

Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2025
SUBJECT NAME SCIENCE (Q.P. CODE 31/3/1)

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	<p>Ensure that you do not make the following common types of errors committed by the Examiner in the past:-</p> <ul style="list-style-type: none"> • 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.) <p>Half or a part of answer marked correct and the rest as wrong, but no marks awarded.</p>
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 totalled 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

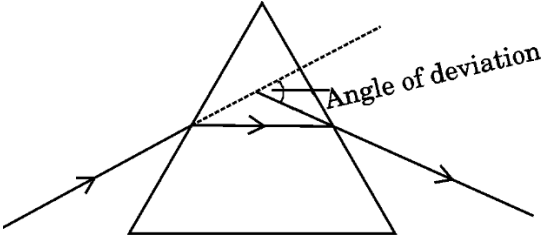
MARKING SCHEME

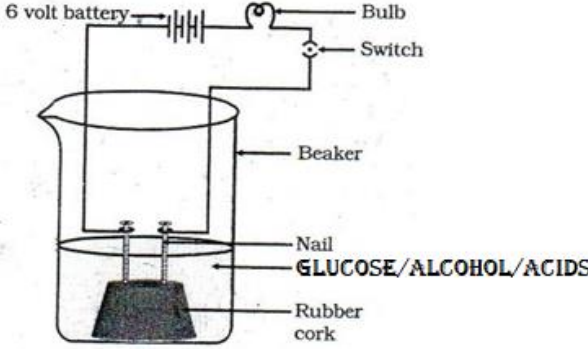
CLASS: X SCIENCE (Subject Code–086)

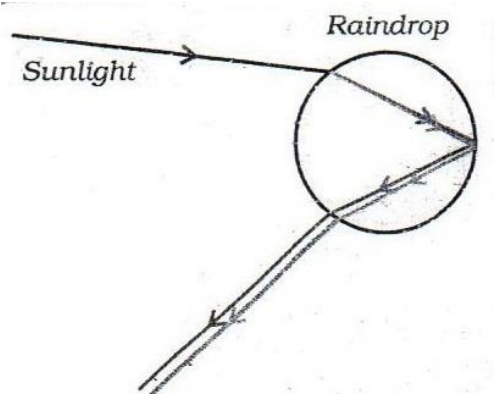
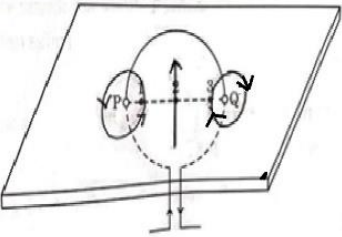
[Paper Code: 31/3/1]

Maximum Marks: 80

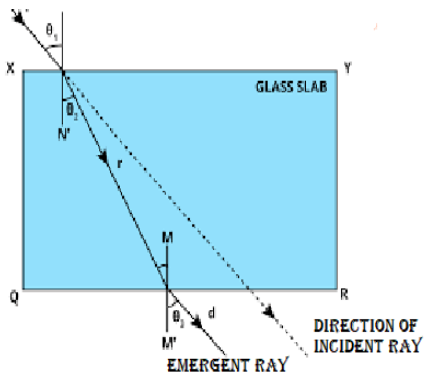
Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
SECTION A			
1	(C) / 2, 3, 1, 3	1	1
2	(B) / K_2SO_4 , Na_2SO_4 , $CaSO_4$	1	1
3	(A) / Reduction with carbon	1	1
4	(C) / (ii) and (iii)	1	1
5	(D) / It is an addition reaction which occurs in the presence of an acid catalyst.	1	1
6	(D) / a-(iii), b-(ii), c-(i), d-(iv)	1	1
7	(C) / Cerebellum	1	1
8	(B) / Cytokinins	1	1
9	(B) / <i>Hibiscus</i> and mustard	1	1
10	(C) / Mucus and Pepsin	1	1
11	NOTE: - Full credit of one mark to all the students.	1	1
12	(C) / Blue	1	1
13	(C) / 9R	1	1
14	(D) / The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.	1	1
15	(D) / Radius of the coil of the solenoid	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 not 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) Heat, light, electricity $2 \text{ AgBr(s)} \xrightarrow{\text{Sunlight}} 2 \text{ Ag(s)} + \text{Br}_2\text{(g)}$ (or any other example or statement) OR	1	
	(b) Observation:	1	
	Water droplets on upper part of the test tube/Colour changes from green to white/White to brown on heating strongly/Pungent smell of burning Sulphur.	½	
	$\text{Fe SO}_4 \cdot 7\text{H}_2\text{O} \rightarrow \text{FeSO}_4 + 7\text{H}_2\text{O}$	½	
	$2\text{FeSO}_4 \xrightarrow{\text{Heat}} \text{Fe}_2\text{O}_3 + \text{SO}_3 + \text{SO}_2$	1	
			2

22	<p>(a) (i) $\text{H}^+ / \text{H}_3\text{O}^+$</p> <p>(ii) OH^-</p> <p>(b) Dry HCl does not dissociate into hydrogen ions in absence of water.</p>	$\frac{1}{2}$ $\frac{1}{2}$ 1	 2
23	<ul style="list-style-type: none"> • Veins carry deoxygenated blood from different organs and bring it back to the heart. • Because blood flows at low pressure inside veins. 	1 1	 2
24	<p>(a) Tallness depends on the amount of plant hormone, synthesis of plant hormone depends on the efficiency of enzymes (proteins), synthesis of enzymes (proteins) depends on specific DNA sequence(gene). More the synthesis of hormone, more the pea plant will be taller.</p> <p>(b) Gene</p>	1 1	 2
25	<p>(a) Hypermetropia /Farsightedness/Longsightedness.</p> <p>Reasons:</p> <p>(i) Focal length of the eye lens is too long</p> <p>(ii) Eyeball becomes too small.</p> <p>Correction</p> <p>Convex lens /Converging lens</p> <p style="text-align: center;">OR</p> <p>(b)</p>  <p style="text-align: center;">DIAGRAM DIRECTION OF RAYS MARKING OF ANGLE</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$	 2
26	<p>$P = 1000 \text{ W}$, $V = 230 \text{ V}$; Formula = $P = \frac{V^2}{R}$</p> $R = \frac{V^2}{P}$ $= \frac{(230)^2}{1000}$ $= 52.9 \Omega$	$\frac{1}{2}$ 1 $\frac{1}{2}$	 2

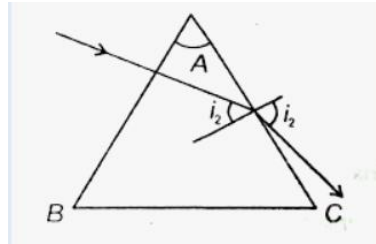
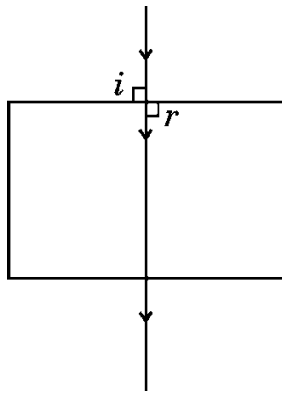
SECTION C			
27	<p>(a)</p> <ul style="list-style-type: none"> A series of metals arranged in the order of their decreasing reactivity/ activity. By performing displacement reactions Calcium, Aluminium, Lead, Copper <p>(b) $\text{Fe}_2\text{O}_3 + 2 \text{Al} \longrightarrow \text{Al}_2\text{O}_3 + 2 \text{Fe} + \text{Heat}$</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p>	3
28	<p>(a) (i) Electricity is passed through an aqueous solution of NaCl (brine), it decomposes to form NaOH. / Chlor-Alkali Process</p> $2 \text{NaCl(aq)} + 2 \text{H}_2\text{O} \longrightarrow 2 \text{NaOH(aq)} + \text{Cl}_2 + \text{H}_2$ <p>(ii) When brine reacts with carbon dioxide and ammonia, sodium hydrogen carbonate and ammonium chloride are formed</p> $2 \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \longrightarrow \text{NaHCO}_3 + \text{NH}_4\text{Cl}$ <p>(b)</p> <p style="text-align: center;">OR</p>  <p>Bulb does not glow when solution of alcohol and glucose are taken but glows when acids solution are taken. (Award marks if explained in words)</p> <p>Reason:- Acidic solutions liberate ions but glucose and alcohol do not liberate ions .Hence bulb only glows for acidic solutions.</p>	<p>$\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>2</p> <p>1</p>	3
29	<p>(a) Aerobic – carbon dioxide+water Anaerobic - Lactic Acid</p> <p>(b) Respiration –carbon dioxide Photosynthesis – oxygen</p> <p>(c) Terrestrial Animals – lungs / skin Fish– Gills</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	3
30	<p>(a) Round, yellow</p> <p>(b) round yellow : 9 round green : 3 wrinkled yellow : 3</p>	<p>1</p> <p>1</p>	

	wrinkled green : 1 (c) Traits are inherited independently/Independent assortment of the traits.	1	3
31	<p>A rainbow is a natural spectrum appearing in the sky after a rain shower.</p>  <p>(Deduct half mark if arrows are not marked)</p>	1 2	3
32	<p>(a)</p>  <p>Marking magnetic lines for points 1,2 and 3</p> <p>(b)</p> <ul style="list-style-type: none"> • Strength of the current in the loop • No. of turns of loop <p>(c) Right hand thumb rule</p>	$\frac{1}{2} \times 3$ $\frac{1}{2} \times 2$ $\frac{1}{2}$	3
33	<p>(a)</p> <ul style="list-style-type: none"> • The energy captured by plants does not revert to solar input and the energy which passes to the herbivores does not revert back to autotrophs. • As energy moves progressively through the various trophic levels it is no longer available to the previous level. • The energy available at each trophic level gets diminished progressively due to loss of energy at each level. <p>(any two)</p> <p>(b) 100 J</p> <ul style="list-style-type: none"> • Autotrophs \longrightarrow Primary consumer \longrightarrow secondary consumer 10000 J (1000 J) (100 J) 	1x2 $\frac{1}{2}$ $\frac{1}{2}$	

	/ Only 10% energy of the organic matter of previous trophic level is transferred to next trophic level. /10% law		3
SECTION-D			
34	<p>(a) (i) (I) Ag, (II) Al, (III) K, (IV) Cu</p> <p>(ii) Metal oxides which react with both acids as well as bases to produce salts and water are called amphoteric oxides.</p> <p>$\text{Al}_2\text{O}_3 + 6 \text{HCl} \longrightarrow 2 \text{AlCl}_3 + 3 \text{H}_2\text{O}$</p> <p>$\text{Al}_2\text{O}_3 + 2 \text{NaOH} \longrightarrow 2 \text{NaAlO}_2 + \text{H}_2\text{O}$</p> <p>(Do not deduct marks if equation is not balanced)</p> <p>(iii) Water soluble bases are called Alkalis. NaOH / KOH / Sodium Hydroxide / Potassium Hydroxide (any one)</p> <p style="text-align: center;">OR</p> <p>(b) (i)</p> <p>(I) $2 \text{HgS(s)} + 3 \text{O}_2\text{(g)} \xrightarrow{\text{Heat}} 2 \text{HgO(s)} + 2 \text{SO}_2\text{(s)}$ (cinnabar)</p> <p>$2 \text{HgO(s)} \xrightarrow{\text{Heat}} 2 \text{Hg(l)} + \text{O}_2\text{(g)}$</p> <p>(II)</p> <p>$2 \text{CuS} + 3 \text{O}_2\text{(g)} \xrightarrow{\text{Heat}} 2 \text{Cu}_2\text{O(s)} + 2 \text{SO}_2\text{(g)}$</p> <p>$2 \text{Cu}_2\text{O} + \text{Cu}_2\text{S} \xrightarrow{\text{Heat}} 6 \text{Cu(s)} + \text{SO}_2\text{(g)}$ (Deduct half mark each for unbalanced equation)</p> <p>(ii)</p> <p>(I) Silver sulphide /Ag₂S</p> <p>(II) Basic Copper carbonate/ Cu(OH)₂. CuCO₃</p>	<p>$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$</p> <p>1</p> <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>1</p> <p>1</p> <p>$\frac{1}{2}$ $\frac{1}{2}$</p>	5
35	<p>(a)</p> <p>(i) 'X' – Stigma 'Y' – Anther</p> <p>(ii) Pollen grains</p> <p>(iii) Pollination</p> <p>(iv) After the transfer of pollen grains from anther into stigma, a pollen tube grows out of the pollen grain and travels through the style to reach the ovary. Male germ cell fuses with the</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>1</p>	

	<p>female germ cell to form a zygote which divides several times to form an embryo within the ovule. The ovule develops a tough coat and is gradually converted into a seed.</p> <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i) Binary fission</p> <p>(ii) <u>Leishmania</u></p> <p>(iii) Produces a greater number of offsprings within a short period of time /Ensures better chances of survival of organisms in unfavorable conditions/Formation of genetically similar organisms /gamete formation is not required.</p> <p style="text-align: right;">(any two)</p> <p>(iv)</p> <p>Budding</p> <p>A bud develops as an outgrowth due to repeated cell division at a specific site, develop into tiny individuals, and after being matured, detach from parent body and become new independent individuals.</p> <p>(Award marks if explained through labelled diagram) (or any other mode of reproduction)</p>	<p>2</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1+1</p> <p>1</p> <p>1</p>	5
36	<p>(a) (i)</p> <p>The extent of bending of the ray of light at the opposite parallel faces of the rectangular glass slab is equal and opposite. This is why the ray emerges parallel to the incident ray.</p> 	<p>1</p> <p>1</p>	

NORMAL INCIDENCE



(ii) $u = -30 \text{ cm}$, $f = -20 \text{ cm}$

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{v} = \frac{1}{u} + \frac{1}{f}$$

$$\frac{1}{v} = \frac{1}{-30 \text{ cm}} + \frac{1}{-20 \text{ cm}}$$

$$= \frac{1}{-12 \text{ cm}} \quad \text{or} \quad v = -12 \text{ cm}$$

The image is at -12 cm on the same side of the lens.

OR

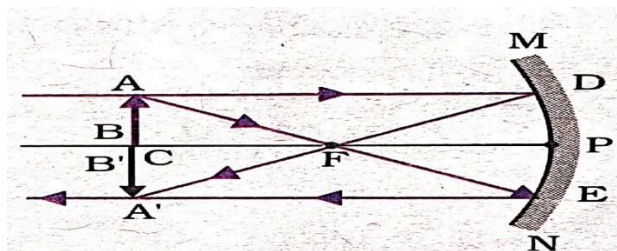
(b)

(i)

Type of Image

Real and Inverted (when candle is beyond F)/ Virtual and Erect (when candle is between P and F)

As the object is moved gradually away from the pole of the mirror, the image gets diminished.



(ii) Object distance, $u = -6.00 \text{ m}$

Image distance, $v = ?$

Focal length, $f = 3.00 \text{ m}$

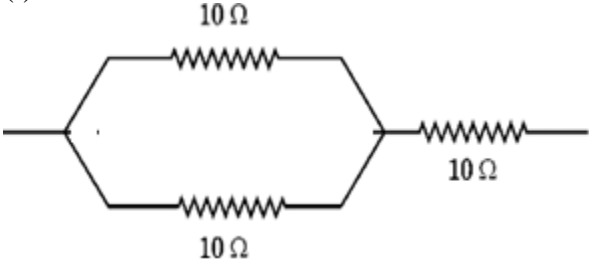
$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

[illegible]

SECTION E

37	<p>(a) (III) /Tubewell water +Solution of Salt A</p> <p>(b)</p> <table><tr><td>Salt A</td><td>Salt B</td></tr><tr><td>Soap</td><td>Detergent</td></tr><tr><td>Na/K salt of long chain carboxylic acids</td><td>sodium salt of sulphonic acids or ammonium salts with chloride or bromide ions.</td></tr><tr><td>Does not form lather with hard water</td><td>Forms lather even with hard water</td></tr></table> <p style="text-align: right;">(Any one)</p> <p>(c) (i)</p> <ul style="list-style-type: none">Esters are sweet smelling substances used in making perfumes and flavoring agents. / Formed when alcohol and carboxylic acid react in presence of acid to form ester.It is converted back to alcohol and a salt of carboxylic acid. <p>$\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \longrightarrow \text{C}_2\text{H}_5\text{OH} + \text{CH}_3\text{COONa}$</p> <p style="text-align: center;">OR</p> <p>(c) (ii)</p> <ul style="list-style-type: none">Presence of Ca and Mg salts in waterScumSoap reacts with calcium and magnesium salts to form insoluble substance.	Salt A	Salt B	Soap	Detergent	Na/K salt of long chain carboxylic acids	sodium salt of sulphonic acids or ammonium salts with chloride or bromide ions.	Does not form lather with hard water	Forms lather even with hard water	1	
Salt A	Salt B										
Soap	Detergent										
Na/K salt of long chain carboxylic acids	sodium salt of sulphonic acids or ammonium salts with chloride or bromide ions.										
Does not form lather with hard water	Forms lather even with hard water										
		1									
		1									
		1/2									
		1/2									
		1/2									
		1/2									
		1	4								

38	<p>(a) (i) Adrenaline</p> <p style="text-align: center;">OR</p> <p>(ii) Adrenal Gland</p> <p>(b) Heart beat becomes faster to supply more oxygen to the muscles / blood supply to the digestive system is reduced / blood supply to the skin is reduced / blood is diverted to the skeletal muscles / breathing rate increases/increased contractions of diaphragm and rib muscles.</p> <p style="text-align: right;">(Any two)</p> <p>(c) Chemical signal – travel through bloodstream and reach a wide range of target cells across the body.</p>	2	
		1	

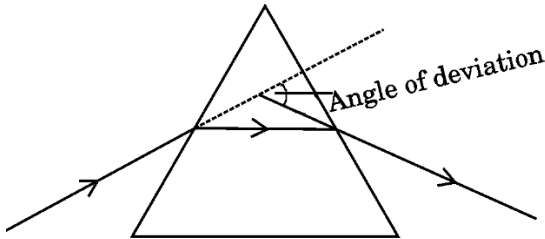
	Electrical signal – travels through a nerve cell. (Any other)	1	4
39	<p>(a) Graph A</p> <p>(b) Graph D,</p> <p>(c) (i)</p>  $R = \frac{R_1 R_2}{R_1 + R_2} + R_3$ $R = \left(\frac{10 \times 10}{10 + 10} + 10 \right) \Omega = 5 \Omega + 10 \Omega = 15 \Omega$ <p style="text-align: center;">OR</p> <p>(c)</p> <p>(ii) • $I = \frac{V}{R} = \frac{6 \text{ V}}{(0.1 + 0.2 + 0.3 + 0.4 + 0.5) \Omega} = \frac{6 \text{ V}}{1.5 \Omega} = 4.0 \text{ A}$</p> <p>• same current flows when resistors are connected in series.</p>	<p>1</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p>	4

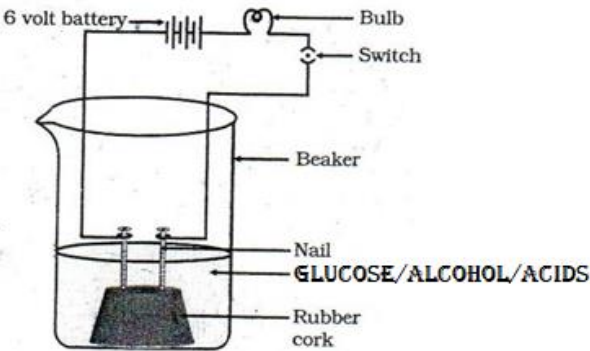
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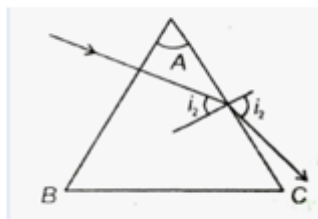
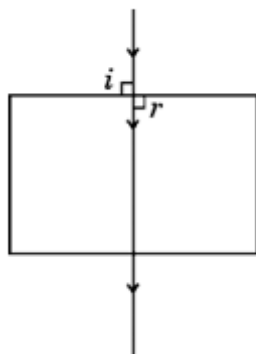
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13	<p>Ensure that you do not make the following common types of errors committed by the Examiner in the past:-</p> <ul style="list-style-type: none"> • Leaving answer or part thereof unassessed in an answer book. • Giving more marks for an answer than 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.) <p>Half or a part of answer marked correct and the rest as wrong, but no marks awarded.</p>
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 totalled 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.

22	<p>Baking powder contains mild edible acid like tartaric acid/liberates carbon dioxide easily/ neutralizes the sodium carbonate produced on heating baking soda/ removes the bitter taste</p> <p style="text-align: center;">/</p> <p>$\text{NaHCO}_3 + \text{H}^+ \rightarrow \text{CO}_2 + \text{H}_2\text{O} + \text{Sodium salt of acid}$</p>	2	2
23	<ul style="list-style-type: none"> To carry oxygenated blood away from the heart to various organs of the body. Because blood flows in Arteries under high pressure. 	1 1	2
24	<p>a) Plant height depends on the amount of plant hormone produced, synthesis of plant hormone depends on the efficiency of enzymes (proteins), whose synthesis depends upon the specific DNA sequence(gene). Lesser the hormone formed, shorter will be the height of the plant.</p> <p>(b)DNA/ Deoxyribonucleic acid/ Cellular DNA</p>	$\frac{1}{2} \times 3$ $\frac{1}{2}$	2
25	<p>(a) Hypermetropia /Farsightedness/Longsightedness.</p> <p>Reasons:</p> <p>(i) Focal length of the eye lens is too long</p> <p>(ii)Eyeball becomes too small.</p> <p>Correction Convex lens /Converging lens</p> <p style="text-align: center;">OR</p> <p>(b)</p>  <p style="text-align: center;">DIAGRAM DIRECTION OF RAYS MARKING OF ANGLE</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
26	<p>Given $I = 2 \text{ A}$, $R = 40 \Omega$, $t = 5 \text{ minutes} = 300 \text{ s}$</p> <p>Electrical energy = $I^2 R t$</p>	$\frac{1}{2}$	

	$= (2A)^2 \times 40\ \Omega \times 300\ s$ $= 48000\ J$	1 $\frac{1}{2}$	2
SECTION C			
27	<p>In a double displacement reaction, an exchange of ions takes place between the reactants whereas in a displacement reaction a more reactive element displaces a less reactive element from its compound.</p> <ul style="list-style-type: none"> • $Na_2SO_4 + BaCl_2 \longrightarrow BaSO_4 + 2 NaCl$ (Double displacement Reaction) • $Fe + CuSO_4 \rightarrow FeSO_4 + Cu$ (Displacement reaction) (Any other example) 	1 1 1	3
28	<p>(a) (i) Electricity is passed through an aqueous solution of NaCl (brine), it decomposes to form NaOH. / Chlor-Alkali Process</p> $2 NaCl(aq) + 2 H_2O \longrightarrow 2 NaOH(aq) + Cl_2 + H_2$ <p>(ii) When brine reacts with carbon dioxide and ammonia, sodium hydrogen carbonate and ammonium chloride are formed</p> $2 NaCl + H_2O + CO_2 + NH_3 \longrightarrow NaHCO_3 + NH_4Cl$ <p>(b) OR</p>  <p>Bulb does not glow when solution of alcohol and glucose are taken but glows when acidic solutions are taken. (Award marks if explained in words)</p> <p>Reason:- Acidic solutions liberate ions but glucose and alcohol do not liberate ion .Hence bulb only glows for acidic solutions.</p>	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1 2 1	3
29	(a) Urea, Uric acid	$\frac{1}{2} \times 2$	

NORMAL INCIDENCE



(ii) $u = -30 \text{ cm}$, $f = -20 \text{ cm}$

$$\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{v} = \frac{1}{u} + \frac{1}{f}$$

$$\frac{1}{v} = \frac{1}{-30 \text{ cm}} + \frac{1}{-20 \text{ cm}}$$

$$= \frac{1}{-12 \text{ cm}} \quad \text{or} \quad V = -12 \text{ cm}$$

The image is at -12 cm behind the lens.

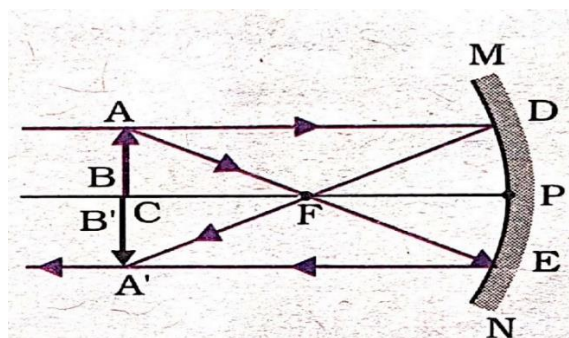
(b)

(i)

Type of Image

Real and Inverted (when candle is beyond F)/ Virtual and Erect (when candle is between P and F)

As the object is moved gradually away from the pole of the mirror, the image gets diminished



(ii) Object distance, $u = -6.00 \text{ m}$

Image distance, $v = ?$

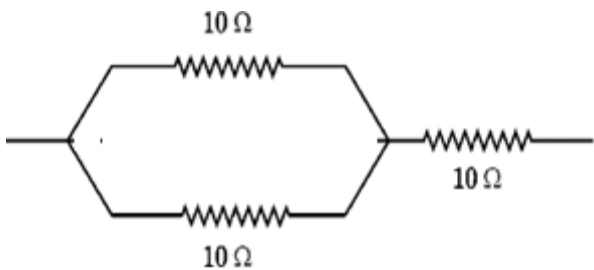
Focal length, $f = 3.00 \text{ m}$

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

	$\frac{1}{v} = \frac{1}{+3.00 \text{ m}} - \frac{1}{(-6.00 \text{ m})}$ $= \frac{1}{+3.00 \text{ m}} + \frac{1}{6.00 \text{ m}} = \frac{2+1}{6 \text{ m}}$ $\text{or } v = \frac{6}{3} = 2.0 \text{ m}$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	5
35	<p>(a) (i) (I) Ag, (II) Al, (III) K, (IV) Cu</p> <p>(ii) Metal oxides which react with both acids as well as bases to produce salts and water are called amphoteric oxides.</p> $\text{Al}_2\text{O}_3 + 6 \text{HCl} \longrightarrow 2 \text{AlCl}_3 + 3 \text{H}_2\text{O}$ $\text{Al}_2\text{O}_3 + 2 \text{NaOH} \longrightarrow 2 \text{NaAlO}_2 + \text{H}_2\text{O}$ <p>(Do not deduct marks if equation is not balanced)</p> <p>(iii) Water soluble bases are called Alkalis.</p> <p>NaOH/KOH</p> <p>Sodium Hydroxide / Potassium Hydroxide</p> <p style="text-align: right;">(any one)</p> <p style="text-align: center;">OR</p> <p>(b) (i)</p> <p>(I)</p> $2 \text{HgS(s)} + 3 \text{O}_2(\text{g}) \xrightarrow{\text{Heat}} 2 \text{HgO(s)} + 2 \text{SO}_2(\text{s})$ <p>(cinnabar)</p> $2 \text{HgO(s)} \xrightarrow{\text{Heat}} 2 \text{Hg(l)} + \text{O}_2(\text{g})$ <p>(II)</p> $2 \text{CuS} + 3 \text{O}_2(\text{g}) \xrightarrow{\text{Heat}} 2 \text{Cu}_2\text{O(s)} + 2 \text{SO}_2(\text{g})$ $2 \text{Cu}_2\text{O} + \text{Cu}_2\text{S} \xrightarrow{\text{Heat}} 6 \text{Cu(s)} + \text{SO}_2(\text{g})$ <p>(Deduct half mark each for unbalanced equation)</p> <p>(ii)</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 1 1 1	

	(I) Silver sulphide /Ag ₂ S (II) Basic Copper carbonate/Cu(OH) ₂ . CuCO ₃	½ ½	5
36	(a) (i) ‘X’ – Stigma ‘Y’ – Anther (ii) Pollen grains (iii) Pollination (iv) After the transfer of pollen grains from anther into stigma, a pollen tube grows out of the pollen grain and travels through the style to reach the ovary. Male germ cell fuses with the female germ cell to form a zygote which divides several times to form an embryo within the ovule. The ovule develops a tough coat and is gradually converted into a seed. OR (b) (i) Binary fission (ii) <u>Leishmania</u> (iii) Produces a greater number of offsprings within a short period of time /ensures better chances of survival of species within a population/ production of large no. of offsprings with similar genetic structure or clones /no need for both male and female parents for fertilization. (any two) (iv) Budding A bud develops as an outgrowth due to repeated cell division at a specific site, develop into tiny individuals, and after being matured, detach from parent body and become new independent individuals. (or any other)	½+½ 1 1 2 	

		salts with chloride or bromide ions.	1	
	Does not form lather with hard water	Forms lather even with hard water		
	(Any one)			
	(c) (i)			
	<ul style="list-style-type: none"> Esters are sweet smelling substances used in making perfumes and flavoring agents. / Formed when alcohol and carboxylic acid in presence of acid to form ester. 		1	
	<ul style="list-style-type: none"> It is converted back to alcohol and a salt of carboxylic acid. 		½	
	$\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \longrightarrow \text{C}_2\text{H}_5\text{OH} + \text{CH}_3\text{COONa}$		½	
	OR			
	(c) (ii) • Presence of Ca and Mg salts in water		½	
	• Scum		½	
	Soap reacts with calcium and magnesium salts to form insoluble substance .		1	4
38	(a)(i)Adrenaline		2	
	OR			
	(ii)Adrenal Gland		2	
	(b) Heart beat becomes faster / more supply of oxygen to the muscles / blood supply to the digestive system is reduced / blood supply to the skin is reduced / blood diverted to the skeletal muscles / breathing rate increases / increased alkalinity / increased sweating.		1	
	(Any two)			
	(c) Chemical signal – travel through bloodstream and reach a wide range of target cells across the body.			
	Electrical signal – travels through a nerve cell. (Any other)		1	4
39	(a) Graph A		1	
	(b) Graph D		1	

	<p>(c) (i)</p>  $R = \frac{R_1 R_2}{R_1 + R_2} + R_3$ $R = \left(\frac{10 \times 10}{10 + 10} + 10 \right) \Omega = 5 \Omega + 10 \Omega = 15 \Omega$ <p style="text-align: center;">OR</p> <p>(c)</p> <p>(ii) • $I = \frac{V}{R} = \frac{6 \text{ V}}{(0.1 + 0.2 + 0.3 + 0.4 + 0.5) \Omega} = \frac{6 \text{ V}}{1.5 \Omega} = 4.0 \text{ A}$</p> <p>• same current flows when resistors are connected in series.</p>	<p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</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 31/3/3)

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.

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.
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SECONDARY SCHOOL EXAMINATION, 2025

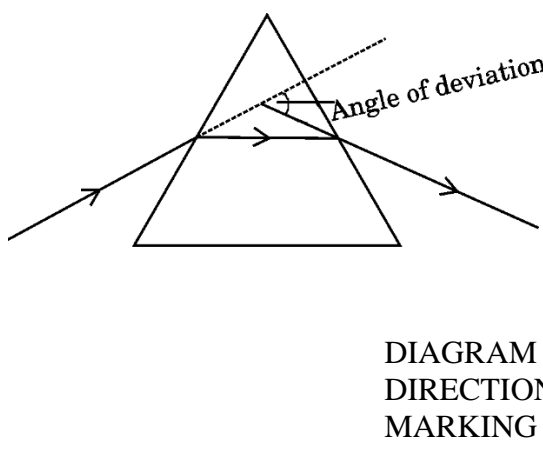
MARKING SCHEME

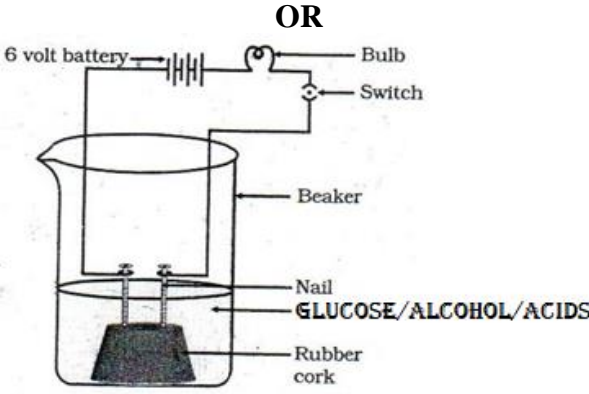
CLASS: X [SCIENCE (Subject Code–086)]

[Paper Code:30/3/3]

Maximum Marks: 80

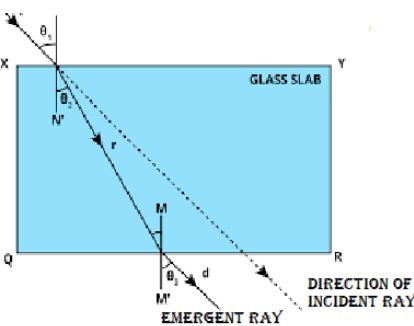
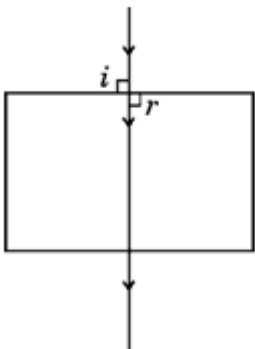
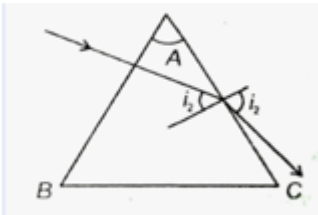
Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
SECTION A			
1	(A) / Reduction with carbon	1	1
2	(C) / 2, 3, 1, 3	1	1
3	(C) / (ii) and (iii)	1	1
4	(D) / It is an addition reaction which occurs in the presence of an acid catalyst.	1	1
5	(B) / K_2SO_4 , Na_2SO_4 , $CaSO_4$	1	1
6	(B) / <i>Hibiscus</i> and mustard	1	1
7	(D) / Chemotropism	1	1
8	(D) / a-(iii), b-(ii), c-(i), d-(iv)	1	1
9	(B) / Cytokinins	1	1
10	(C) / <i>Cuscuta</i>	1	1
11	(D) / Behind the mirror at a distance $\frac{f}{2}$	1	1
12	(C) / When sunlight passes through the fine particles in air, they scatter the blue colour of visible light more strongly than red.	1	1
13	(B) / Red for live wire, black for neutral wire and green for earth wire	1	1
14	(D) / Radius of the coil of the solenoid	1	1
15	(D) / The direction of magnetic field lines inside a bar magnet is from its north pole to its south pole.	1	1
16	(D) / (ii) and (iv)	1	1
17	(D) / Assertion (A) is false, but Reason (R) is true.	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	(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	(a) Heat, light, electricity $2 \text{ AgBr(s)} \xrightarrow{\text{Sunlight}} 2 \text{ Ag(s)} + \text{Br}_2\text{(g)}$ (or any other example or statement) OR (b) Observation: Water droplets on upper part of the test tube/Colour changes from green to white/White to brown on heating strongly/Pungent smell of burning Sulphur. $\text{Fe SO}_4 \cdot 7\text{H}_2\text{O} \rightarrow \text{FeSO}_4 + 7\text{H}_2\text{O}$ $2\text{FeSO}_4 \xrightarrow{\text{Heat}} \text{Fe}_2\text{O}_3 + \text{SO}_3 + \text{SO}_2$	1 1 1/2 1/2 1	2

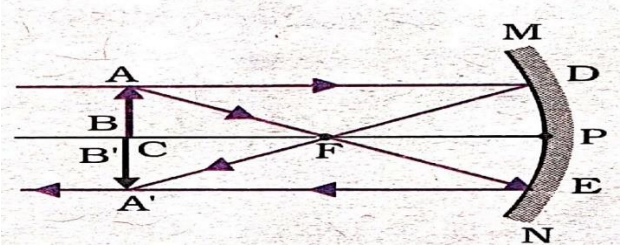
22	<ul style="list-style-type: none"> Bleaching powder/Calcium oxychloride CaOCl_2 By the action of chlorine on dry slaked lime. $\text{Ca(OH)}_2 + \text{Cl}_2 \rightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$ 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
23	<ul style="list-style-type: none"> Veins carry deoxygenated blood from different organs and bring it back to the heart. Because blood flows at low pressure inside veins. 	1 1	2
24	Males have sex chromosomes XY while females have XX. If the male gamete with X chromosome fuses with the female gamete, then the offspring will be a female child and if the male gamete with Y chromosome fuses with the female gamete, then the offspring will be a male child. Hence, the sex of a child/ children will be determined by the chromosome inherited from the father. (Award marks if flow chart is drawn)	2	2
25	<p>(a) Hypermetropia /Farsightedness/Long sightedness.</p> <p>Reasons:</p> <p>(i) Focal length of the eye lens is too long</p> <p>(ii) Eyeball becomes too small.</p> <p>Correction</p> <p>Convex lens /Converging lens</p> <p style="text-align: center;">OR</p> <p>(b)</p>  <div style="position: absolute; top: 720px; left: 500px;"> DIAGRAM DIRECTION OF RAYS MARKING OF ANGLE </div>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$	2
26	Between A and B, 3 resistors in series = AD + DC + CB in one branch Equivalent resistance, $R_s = 2\Omega + 2\Omega + 2\Omega = 6\Omega$ Now one resistor in arm AD is in parallel combination with the other three. Two branches: $R_1 = 2\Omega$ $R_s = 6\Omega$	$\frac{1}{2}$ $\frac{1}{2}$	

	$\therefore \frac{1}{R_p} = \frac{1}{6} + \frac{1}{2} = \frac{1+3}{6} = \frac{4}{6}$ $R_p = \frac{6}{4} = 1.5 \Omega$	$\frac{1}{2}$ $\frac{1}{2}$	2
SECTION C			
27	<ul style="list-style-type: none"> • Reddish brown to black • Oxidation/Redox reaction • $2 \text{Cu} + \text{O}_2 \xrightarrow{\text{Heat}} 2 \text{CuO}$ • Corrosion occurs in open air whereas oxidation occurs on heating. • Basic copper carbonate / $\text{Cu}(\text{OH})_2 \cdot \text{CuCO}_3$ • Green 	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3
28	<p>(a)(i) Electricity is passed through an aqueous solution of NaCl (brine), it decomposes to form NaOH. / Chlor-Alkali Process</p> $2 \text{NaCl}(\text{aq}) + 2 \text{H}_2\text{O} \longrightarrow 2 \text{NaOH}(\text{aq}) + \text{Cl}_2 + \text{H}_2$ <p>(ii) When brine reacts with carbon dioxide and ammonia, sodium hydrogen carbonate and ammonium chloride are formed</p> $2 \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2 + \text{NH}_3 \longrightarrow \text{NaHCO}_3 + \text{NH}_4\text{Cl}$ <p>(b)</p> <p style="text-align: center;">OR</p>  <p>Bulb does not glow when solution of alcohol and glucose are taken but glows when acidic solution are taken. (Award marks if explained in words)</p> <p>Reason:- Acidic solutions liberate ions but glucose and alcohol do not liberate ions. Hence bulb only glows for acidic solutions..</p>	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1 2 1	3

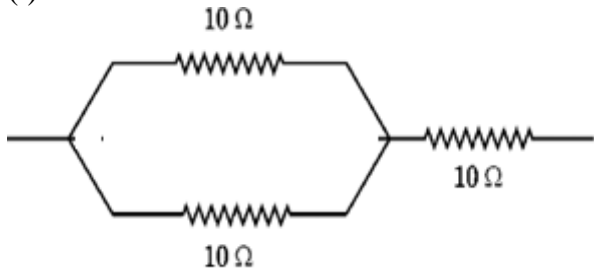
29	<ul style="list-style-type: none">Blood flows twice in the heart before it completes one complete round of the body. <div><div><div>Lungs</div><div>Right Ventricle</div><div>Right Atrium</div><div>Vena cava</div><div>(Deoxygenated blood)</div></div><div><div>Pulmonary vein</div><div>(Oxygenated Blood)</div></div><div><div>Left atrium</div><div>Left Ventricle</div><div>Aorta</div><div>Body Parts</div><div>Veins</div></div></div> <div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><div>→</div><di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	(ii) Minimum in Case I – Magnetic field and current/motion of charge are parallel to each other.	$\frac{1}{2}$ $\frac{1}{2}$	3
33	<p>(a)</p> <ul style="list-style-type: none"> The energy captured by plants does not revert to solar input and the energy which passes to the herbivores does not come back to autotrophs. As energy moves progressively through the various trophic levels it is no longer available to the previous level. The energy available at each trophic level gets diminished progressively due to loss of energy at each level. <p style="text-align: center;">(ANY TWO)</p> <p>(b) 100 J</p> <ul style="list-style-type: none"> Autotrophs \longrightarrow Primary consumer \longrightarrow Secondary Consumer <p>10000 J (1000 J) (100 J)</p> <p>/Only 10% energy of the organic matter of previous trophic level is transferred to next trophic level. /10% law</p>	<p>1x2</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	3
SECTION D			
34	<p>(a) (i) (I) Ag, (II) Al, (III) K, (IV) Cu</p> <p>(ii) Metal oxides which react with both acids as well as bases to produce salts and water are called amphoteric oxides.</p> <p>$\text{Al}_2\text{O}_3 + 6 \text{HCl} \longrightarrow 2 \text{AlCl}_3 + 3 \text{H}_2\text{O}$</p> <p>$\text{Al}_2\text{O}_3 + 2 \text{NaOH} \longrightarrow 2 \text{NaAlO}_2 + \text{H}_2\text{O}$</p> <p style="text-align: center;">(Do not deduct marks if equation is not balanced)</p> <p>(iii) Water soluble bases are called Alkalis.</p> <p style="text-align: center;">NaOH / KOH (Sodium Hydroxide) / (Potassium Hydroxide)</p> <p style="text-align: right;">(any one)</p> <p>OR</p> <p>(b) (i)</p> <p>(I)</p> <p>$2 \text{HgS(s)} + 3 \text{O}_2(\text{g}) \xrightarrow{\text{Heat}} 2 \text{HgO(s)} + 2 \text{SO}_2(\text{s})$</p> <p style="text-align: center;">(cinnabar)</p> <p>$2 \text{HgO(s)} \xrightarrow{\text{Heat}} 2 \text{Hg(l)} + \text{O}_2(\text{g})$</p> <p>(II)</p> <p>$2 \text{CuS} + 3 \text{O}_2(\text{g}) \xrightarrow{\text{Heat}} 2 \text{Cu}_2\text{O(s)} + 2 \text{SO}_2(\text{g})$</p>	<p>$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$ $\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>1</p>	

	$2 \text{Cu}_2\text{O} + \text{Cu}_2\text{S} \xrightarrow{\text{Heat}} 6 \text{Cu(s)} + \text{SO}_2\text{(g)}$ <p>(Deduct half mark each for unbalanced equation)</p> <p>(ii)</p> <p>(I) Silver sulphide /Ag₂S</p> <p>(II) Basic Copper carbonate/Cu(OH)₂. CuCO₃</p>	1	
		½	5
35	<p>(a) (i)</p> <p>The extent of bending of the ray of light at the opposite parallel faces of the rectangular glass slab is equal and opposite. This is why the ray emerges parallel to the incident ray.</p>  <p>NORMAL INCIDENCE</p>   <p>(ii) $u = -30 \text{ cm}$, $f = -20 \text{ cm}$</p> $\frac{1}{v} - \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{v} = \frac{1}{u} + \frac{1}{f}$ $\frac{1}{v} = \frac{1}{-30 \text{ cm}} + \frac{1}{-20 \text{ cm}}$ $= \frac{1}{-12 \text{ cm}} \quad \text{or } v = -12 \text{ cm}$ <p>The image is at -12 cm on the same side of the lens.</p> <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i)</p> <p>Type of Image</p> <p>Real and Inverted (when candle is beyond F)/ Virtual and Erect (when candle is between P and F)</p>	1	
		1	
		1	
		½	
		½	
		1	
		1	

	<p>As the object is moved gradually away from the pole of the mirror, the image gets diminished.</p>  <p>(ii) Object distance, $u = -6.00 \text{ m}$ Image distance, $v = ?$ Focal length, $f = 3.00 \text{ m}$</p> $\frac{1}{v} + \frac{1}{u} = \frac{1}{f} \quad \text{or} \quad \frac{1}{v} = \frac{1}{f} - \frac{1}{u}$ $\frac{1}{v} = \frac{1}{+3.00 \text{ m}} - \frac{1}{(-6.00 \text{ m})}$ $= \frac{1}{+3.00 \text{ m}} + \frac{1}{6.00 \text{ m}} = \frac{2+1}{6 \text{ m}}$ $\text{or } v = \frac{6}{3} = 2.0 \text{ m}$	<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>	<p>5</p>
36	<p>(a)</p> <p>(i) 'X' – Stigma 'Y' – Anther</p> <p>(ii) Pollen grains</p> <p>(iii) Pollination</p> <p>(iv) After the transfer of pollen grains from anther into stigma, a pollen tube grows out of the pollen grain and travels through the style to reach the ovary. Male germ cell fuses with the female germ cell to form a zygote which divides several times to form an embryo within the ovule. The ovule develops a tough coat and is gradually converted into a seed.</p> <p style="text-align: center;">OR</p> <p>(b)</p> <p>(i) Binary fission</p> <p>(ii) <i>Leishmania</i></p> <p>(iii) Produces a greater number offsprings within a short period of time /Ensures better chances of survival of organisms in unfavorable conditions/ formation of genetically similar organisms /gamete formation is not required.</p> <p style="text-align: right;">(any two)</p> <p>(iv) Budding</p> <p>A bud develops as an outgrowth due to repeated cell division at on specific site, develop into tiny individuals, and after being matured, detach from parent body and become new independent individuals.</p> <p>(Award marks if explained through labelled diagram) (or any other mode of reproduction)</p>	<p>$\frac{1}{2} + \frac{1}{2}$</p> <p>1</p> <p>1</p> <p>2</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1+1</p> <p>1</p> <p>1</p>	<p>5</p>

SECTION E

37	<p>(a) Graph A (b) Graph D</p> <p>(c) (i)</p>  $R = \frac{R_1 R_2}{R_1 + R_2} + R_3$ $R = \left(\frac{10 \times 10}{10 + 10} + 10 \right) \Omega = 5 \Omega + 10 \Omega = 15 \Omega$ <p style="text-align: center;">OR</p> <p>(c) (ii) • $I = \frac{V}{R} = \frac{6 \text{ V}}{(0.1 + 0.2 + 0.3 + 0.4 + 0.5) \Omega} = \frac{6 \text{ V}}{1.5 \Omega} = 4.0 \text{ A}$</p> <p>• same current flows when resistors are connected in series.</p>	<p>1 1</p> <p>1</p> <p>1/2</p> <p>1/2</p> <p>1</p> <p>1</p>	4								
38	<p>(a) (III)/ Tubewell water+ Solution of Salt A (b)</p> <table border="1"> <tr> <td>Salt A</td> <td>Salt B</td> </tr> <tr> <td>Soap</td> <td>Detergent</td> </tr> <tr> <td>Na/K salt of long chain carboxylic acids</td> <td>sodium salt of sulphonic acids or ammonium salts with chloride or bromide ions.</td> </tr> <tr> <td>Does not form lather with hard water</td> <td>Forms lather even with hard water</td> </tr> </table> <p style="text-align: center;">(Any one)</p> <p>(c)(i)</p> <ul style="list-style-type: none"> Esters are sweet smelling substances used in making perfumes and flavoring agents. / Formed when alcohol and carboxylic acid in presence of acid to form ester. It is converted back to alcohol and a salt of carboxylic acid. $\text{CH}_3\text{COOC}_2\text{H}_5 + \text{NaOH} \longrightarrow \text{C}_2\text{H}_5\text{OH} + \text{CH}_3\text{COONa}$ <p style="text-align: center;">OR</p> <p>(c) (ii) • Presence of Ca and Mg salts in water</p>	Salt A	Salt B	Soap	Detergent	Na/K salt of long chain carboxylic acids	sodium salt of sulphonic acids or ammonium salts with chloride or bromide ions.	Does not form lather with hard water	Forms lather even with hard water	<p>1</p> <p>1</p> <p>1/2</p> <p>1/2</p>	
Salt A	Salt B										
Soap	Detergent										
Na/K salt of long chain carboxylic acids	sodium salt of sulphonic acids or ammonium salts with chloride or bromide ions.										
Does not form lather with hard water	Forms lather even with hard water										

	<p>•Scum</p> <p>Soap reacts with calcium and magnesium salts to form Insoluble substance.</p>	<p>½</p> <p>1</p>	<p>4</p>
39	<p>(a)(i) Adrenaline</p> <p style="text-align: center;">OR</p> <p>(ii) Adrenal Gland</p> <p>(b) Heart beat becomes faster to supply more oxygen to the muscles / blood supply to the digestive system is reduced / blood supply to the skin is reduced / blood is diverted to the skeletal muscles / breathing rate increases/increased contractions of diaphragm and rib muscles.</p> <p style="text-align: right;">(Any two)</p> <p>(c) Chemical signal – travel through bloodstream and reach a wide range of target cells across the body. Electrical signal – travels through a nerve cell.</p> <p style="text-align: right;">(Any other)</p>	<p>2</p> <p>2</p> <p>1</p> <p>1</p>	<p>4</p>