow{\text{Heat}} 2\text{HgO} + 2\text{SO}_2$ • $2\text{HgO} \xrightarrow{\text{Heat}} 2\text{Hg} + \text{O}_2$ | $\frac{1}{2}$ $\frac{1}{2}$ 1 1 | 3 |
| 29 | <p>(i) •Growth hormone •Secreted by pituitary gland. •It stimulates growth in all organs.</p> <p>(ii) •Thyroxin •Secreted by thyroid gland. •It regulates carbohydrate, protein and fat metabolism for body growth.</p> | $\frac{1}{2} \times 3$ $\frac{1}{2} \times 3$ | 3 |
| 30 | <p>(a) •All Plants Tall •Gene combination: Tt</p> <p>(b) It is a recessive trait / it cannot be expressed in presence of dominant trait.</p> <p>(c) Tall : Short 3:1 Conclusion: Tall trait is dominant and short trait is recessive.</p> | $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ | 3 |
| 31 | <p>(a)</p> <p>(i) • Hypermetropia • Ciliary muscles/ eye lens</p> <p>(ii) • Focal length of the eye lens is too long. • Eyeball becomes too small.</p> <p>(iii) Converging lenses/ convex lens They provide the additional focussing power required for forming the image on the retina./ Helps to decrease the focal length of the eye lens.</p> <p style="text-align: center;">OR</p> <p>(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.</p> <div style="text-align: center;">  </div> | $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 1 1 | 3 |

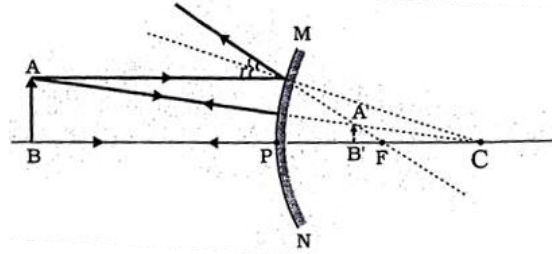
| 32 | <p>(a)</p> <ul style="list-style-type: none"> • It gets magnetised • Electromagnet. • It behaves as a magnet only when current passes through the solenoid. <p>(b)</p>  <p style="text-align: center;">(Any one diagram)</p> <ul style="list-style-type: none"> • This pattern indicates that the magnetic field is uniform. | <p>½ ½ ½</p> <p>1 ½</p> | <p>3</p> | | | | |
|--|--|--|----------|--|---|---------------------------|----------|
| 33 | <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%; text-align: center;">Food chain</th> <th style="width: 50%; text-align: center;">Food web</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">It is a series of organisms feeding on one another at various levels</td> <td style="padding: 5px;">It is a network of interconnected food chains / series of branching lines which provides a number of feeding connections amongst different organisms.</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Population of grass/ first trophic level will increase. • Population of tiger/ third trophic level will decrease. | Food chain | Food web | It is a series of organisms feeding on one another at various levels | It is a network of interconnected food chains / series of branching lines which provides a number of feeding connections amongst different organisms. | <p>1+1</p> <p>½ ½</p> | <p>3</p> |
| Food chain | Food web | | | | | | |
| It is a series of organisms feeding on one another at various levels | It is a network of interconnected food chains / series of branching lines which provides a number of feeding connections amongst different organisms. | | | | | | |
| SECTION D | | | | | | | |
| 34 | <p>(a)</p> <p>(i) The molecules of water of crystallisation in ferrous sulphate crystals get evaporated on heating.</p> <p>(ii) Green \longrightarrow White</p> <p>(iii) Seven / $(\text{FeSO}_4 \cdot 7\text{H}_2\text{O})$</p> <p>(I) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$</p> <p>(II) $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$</p> <p>(iv) • On heating gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$) at 373 K it loses water molecules/</p> $\text{CaSO}_4 \cdot 2\text{H}_2\text{O} \xrightarrow{373\text{ K}} \text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O} + 1\frac{1}{2}\text{H}_2\text{O}$ <p>Two uses of plaster of Paris:</p> <ul style="list-style-type: none"> • Making toys / material for decoration • Supporting fractured bones <p style="text-align: right;">(or any other)</p> | <p>1</p> <p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>1</p> <p>½ + ½</p> | | | | | |

| | | | |
|----|--|---|---|
| | OR | | |
| | <p>(b)</p> <p>(i) X-Tartaric acid Y-Baking soda Z- Baking powder Y- NaHCO₃</p> <p>(ii)</p> $\text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \longrightarrow \text{NH}_4\text{Cl} + \text{NaHCO}_3$ $\text{NaHCO}_3 + \text{H}^+ \longrightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Sodium salt of acid}$ <p>CO₂ released during heating makes the cake soft and spongy</p> <p>(iii) Magnesium hydroxide; Mg(OH)₂</p> | <p>½</p> <p>½</p> <p>½</p> <p>½</p> <p>1</p> <p>½</p> <p>½</p> <p>1</p> | 5 |
| 35 | <p>(a)</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • <u>Observation</u>: The leaf of the potted plant A with KOH did not turn blue – black. The leaf of the potted plant B turns blue. • <u>Conclusion</u>: KOH absorbs CO₂ so photosynthesis did not occur in potted plant A. <p style="text-align: center;">OR</p> <p>(b)</p> <p>(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 CO₂ as compared to atmospheric air.</p> | <p>½ x 6</p> <p>1</p> <p>1</p> <p>1,1</p> | |

| | | | |
|----|--|--|---|
| | <p>(ii)</p>  <p style="text-align: center;">Open Stomatal Pore</p> <p>Two labellings : (I) Guard Cells (II) Chloroplast</p> <p>Two functions performed by stomata :</p> <ul style="list-style-type: none"> • Gaseous exchange • Transpiration | <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> | 5 |
| 36 | <p>(a)</p> <p>(i) • Current becomes one-third of its initial value. • Ohm's Law</p> <p>The potential difference across the ends of a conductor is directly proportional to the current flowing through it, provided its temperature remains the same.</p> <p>(ii)</p>  <p style="text-align: center;">6V K</p> <p>Total Voltage = $V = 4 \times 1.5 \text{ V} = 6 \text{ V}$ Total resistance, $R(s) = R_1 + R_2 + R_3$ $= 5 \Omega + 10 \Omega + 15 \Omega = 30 \Omega$</p> <p>(I) Current, $I = \frac{V}{R} = \frac{6 \text{ V}}{30 \Omega} = 0.2 \text{ A}$</p> <p>(II) $V = IR = 0.2 \text{ A} \times 10 \Omega = 2 \text{ V}$</p> | <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> | |

| | | | |
|----|--|-----------------------------|---|
| | OR | | |
| | (b) | | |
| | (i) When 1 joule of work is done to move a charge of 1 coulomb from one point to the other. | 1 | |
| | (ii) $d = 0.2 \text{ mm} = 2 \times 10^{-4} \text{ m}$; $R = 14 \Omega$ $\rho = 1.6 \times 10^{-8} \Omega \text{ m}$; $A = \frac{\pi d^2}{4}$ | $\frac{1}{2}$ | |
| | $R = \frac{\rho l}{A} = \frac{4\rho l}{\pi d^2}$ or $l = \frac{\pi d^2 R}{4\rho}$ | $\frac{1}{2}$ | |
| | $l = \frac{22}{7} \times \frac{(2 \times 10^{-4})^2}{4 \times 1.6 \times 10^{-8}} \times 14$ | | |
| | $= 27.5 \text{ m}$ | 1 | |
| | When the diameter is doubled, $d' = 2d$ $A' = 4A$ | $\frac{1}{2}$ | |
| | $\frac{R'}{R} = \frac{A}{A'}$ or $R' = \frac{RA}{A'} = \frac{RA}{4A}$ | | |
| | $\frac{R'}{14} = \frac{A}{4A}$ | | |
| | $R' = 3.5 \Omega$ | 1 | |
| | Change $(14.0 - 3.5) = 10.5 \Omega$ | $\frac{1}{2}$ | |
| | | | 5 |
| | SECTION E | | |
| 37 | (a) Compounds formed by carbon and hydrogen only. | 1 | |
| | (b) Tetravalency and Catenation | 1 | |
| | (c) (i) (1)  (2)  | $\frac{1}{2} + \frac{1}{2}$ | |
| | $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Acid}} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$ <div style="margin-left: 300px;">Ester</div> | 1 | |
| | OR | | |
| | (c) | | |
| | (ii) Compounds with identical molecular formula but different structures | 1 | |

| | <p>Two isomers of butane C_4H_{10}</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $\begin{array}{cccc} & H & H & H & H \\ & & & & \\ H & -C & -C & -C & -C-H \\ & & & & \\ & H & H & H & H \end{array}$ </div> <div style="text-align: center;"> $\begin{array}{ccccc} & H & & H & & H \\ & & & & & \\ H & -C & - & C & - & C & -H \\ & & & & & \\ & H & & & & H \\ & & & H & - & C & -H \\ & & & & & \\ & & & & & H \end{array}$ </div> </div> | $\frac{1}{2} + \frac{1}{2}$ | 4 | | | | |
|---|---|---|-------------------|---|--|---|---|
| 38 | <p>(a)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center; padding: 5px;">Self-pollination</th> <th style="text-align: center; padding: 5px;">Cross-pollination</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Transfer of pollen grains from anther to the stigma of the same flower.</td> <td style="padding: 5px;">Transfer of pollen grains from the anther of one flower to the stigma of another flower.</td> </tr> </tbody> </table> <p>(b) Petals, they dry and fall off.</p> <p>(c)(i) Fusion of male and female gametes to form a zygote Ovule – Seed, Ovary – fruit</p> <p style="text-align: center;">OR</p> <p>(c) (ii) Future shoot – Plumule, Future root – Radicle Cotyledon – Stores food.</p> | Self-pollination | Cross-pollination | Transfer of pollen grains from anther to the stigma of the same flower. | Transfer of pollen grains from the anther of one flower to the stigma of another flower. | 1 | 4 |
| Self-pollination | Cross-pollination | | | | | | |
| Transfer of pollen grains from anther to the stigma of the same flower. | Transfer of pollen grains from the anther of one flower to the stigma of another flower. | | | | | | |
| 39 | <p>(a) It is straight line passing through the pole and centre of curvature of a concave mirror.</p> <p>(b) Radius of curvature ,$R= 20$ cm</p> <p>(c)</p> <p>(i) $u = -10$ cm, $f = +15$ cm</p> $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{15} - \frac{1}{-10}$ $\frac{1}{v} = \frac{1}{6}$ $\Rightarrow v = + 6 \text{ cm}$ <p style="text-align: center;">OR</p> <p>(c) (ii) Convex mirror / Diverging mirror</p> | 1 1 $\frac{1}{2}$ $\frac{1}{2}$ 1 | $\frac{1}{2}$ | | | | |



[Note: Deduct ½ mark if direction of rays is not shown]

1 ½

4
