

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT NAME : SCIENCE (Q.P. CODE 31/1/1)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC.”
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded
4	The Marking Scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark(✓) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “Extra Question” .
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per

	day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13	<ul style="list-style-type: none"> • Ensure that you do not make the following common types of errors committed by the Examiner in the past:- • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than assigned to it. • Wrong totaling of marks awarded on an answer. • Wrong transfer of marks from the inside pages of the answer book to the title page. • Wrong question wise totaling on the title page. • Wrong totaling of marks of the two columns on the title page. • Wrong grand total. • Marks in words and figures not tallying/not same. • Wrong transfer of marks from the answer book to online award list. • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0) Marks.
15	Any unassessed portion, non-carrying over of marks to the title page, or totaling error detected by the candidate shall damage the prestige of all the personnel engaged in the evaluation work as also of the Board. Hence, in order to uphold the prestige of all concerned, it is again reiterated that the instructions be followed meticulously and judiciously.
16	The Examiners should acquaint themselves with the guidelines given in the “ Guidelines for Spot Evaluation ” before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18.	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

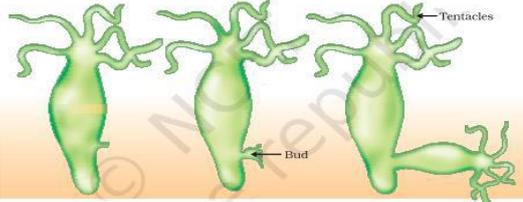
SECONDARY SCHOOL EXAMINATION, 2025

MARKING SCHEME

CLASS: X SCIENCE (Subject Code–086)

[Paper Code: 31/1/1]

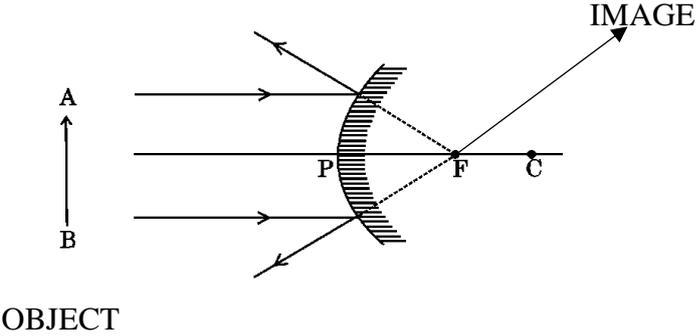
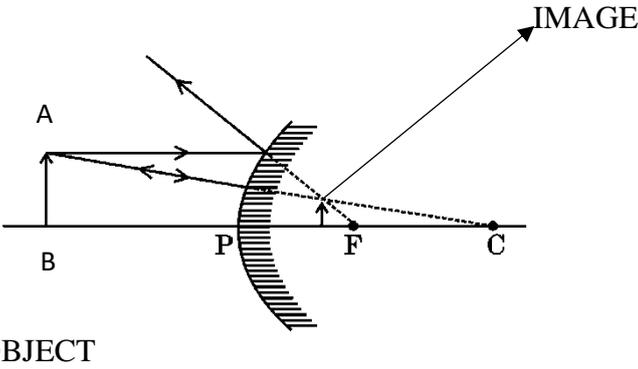
Maximum Marks: 80

Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
SECTION A			
1.	D / 1: 8	1	1
2.	B / Al ₂ O ₃ and MgO	1	1
3.	D / Weak acid, neutral, strong base, strong acid	1	1
4.	A / Salt and water is formed	1	1
5.	C / It has weak electrostatic forces of attraction between its oppositely charged ions.	1	1
6.	B / Calcium and Magnesium	1	1
7.	A / $Mg : \overset{\times\times}{\underset{\times\times}{\curvearrowright}} \overset{\times\times}{\underset{\times\times}{O}} \times \times \rightarrow Mg^{2+} \left[\overset{\times\times}{\underset{\times\times}{:O}} \times \times \right]^{2-}$	1	1
8.	C / starch into simple sugars	1	1
9.	D / Auxins	1	1
10.	C / (i) and (iii)	1	1
11.	C / 100% round and yellow	1	1
12.	D / Cytoplasm and Oxygen deficient muscle cells	1	1
13.	A / (i) and (ii)	1	1
14.	B / Presbyopia and bifocal lens	1	1
15.	D / (ii) and (iv)	1	1
16.	D / 99%	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.	C / Assertion (A) is true, but Reason (R) is false.	1	1
19.	A / Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	1	1
20.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).	1	1
SECTION B			
21.	<ul style="list-style-type: none"> • Evolution of gas • Change / Rise in temperature 	1 1	2
22.		<p style="text-align: right;">diagram labelling</p>	1 1 2

23.	<p>(a)</p> <ul style="list-style-type: none"> • 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. <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i) Plants have low energy needs because they have a large proportion of dead cells in many tissues / Plants have low energy needs as they do not move</p> <p>(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.</p>	1 ½ ½ 1 1	2
24	<p>$u = -60 \text{ cm}$ $f = -30 \text{ cm}$</p> $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ $\frac{1}{-30 \text{ cm}} = \frac{1}{v} - \frac{1}{-60 \text{ cm}}$ $\frac{1}{v} = \frac{1}{-30} - \frac{1}{60}$ $\frac{-3}{60 \text{ cm}} = \frac{1}{v} \Rightarrow v = -20 \text{ cm}$ <p>Position of image is 20 cm from a concave lens.</p>	½ ½ 1	2
25.	<p>(a)</p> <p>Resistance of each part = $\frac{R}{3}$</p> $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}$ $\frac{1}{R_p} = \frac{1}{R/3} + \frac{1}{R/3} + \frac{1}{R/3}$ $\frac{1}{R_p} = \frac{3}{R} + \frac{3}{R} + \frac{3}{R} = \frac{9}{R}$ $\Rightarrow R_p = \frac{R}{9}$ <p style="text-align: center;">OR</p> <p>(b)</p> <ul style="list-style-type: none"> • Electric power is the rate at which electrical energy is 	½ ½ ½ ½	1

	<p>consumed or dissipated in an electrical circuit. / Electric power is electrical energy consumed per unit time.</p> <ul style="list-style-type: none"> When 1A current at 1V potential difference flows in a circuit. / Power consumed is 1W when 1J electrical energy is consumed in 1 s. 	1	2
26.	<p>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.</p>	2	2
SECTION C			
27.	<p>(a)</p> $3 MnO_2(s) + 4 Al(s) \rightarrow 3 Mn(l) + 2 Al_2O_3(s) + heat$ $Fe_2O_3(s) + 2 Al(s) \rightarrow 2 Fe(l) + Al_2O_3(s) + heat$ <p>(Award marks if explained through statement or any other reactions.)</p> <p>(b)</p> <p>Metals towards the top of the reactivity series (Na, Mg, Ca) have more affinity for oxygen than carbon.</p>	1 1	
28.	<p>(a)</p> <ul style="list-style-type: none"> ➤ 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. <p>Iron nails rust in test tube A, but they do not rust in test tubes B and C.</p> <p>Rusting of iron takes place when exposed to both air and water.</p> <p style="text-align: center;">/</p> <div style="text-align: center;"> <p>The diagram illustrates three test tubes labeled A, B, and C, each containing an iron nail. Test tube A is partially filled with water and has air above it; the nail is labeled 'Rusty iron nails'. Test tube B is filled with 'Bottled distilled water (boiled to remove any dissolved air)' and has a 'Layer of oil (prevents air dissolving in the water)' on top; the nail is clean. Test tube C contains 'Anhydrous calcium chloride (drying agent)' at the bottom and 'Dry air' above it; the nail is clean.</p> </div>	3	3

	<p>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.</p> <p>(Note: if a student explains activity through description or through labelled diagram, award full marks.)</p> <p style="text-align: center;">OR</p> <p>(b) (i)</p> <ul style="list-style-type: none"> • Sodium, Potassium, Lithium (any two) • Observations: <ul style="list-style-type: none"> ➤ A violent reaction occurs. ➤ Large amount of heat is evolved. ➤ Evolved gas may catch fire. <p>(ii) The gas (bubbles) burns with a pop sound</p>	<p>1/2, 1/2</p> <p>1 1/2</p> <p>1/2</p>	<p>3</p>								
29.	<p>(a) Plant cells use electrical– chemical means to convey information. /The information that touch has occurred must be communicated</p> <p>(b) Plant cells change shape by changing the amount of water in them (swelling or shrinking).</p> <p>(c)</p> <table border="1" data-bbox="288 1140 1166 1440"> <tr> <td>Movement in touch-me-not Plant</td> <td>Movement of tendrils in pea plant</td> </tr> <tr> <td>It is growth independent</td> <td>It is growth dependent</td> </tr> <tr> <td>It does not take place in the direction of stimulus</td> <td>It takes place in the direction of stimulus</td> </tr> <tr> <td>It is also called as nastic movement.</td> <td>It is also called as tropic movement (any other)</td> </tr> </table> <p style="text-align: center;">(Any one difference)</p>	Movement in touch-me-not Plant	Movement of tendrils in pea plant	It is growth independent	It is growth dependent	It does not take place in the direction of stimulus	It takes place in the direction of stimulus	It is also called as nastic movement.	It is also called as tropic movement (any other)	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>
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30.	<p>(a) Chromosomes carry genes which control the traits of an organism/chromosomes contain information for inheritance of features from parents to next generation in the form of DNA(Deoxy ribonucleic acid) molecule.</p> <p>(b)</p> <ul style="list-style-type: none"> • Each cell has two copies of each chromosome, one from male and the other from female parents which get halved during the formation of germ cells/gametes. • After fusion of the germ cells zygote is formed which restores the normal number of chromosomes and the same amount of DNA in the progeny. 	<p>1</p> <p>1</p> <p>1</p>	<p>3</p>								

31.	<p>(i)</p>  <p>OBJECT</p> <p>(ii)</p>  <p>OBJECT</p> <p>(Note: Deduct ½ mark if arrows are not drawn.)</p>	1 ½	
32.	<p>(a)</p> $\frac{1}{R_1} = \frac{1}{10\ \Omega} + \frac{1}{15\ \Omega} = \frac{1}{6\ \Omega} \Rightarrow R_1 = 6\ \Omega$ $\frac{1}{R_2} = \frac{1}{60\ \Omega} + \frac{1}{40\ \Omega} = \frac{100}{2400\ \Omega} \Rightarrow R_2 = 24\ \Omega$ <p>∴ R_1 and R_2 are in series</p> <p>∴ $R_{\text{total}} = R_1 + R_2 = (6 + 24) = 30\ \Omega$</p> <p>(b) $V = IR \Rightarrow I = \frac{V}{R} = \frac{15\ \text{V}}{30\ \Omega} = 0.5\ \text{A}$</p> <p>(c) $V = IR_1 = 0.5\ \text{A} \times 6\ \Omega = 3.0\ \text{V}$</p>	1 1 1	3
33.	<p>(a)</p> <ul style="list-style-type: none"> • $R = \rho \frac{l}{A}$ • $\rho = \frac{RA}{l}$ • SI unit of $\rho = \frac{\text{ohm} \times (\text{metre})^2}{\text{metre}}$ = ohm meter 	1 ½ ½	

	(b) Resistivity of alloy is higher than pure metals. / They do not oxidise (burn) readily at high temperatures.	1	3
SECTION D			
34.	<p>(a)</p> <p>(i)</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> $\begin{array}{cccc} & \text{H} & \text{H} & \text{H} & \text{H} \\ & & & & \\ \text{H} & -\text{C} & -\text{C} & -\text{C} & =\text{C} \\ & & & & \\ & \text{H} & \text{H} & & \text{H} \end{array}$ </div> <div style="text-align: center;"> $\begin{array}{cccc} & \text{H} & \text{H} & \text{H} & \text{H} \\ & & & & \\ \text{H} & -\text{C} & -\text{C} & =\text{C} & -\text{C} & -\text{H} \\ & & & & \\ & \text{H} & & & \text{H} \end{array}$ </div> <div style="text-align: center;"> $\begin{array}{ccc} & \text{H} & & \text{H} \\ & & & \\ \text{H} & -\text{C} & -\text{C} & =\text{C} \\ & & & \\ & \text{H} & & \text{H} \\ & & & \\ & & & \text{H} \\ & & & \\ & & & \text{H} \\ & & & \\ & & & \text{H} \end{array}$ </div> </div> <p style="text-align: right;">(any two)</p> <p>(ii) (I) Chloropropane 1/2 (II) Butanone/ Butan-2-one 1/2</p> <p>(iii) (I)</p> $\text{CH}_3 - \text{CH}_2\text{OH} \xrightarrow[\text{Or acidified K}_2\text{Cr}_2\text{O}_7 + \text{Heat}]{\text{Alkaline KMnO}_4 + \text{Heat}} \text{CH}_3\text{COOH}$ <p style="text-align: right;">1</p> <p>(II)</p> $\text{CH}_3\text{CH}=\text{CH}_2 + \text{H}_2 \xrightarrow{\text{Ni/Pd}} \text{CH}_3\text{CH}_2\text{CH}_3$ <p style="text-align: right;">1</p> <p>(III) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Acid}} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$ 1</p> <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i) X = Ethanol/ Ethyl alcohol/ $\text{C}_2\text{H}_5\text{OH}$ 1/2 Y = Sodium ethoxide/ $\text{C}_2\text{H}_5\text{ONa}$ 1/2 Z = Hydrogen/H_2 1/2</p> $\text{CH}_3\text{CH}_2\text{OH} + \text{Na} \longrightarrow \text{CH}_3\text{CH}_2\text{ONa} + \frac{1}{2}\text{H}_2$ <p style="text-align: center;">X Y Z</p> <p style="text-align: right;">1/2</p> <p>(ii) (I)</p> $2\text{C}_2\text{H}_5\text{OH} + 7\text{O}_2 \longrightarrow 4\text{CO}_2 + 6\text{H}_2\text{O} + \text{Heat} + \text{Light}$ <p style="text-align: right;">1</p> <p>(II)</p> $\text{C}_2\text{H}_5\text{OH} \xrightarrow[\text{Conc. H}_2\text{SO}_4]{443\text{ K}} \text{C}_2\text{H}_4 + \text{H}_2\text{O}$ <p style="text-align: right;">1</p>		

	<p>(III)</p> $C_2H_5OH \xrightarrow{\text{Acidified } K_2Cr_2O_7} CH_3COOH$ <p>(No mark to be deducted if equations are not balanced.)</p>	1	5				
35.	<p>(a) (i)</p> <p>(I) Ovary: Produces female gamete (egg) and female hormones(oestrogen).</p> <p>(II) Fallopian tube: Site of Fertilization</p> <p>(III) Uterus: Site of Implantation and embryonic development.</p> <p>(ii) Methods of contraception used by males:</p> <ul style="list-style-type: none"> • Mechanical barrier - Condoms • Surgical method – blocking the vas deferens in males (Vasectomy) <p style="text-align: center;">OR</p> <p>(b) (i)</p> <table border="1" style="width: 100%;"> <thead> <tr> <th style="width: 50%;">Self-pollination</th> <th style="width: 50%;">Cross-pollination</th> </tr> </thead> <tbody> <tr> <td>Pollen grains are transferred from stamen to the stigma of the same flower.</td> <td>Transfer of pollen grains from stamen of one flower to the stigma of another flower of same species.</td> </tr> </tbody> </table> <p>(ii)</p> <p>A – Stigma: Receives pollen and provides suitable environment for its germination.</p> <p>B –Pollen tube: Carries males germ cells (gametes) to the female gamete situated in the ovary.</p> <p>C – Egg Cell (Female germ cell): Fuses with male gamete and forms zygote.</p>	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.	<p>1/2,1/2</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1+1</p> <p>1</p> <p>1</p> <p>1</p>	5
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.						
36.	<p>(a) (i)</p> <ul style="list-style-type: none"> • Concave lens • $P = \frac{1}{f(m)}$ $-2.5 = \frac{1}{f}$ $f = \frac{10}{-2.5} = -0.4 \text{ m} = -40 \text{ cm}$ <ul style="list-style-type: none"> • Myopia <p>(ii) (I) Real and inverted</p> <p>(II) magnified image /size of image is double the size of object</p> <p>(III) beyond 2F/ on the other side as that of object</p> <p>(IV) Negative</p> <p>(iii)</p> <ul style="list-style-type: none"> • The lens with focal length 10 cm • less focal length, more converging/diverging power 	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2×4</p> <p>1/2</p> <p>1/2</p>					

	<ul style="list-style-type: none"> • $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$/ Green Vitrol/Ferrous sulphate hepta hydrate • $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$/ Calcium Sulphate hemihydrate /POP <p style="text-align: center;">(Any two examples)</p>	$\frac{1}{2}, \frac{1}{2}$	4
38.	<p>(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.</p> <p>(b)</p> $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$ <p>(c) (i)</p> <ul style="list-style-type: none"> • 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 intermediate, which is acted upon by the energy absorbed by the chlorophyll during the day. <p style="text-align: center;">OR</p> <p>(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.</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p>	4
39.	<p>(a) Live wire- Red Neutral wire- Black</p> <p>(b) Power, $P = 1 \text{ kW} = 1 \times 1000 \text{ W} = 1000 \text{ W}$ Voltage, $V = 220 \text{ V}$ Current drawn $I = ?$ $P = V \times I$ $I = \frac{1000 \text{ W}}{220 \text{ V}} = 4.54 \text{ A}$ Current rating should be of 5A.</p> <p>(c) (i)</p> <ul style="list-style-type: none"> • 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. <p style="text-align: center;">OR</p> <p>(c) (ii)</p> <ul style="list-style-type: none"> • 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. 	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	4

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11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
12	Every examiner has to necessarily do evaluation work for full working hours i.e., 8 hours every day and evaluate 20 answer books per day in main subjects and 25 answer books per day in other subjects (Details are given in Spot Guidelines).This is in view of the reduced syllabus and number of questions in question paper.

13	<ul style="list-style-type: none"> • Ensure that you do not make the following common types of errors committed by the Examiner in the past:- • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than assigned to it. • Wrong totaling of marks awarded on an answer. • Wrong transfer of marks from the inside pages of the answer book to the title page. • Wrong question wise totaling on the title page. • Wrong totaling of marks of the two columns on the title page. • Wrong grand total. • Marks in words and figures not tallying/not same. • Wrong transfer of marks from the answer book to online award list. • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
14	While evaluating the answer books if the answer is found to be totally incorrect, it should be marked as cross (X) and awarded zero (0)Marks.
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16	The Examiners should acquaint themselves with the guidelines given in the “ Guidelines for Spot Evaluation ” before starting the actual evaluation.
17	Every Examiner shall also ensure that all the answers are evaluated, marks carried over to the title page, correctly totaled and written in figures and words.
18.	The candidates are entitled to obtain photocopy of the Answer Book on request on payment of the prescribed processing fee. All Examiners/Additional Head Examiners/Head Examiners are once again reminded that they must ensure that evaluation is carried out strictly as per value points for each answer as given in the Marking Scheme.

SECONDARY SCHOOL EXAMINATION, 2025

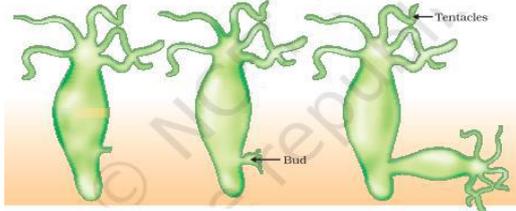
MARKING SCHEME

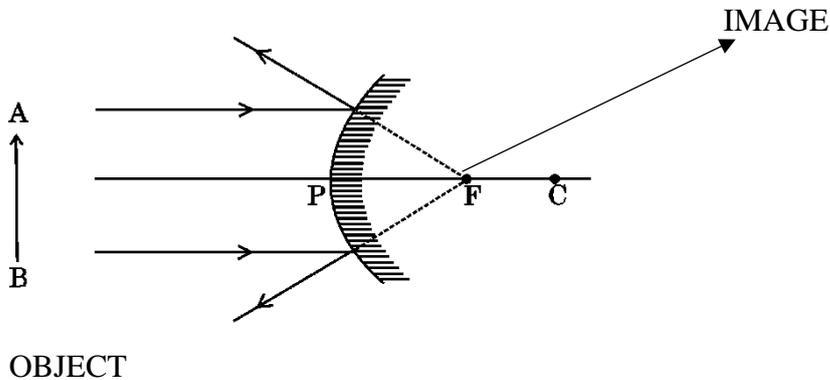
CLASS: X [SCIENCE (Subject Code–086)]

[Paper Code: 31/1/2]

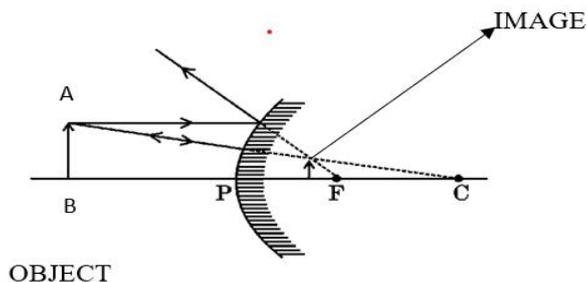
Maximum Marks: 80

Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
SECTION A			
1.	A/ $Mg : \overset{\times\times}{\underset{\times\times}{\curvearrowright}} \overset{\times\times}{\underset{\times\times}{O}} : \rightarrow Mg^{2+} \left[\overset{\times\times}{\underset{\times\times}{O}} : \overset{\times\times}{\underset{\times\times}{O}} : ^{2-} \right]$	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 ₂ O 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 <i>not</i> the correct explanation of Assertion (A).	1	1
19.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is <i>not</i> 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.	<ul style="list-style-type: none"> • (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 	<ul style="list-style-type: none"> ½ ½ 	

	<ul style="list-style-type: none"> • will be inversely proportional to the resistance of the circuit. • • (Award marks if explained through calculations) • • • OR • (b) Voltage $V = 220V$ • $P = V \times I$ • Power $P_1 = 100 W$ $P_2 = 60 W$ • $\therefore I_1 = \frac{P_1}{V} = \frac{100 W}{220 V} = 0.45 A$ • $\therefore I_2 = \frac{P_2}{V} = \frac{60 W}{220 V} = 0.27 A$ • \therefore Total current drawn • $I = I_1 + I_2 = 0.45 + 0.27 = 0.72 A$ 	<p>1</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>	<p>2</p>
<p>23.</p>	<p>$f = -20 \text{ cm} ; u = -30 \text{ cm}$</p> $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{-20} - \frac{1}{-30}$ $\frac{1}{v} = \frac{1}{-20} + \frac{1}{30}$ <p>$v = -60 \text{ cm}$</p> <p>Position of image is 60 cm in front of the mirror.</p>	<p>1/2</p> <p>1/2</p> <p>1</p>	<p>2</p>
<p>24.</p>	<p>(a)</p> <ul style="list-style-type: none"> • 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. <p>OR</p> <p>(b)</p> <p>(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</p> <p>(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.</p>	<p>1</p> <p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p>	<p>2</p>
<p>25.</p>	 <p style="text-align: right;">diagram</p>	<p>1</p>	

		labelling	1	2
26.	(a) $2 Pb(NO_3)_2 \xrightarrow{\text{heat}} 2 PbO + 4 NO_2 + O_2$		1	
	(b) $CH_4 + 2 O_2 \rightarrow CO_2 + 2 H_2O + \text{Heat} + \text{light}$		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 = $0.01 \text{ cm} = 0.01 \times 10^{-2} \text{ m}$			
	• $\rho = 44 \times 10^{-8} \Omega \text{ m}$		½	
	• $R = 14 \Omega$		½	
	• $R = \rho \frac{l}{A}$			
	• $l = \frac{R \times A}{\rho} = \frac{14 \times 22 \times (0.01 \times 10^{-2})^2}{7 \times 44 \times 10^{-8}}$		1	
	• $= \frac{10^{-8}}{10^{-8}} = 1.0 \text{ m}$			3
28.	(a)			
	$\frac{1}{R_1} = \frac{1}{10 \Omega} + \frac{1}{15 \Omega} = \frac{1}{6 \Omega} \Rightarrow R_1 = 6 \Omega$			
	$\frac{1}{R_2} = \frac{1}{60 \Omega} + \frac{1}{40 \Omega} = \frac{100}{2400 \Omega} \Rightarrow R_2 = 24 \Omega$			
	$\therefore R_1$ and R_2 are in series			
	$\therefore R_{\text{total}} = R_1 + R_2 = (6 + 24) = 30 \Omega$		1	
	(b) $V = IR \Rightarrow I = \frac{V}{R} = \frac{15V}{30 \Omega} = 0.5 \text{ A}$		1	
	(c) $V = IR = 0.5 \text{ A} \times 6 \Omega = 3.0 \text{ V}$		1	
				3
29.	(i)			
			1 ½	

(ii)



1 ½

(Note: Deduct ½ mark if arrows are not drawn.)

3

30.

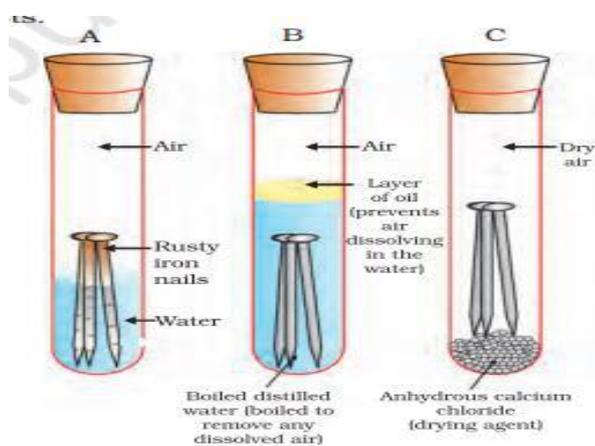
(a)

- 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.

/



3

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)

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

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.

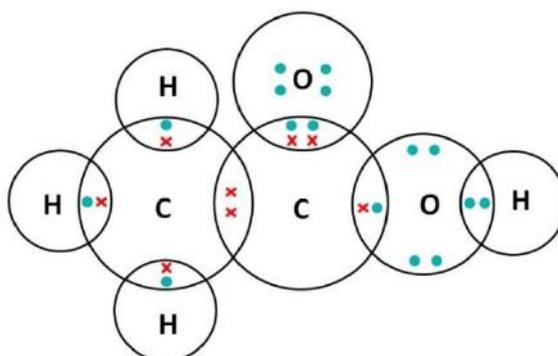
- (a) (i) A = Ethanol /Ethyl alcohol / C_2H_5OH
 B = Ethanoic acid /Acetic acid / CH_3COOH
 C = Ethene / $C_2H_4/CH_2=CH_2$
- (ii) Molecular mass of ethene (C_2H_4)
 $12 \times 2 + 1 \times 4 = 24 + 4 = 28 \text{ u}$
- (iii) Brisk effervescence is observed.
 $CH_3COOH + Na_2CO_3 \rightarrow CH_3COONa + H_2O + CO_2$
- (iv) (Ethanoic acid)

 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$

1

 $\frac{1}{2}$

1



1

OR

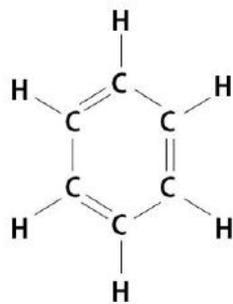
- (b) (i)
 - Homologous series: A series of organic compounds in which the same functional groups or hetero-atom substitutes for hydrogen in a carbon chain/A sequence of a carbon compound with same general formula and similar chemical properties.
 - $HCOOH, CH_3COOH, C_2H_5COOH$
 - Methanoic acid, Ethanoic acid, Propanoic acid
 (any other 3 successive members)
- (ii)
 - (I) Benzene
 - (II) Cyclohexane

1

1

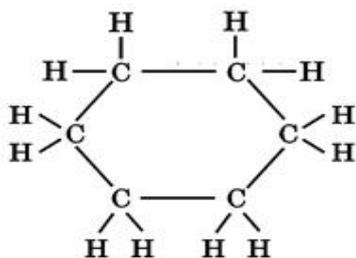
1

 $\frac{1}{2}$ $\frac{1}{2}$



Benzene

OR



Cyclohexane

(any other example)

1

5

36.

- a) (i)
 (I) Ovary: Produces female gamete (egg) and female hormones(oestrogen).
 (II) Fallopian tube: Site of Fertilization
 (III) Uterus: Site of Implantation and embryonic development.
- (ii) Methods of contraception used by males:
- Mechanical barrier - Condoms
 - Surgical method – blocking the vas deferens in males (Vasectomy)

1/2,1/2

1

1

1

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.
 B –Pollen tube: Carries males germ cells (gametes) to the female gamete situated in the ovary.
 C – Egg Cell: (Female germ cell): Fuses with male gamete and forms zygote.

1/2,1/2

1/2,1/2

1/2,1/2

5

SECTION E

37.

- (a) Live wire- Red
 Neutral wire- Black

1/2

1/2

	<p>(b) Power, $P = 1 \text{ kW} = 1 \times 1000 \text{ W} = 1000 \text{ W}$ Voltage, $V = 220 \text{ V}$ Current drawn $I = ?$ $P = V \times I$ $I = \frac{1000 \text{ W}}{220 \text{ V}} = 4.54 \text{ A}$ Current rating should be of 5A.</p> <p>(c) (i)</p> <ul style="list-style-type: none"> 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. <p style="text-align: center;">OR</p> <p>(c) (ii)</p> <ul style="list-style-type: none"> 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. 	<p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>	4
38.	<p>(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.</p> <p>(b)</p> $6\text{CO}_2 + 12\text{H}_2\text{O} \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 + 6\text{H}_2\text{O}$ <p>(c) (i)</p> <ul style="list-style-type: none"> 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. <p style="text-align: center;">OR</p> <p>(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</p>	<p>1/2</p> <p>1/2</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p>	4
39.	<p>(a) $2 \text{NaCl} + 2 \text{H}_2\text{O} \xrightarrow{\text{electricity}} 2 \text{NaOH} + \text{H}_2 + \text{Cl}_2$</p> <p>(b) Uses of NaOH : Degreasing metals/ Soaps and Detergents/ paper making/ artificial fibres/ preparation of bleach</p>	<p>1</p> <p>1/2, 1/2</p>	

	<p>Uses of H₂: As fuel/ Margarine/ Preparation of ammonia for fertilizers/preparation of HCl</p> <p>Uses of Cl₂ : Disinfectant/ PVC/ water treatment/ in swimming pools/ CFC's/ preparation of bleach/ preparation of HCl/ pesticides (Any two uses of anyone product)</p> <p>(c) (i) A – NaHCO₃/ Sodium Hydrogen Carbonate/Baking soda</p> <p style="padding-left: 40px;">B – Na₂CO₃ / Sodium Carbonate</p> $2 \underset{\text{A}}{\text{NaHCO}_3} \xrightarrow{\text{heat}} \underset{\text{B}}{\text{Na}_2\text{CO}_3} + \text{H}_2\text{O} + \text{CO}_2$ <p style="text-align: center;">OR</p> <p>(c) (ii) • The fixed number of water molecules present in one formula unit of a salt.</p> <ul style="list-style-type: none"> • CuSO₄.5H₂O/ Copper Sulphate pentahydrate/Blue vitriol • CaSO₄.2H₂O/Gypsum/Calcium sulphate dihydrate • Na₂CO₃.10H₂O/Washing Soda/Sodium carbonate decahydrate • FeSO₄.7 H₂O / Green Vitriol/Ferrous sulphate heptahydrate • CaSO₄. ½ H₂O /Calcium Sulphate hemihydrate/POP <p style="text-align: center;">(Any two examples)</p>	<p>½</p> <p>½</p> <p>1</p> <p>1</p> <p>½,½</p>	<p>4</p>
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Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT : SCIENCE (Q.P. CODE 31/1/3)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	“Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in Newspaper/Website, etc. may invite action under various rules of the Board and IPC.”
3	Evaluation is to be done as per instructions provided in the Marking Scheme. It should not be done according to one’s own interpretation or any other consideration. Marking Scheme should be strictly adhered to and religiously followed. However, while evaluating, answers which are based on latest information or knowledge and/or are innovative, they may be assessed for their correctness otherwise and due marks be awarded to them. In class-X, while evaluating two competency-based questions, please try to understand given answer and even if reply is not from marking scheme but correct competency is enumerated by the candidate, due marks should be awarded
4	The Marking Scheme carries only suggested value points for the answers. These are in the nature of Guidelines only and do not constitute the complete answer. The students can have their own expression and if the expression is correct, the due marks should be awarded accordingly.
5	The Head-Examiner must go through the first five answer books evaluated by each evaluator on the first day, to ensure that evaluation has been carried out as per the instructions given in the Marking Scheme. If there is any variation, the same should be zero after deliberation and discussion. The remaining answer books meant for evaluation shall be given only after ensuring that there is no significant variation in the marking of individual evaluators.
6	Evaluators will mark(✓) wherever answer is correct. For wrong answer CROSS ‘X’ be marked. Evaluators will not put right (✓)while evaluating which gives an impression that answer is correct and no marks are awarded. This is most common mistake which evaluators are committing.
7	If a question has parts, please award marks on the right-hand side for each part. Marks awarded for different parts of the question should then be totaled up and written in the left-hand margin and encircled. This may be followed strictly.
8	If a question does not have any parts, marks must be awarded in the left-hand margin and encircled. This may also be followed strictly.
9	If a student has attempted an extra question, answer of the question deserving more marks should be retained and the other answer scored out with a note “Extra Question” .
10	No marks to be deducted for the cumulative effect of an error. It should be penalized only once.
11	A full scale of marks 80 (example 0 to 80/70/60/50/40/30 marks as given in Question Paper) has to be used. Please do not hesitate to award full marks if the answer deserves it.
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	day in other subjects (Details are given in Spot Guidelines). This is in view of the reduced syllabus and number of questions in question paper.
13	<ul style="list-style-type: none"> • Ensure that you do not make the following common types of errors committed by the Examiner in the past:- • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than assigned to it. • Wrong totaling of marks awarded on an answer. • Wrong transfer of marks from the inside pages of the answer book to the title page. • Wrong question wise totaling on the title page. • Wrong totaling of marks of the two columns on the title page. • Wrong grand total. • Marks in words and figures not tallying/not same. • Wrong transfer of marks from the answer book to online award list. • Answers marked as correct, but marks not awarded. (Ensure that the right tick mark is correctly and clearly indicated. It should merely be a line. Same is with the X for incorrect answer.) • Half or a part of answer marked correct and the rest as wrong, but no marks awarded.
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SECONDARY SCHOOL EXAMINATION, 2025

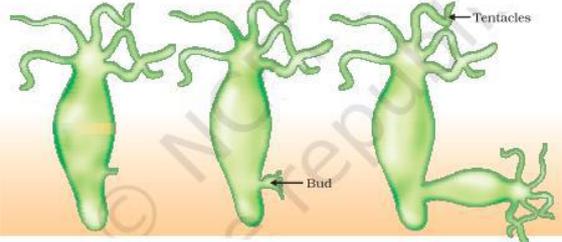
MARKING SCHEME

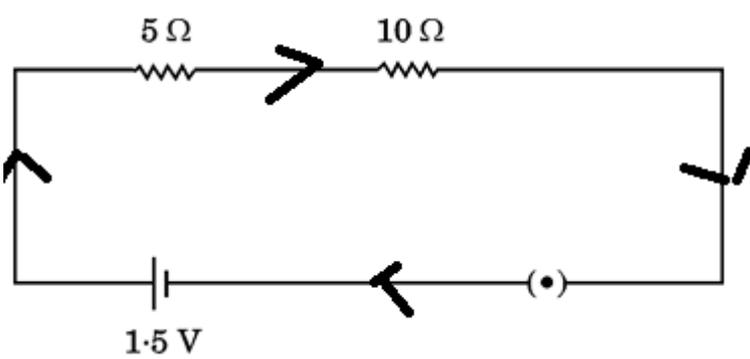
CLASS: X [SCIENCE (Subject Code–086)]

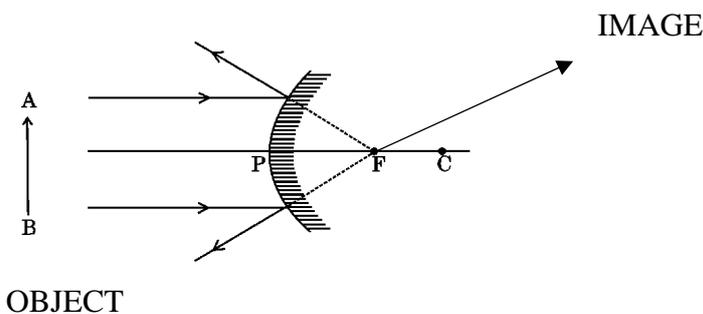
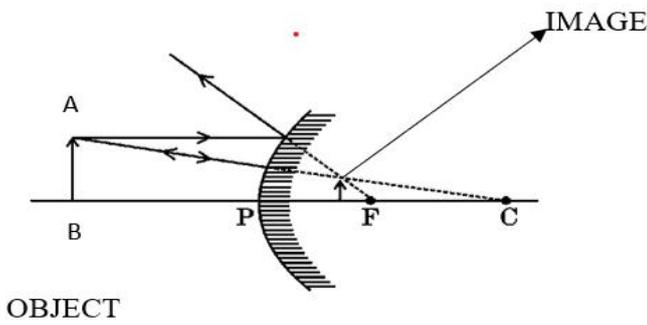
[Paper Code: 31/1/3]

Maximum Marks: 80

Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
	SECTION A	1	1
1.	B / Calcium and Magnesium	1	1
2.	A / $Mg : \overset{\times\times}{\underset{\times\times}{\curvearrowright}} \overset{\times\times}{\underset{\times\times}{O}} \times \times \rightarrow Mg^{2+} \left[\overset{\times\times}{\underset{\times\times}{:O}} \times \times \overset{\times\times}{\underset{\times\times}{:}} \right]^{-2}$	1	1
3.	C / It has weak electrostatic forces of attraction between its oppositely charged ions.	1	1
4.	A / Salt and water is formed	1	1
5.	B /5	1	1
6.	B / Al ₂ O ₃ and MgO	1	1
7.	D / 1 : 8	1	1
8.	D / Cytoplasm and Oxygen deficient muscle cells.	1	1
9.	C / 100% round and yellow	1	1
10.	C / (i) and (iii)	1	1
11.	D / Auxins	1	1
12.	C / starch into simple sugars	1	1
13.	D / 99%	1	1
14.	D / (ii) and (iv)	1	1
15.	A / Scattering of light	1	1
16.	A / (i) and (ii)	1	1
17.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is <i>not</i> 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.	C / Assertion (A) is true, but Reason (R) is false.	1	1
20.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is <i>not</i> the correct explanation of Assertion (A).	1	1
	SECTION B		
21.	Here u = – 10 cm; f = – 15 cm ; $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{-15} = \frac{1}{v} + \frac{1}{-10}$ $\frac{1}{v} = \frac{1}{-15} + \frac{1}{10}$ v = +30 cm Position of image is 30 cm from the mirror	½ ½ 1	2
22.	(a) $P = \frac{V^2}{R}$	½	

	$R = \frac{V^2}{P}$ $R_A = \frac{(220)^2}{50}$ $R_B = \frac{(220)^2}{25}$ $\frac{R_A}{R_B} = \frac{1}{2}$ <p style="text-align: center;">/</p> $P = \frac{V^2}{R}$ <p>Since V is same means P is inversely proportional to R. Power of lamp A is double that of B hence Resistance of A is half that of B.</p> $\frac{R_A}{R_B} = \frac{1}{2}$ <p>OR</p> <p>(b)</p> $H = \frac{V^2}{R} \times t$ $400 = \frac{V^2}{4} \times 1$ $V^2 = 1600$ $V = 40V$	<p>1/2</p> <p>1</p> <p>1</p> <p>1</p> <p>1/2</p> <p>1/2</p> <p>1</p>	<p>2</p>
23.	 <p style="text-align: right;">diagram labelling</p>	<p>1</p> <p>1</p>	<p>2</p>
24.	<p>(a)</p> <ul style="list-style-type: none"> • 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. <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i) Plants have low energy needs because they have a large proportion of dead cells in many tissues / Plants have low energy needs as they do not move</p> <p>(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.</p>	<p>1</p> <p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p>	<p>2</p>

25.	<ul style="list-style-type: none"> • Evolution of gas • Change / Rise in temperature 	1 1	2
26.	<p>(a) $2 \text{HNO}_3 + \text{Ca}(\text{OH})_2 \rightarrow \text{Ca}(\text{NO}_3)_2 + 2 \text{H}_2\text{O}$</p> <p>(b) $\text{NaCl} + \text{AgNO}_3 \rightarrow \text{AgCl} + \text{NaNO}_3$ (Deduct half mark if equation is not balanced)</p>	1 1	2
SECTION C			
27.	<p>(a) It is the amount of work done to bring one coulomb charge from one point to another in the field is 1 joule. / $1\text{V} = \frac{1\text{J}}{1\text{C}}$</p> <p>(b)</p>  <p style="text-align: center;"> Current = $\frac{\text{Potential difference}}{\text{Resistance}} = \frac{1.5\text{V}}{(5\Omega + 10\Omega)}$ $= \frac{1.5\text{V}}{15\Omega} = 0.1\text{A}$ </p>	1 1	3
28.	<p>(a)</p> $\frac{1}{R_1} = \frac{1}{10\Omega} + \frac{1}{15\Omega} = \frac{1}{6\Omega} \Rightarrow R_1 = 6\Omega$ $\frac{1}{R_2} = \frac{1}{60\Omega} + \frac{1}{40\Omega} = \frac{100}{2400\Omega} \Rightarrow R_2 = 24\Omega$ <p>∴ R_1 and R_2 are in series</p> <p>∴ $R_{\text{total}} = R_1 + R_2 = (6 + 24) = 30\Omega$</p> <p>(b) $V = IR \Rightarrow I = \frac{V}{R} = \frac{15\text{V}}{30\Omega} = 0.5\text{A}$</p> <p>(c) $V = IR_1 = 0.5\text{A} \times 6\Omega = 3.0\text{V}$</p>	1 1 1	3

29.	<p>(i)</p>  <p>OBJECT</p> <p>(ii)</p>  <p>OBJECT</p> <p>(Note: Deduct ½ mark if arrows are not drawn.)</p>	1 ½ 1 ½	3
30.	<p>(a)</p> <ul style="list-style-type: none"> • 23 pairs or 46 chromosomes • 1 Pair or 2 chromosomes <p>(b) In sexually reproducing organisms chromosomes occur in pairs. The members of the pair separate at the time of gamete formation. The two germ cells fuse and form zygote thus restore the same number of chromosomes as their parents.</p> <p>(Award marks if explained by any other method.)</p>	½ ½ 2	3
31.	<p>(a) Adrenaline Adrenal Gland</p> <p>(b) It acts on heart. Heart beats faster, resulting in more supply of oxygen to skeletal muscles. The blood to the digestive system and skin is reduced due to contraction of muscles around small arteries in these organs. Breathing rate increases because of contraction of diaphragm and the rib muscles.</p>	½ ½ 2	3
32.	<p>(a)</p> <ul style="list-style-type: none"> ➤ Take three test tubes and place clean iron nails in each of them. ➤ Label these test tubes A, B and C. 		

- $P = \frac{1}{f(m)}$

$$-2.5 = \frac{1}{f}$$

$$f = \frac{10}{-2.5} = -0.4 \text{ m} = -40 \text{ cm}$$

- Myopia

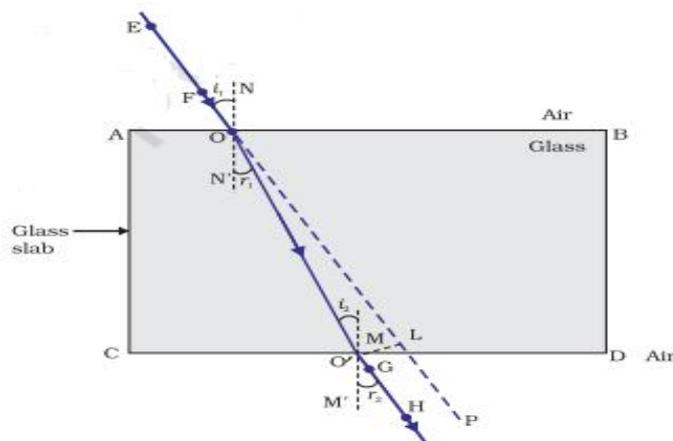
- (ii) (I) Real and inverted
- (II) magnified image /size of image is double the size of object
- (III) beyond 2F/ on the other side as that of object
- (IV) Negative

(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. /

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

(iii)

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 image

1/2

1/2

1/2

1/2 x 4

1/2

1/2

2

1

1

1

5

35.

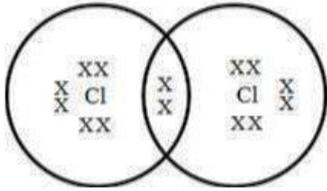
- (a) (i)
- (I) Ovary: Produces female gamete (egg) and female hormones(oestrogen).
- (II) Fallopian tube: Site of Fertilization
- (III) Uterus: Site of implantation and embryonic development.
- (ii) Methods of contraception used by males:
 - Mechanical barrier - Condoms

1/2, 1/2

1

1

1

	<ul style="list-style-type: none"> Surgical method – blocking the vas deferens in males (Vasectomy) <p style="text-align: center;">OR</p> <p>(b) (i)</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 50%; padding: 5px;">Self-pollination</td> <td style="width: 50%; padding: 5px;">Cross-pollination</td> </tr> <tr> <td style="padding: 5px;">Pollen grains are transferred from stamen to the stigma of the same flower.</td> <td style="padding: 5px;">Transfer of pollen grains from stamen of one flower to the stigma of another flower of same species.</td> </tr> </table> <p>(ii)</p> <p>A – Stigma : Receives pollen and provides suitable environment for its germination.</p> <p>B –Pollen tube : Carries males germ cells (gametes) to the female gamete situated in the ovary.</p> <p>C – Egg Cell (Female germ cell) : Fuses with male gamete and forms Zygote.</p>	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.	<p>1</p> <p>1+1</p> <p>1</p> <p>1</p> <p>1</p> <p>5</p>							
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.												
36.	<p>(a) (i)</p> <div style="text-align: center;">  </div> <p>(ii)</p> <ul style="list-style-type: none"> $CH_4 + Cl_2 \xrightarrow{\text{Sunlight}} CH_3Cl + HCl$ <p>/ Chloromethane is formed;</p> <ul style="list-style-type: none"> substitution reaction <p>(iii) Alkaline $KMnO_4$/ Acidified $KMnO_4$ /Acidified $K_2Cr_2O_7$</p> <p style="text-align: center;">(any two)</p> <p>(iv)</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 50%; padding: 5px;">Covalent compounds</td> <td style="width: 50%; padding: 5px;">Ionic Compounds</td> </tr> <tr> <td style="padding: 5px;">Low melting and boiling points</td> <td style="padding: 5px;">High melting and boiling points</td> </tr> <tr> <td style="padding: 5px;">Poor conductors of electricity</td> <td style="padding: 5px;">Conduct electricity in aqueous solution and molten state.</td> </tr> <tr> <td style="padding: 5px;">Generally soft if solids</td> <td style="padding: 5px;">Hard crystalline solids</td> </tr> <tr> <td style="padding: 5px;">Generally soluble in oil or non-polar solvents</td> <td style="padding: 5px;">Generally soluble in soluble in water/polar solvents</td> </tr> </table> <p style="text-align: center;">OR</p> <p>(b) (i) Carbon could gain four electrons forming C^{4-} anion. But it would be difficult for the nucleus with six protons to hold on to ten electrons. Carbon could also</p>	Covalent compounds	Ionic Compounds	Low melting and boiling points	High melting and boiling points	Poor conductors of electricity	Conduct electricity in aqueous solution and molten state.	Generally soft if solids	Hard crystalline solids	Generally soluble in oil or non-polar solvents	Generally soluble in soluble in water/polar solvents	<p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}, \frac{1}{2}$</p> <p>$\frac{1}{2} \times 4$</p>	
Covalent compounds	Ionic Compounds												
Low melting and boiling points	High melting and boiling points												
Poor conductors of electricity	Conduct electricity in aqueous solution and molten state.												
Generally soft if solids	Hard crystalline solids												
Generally soluble in oil or non-polar solvents	Generally soluble in soluble in water/polar solvents												

	<p>lose four electrons forming C^{4+} cation. But it would require a large amount of energy to remove four electrons leaving behind a carbon cation with six protons in its nucleus.</p> <p>\therefore It shares four electrons of the outermost shell to form covalent bond/covalent compound.</p> <p>(ii) There are weak forces of attraction between the molecules of covalent compound.</p> <p>(iii) (I) Covalent compounds do not form ions hence are poor conductors.</p> <p>(II) Carbon-carbon single bond is very strong and stable.</p>	2	
		1	
		1	
		1	
			5
SECTION E			
37.	<p>(a) Live wire- Red Neutral wire- Black</p> <p>(b) Power, $P = 1 \text{ kW} = 1 \times 1000 \text{ W} = 1000 \text{ W}$ Voltage, $V = 220 \text{ V}$ Current drawn $I = ?$ $P = V \times I$ $I = \frac{1000 \text{ W}}{220 \text{ V}} = 4.54 \text{ A}$ Current rating should be of 5A.</p> <p>(c) (i)</p> <ul style="list-style-type: none"> 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. <p style="text-align: center;">OR</p> <p>(c) (ii)</p> <ul style="list-style-type: none"> 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. 	1/2 1/2	
		1/2	
		1/2	
		1	
		1	
		1/2	
		1/2	
			4
38.	<p>(a) $2 \text{ NaCl} + 2 \text{ H}_2\text{O} \xrightarrow{\text{electricity}} 2 \text{ NaOH} + \text{H}_2 + \text{Cl}_2$</p> <p>(b) Uses of NaOH : Degreasing metals/ Soaps and Detergents/ paper making/ artificial fibres/ preparation of bleach Uses of H_2: As fuel/ Margarine/ In 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)</p>	1	
		1/2, 1/2	

	<p>(c) (i) A – NaHCO₃/ Sodium Hydrogen Carbonate/Baking soda</p> <p>B – Na₂CO₃ / Sodium Carbonate</p> $2 NaHCO_3 \xrightarrow{\text{heat}} Na_2CO_3 + H_2O + CO_2$ <p style="text-align: center;">OR</p> <p>(c) (ii) • The fixed number of water molecules present in one formula unit of a salt.</p> <ul style="list-style-type: none"> • CuSO₄.5H₂O/Copper Sulphate pentahydrate/Blue vitriol • CaSO₄.2H₂O/Gypsum/Calcium sulphate dihydrate • Na₂CO₃.10H₂O/Washing Soda/Sodium carbonate decahydrate • FeSO₄.7H₂O/ Green Vitriol/Ferrous sulphate heptahydrate • CaSO₄ . ½ H₂O /Calcium Sulphate hemihydrate/ POP <p style="text-align: right;">(Any other two examples)</p>	<p>½</p> <p>½</p> <p>1</p> <p>1</p> <p>½,½</p>	4
39.	<p>(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.</p> <p>(b)</p> $6CO_2 + 12H_2O \xrightarrow[\text{Sunlight}]{\text{Chlorophyll}} C_6H_{12}O_6 + 6O_2 + 6H_2O$ <p>(c) (i)</p> <ul style="list-style-type: none"> • Absorption of light energy by chlorophyll • Conversion of light energy to chemical energy. • Reduction of carbon dioxide to carbohydrates. • Desert plants take up CO₂ at night and prepare intermediate, which is acted upon by the energy absorbed by the chlorophyll during the day. <p style="text-align: center;">OR</p> <p>(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.</p>	<p>½</p> <p>½</p> <p>1</p> <p>2</p> <p>1</p> <p>1</p>	4