

Strictly Confidential: (For Internal and Restricted use only)
Secondary School Examination, 2023
Marking Scheme – Science (SUBJECT CODE -086)
(PAPER CODE –31/2/1)

General Instructions: -

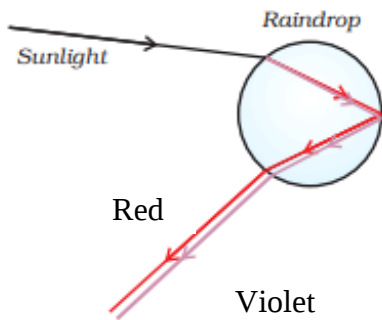
1. You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested 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 News Paper/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($\sqrt{}$) 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. 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 a reply.
 - 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. 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.

MARKING SCHEME
Secondary School Examination, 2023
SCIENCE (Subject Code–086)
[Paper Code: 31/2/1]

Maximum Marks: 80

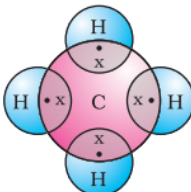
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(c)	1	1
2.	(c)	1	1
3.	(a)	1	1
4.	(b)	1	1
5.	(a)	1	1
6.	(c)	1	1
7.	(c)	1	1
8.	(b)	1	1
9.	(b)	1	1
10.	(c)	1	1
11.	(d)	1	1
12.	(a)	1	1
13.	(d)	1	1
14.	(b)	1	1
15.	(b)	1	1
16.	(c)	1	1
17.	(d)	1	1
18.	(a)	1	1
19.	(c)	1	1
20.	(b)	1	1
	SECTION—B		
21.	(a) • Yellow precipitate of lead iodide is formed. • Double displacement reaction / Precipitation reaction $\text{Pb (NO}_3)_2 + 2\text{KI} \longrightarrow \text{PbI}_2 + 2\text{KNO}_3$	$\frac{1}{2}$ $\frac{1}{2}$ 1	

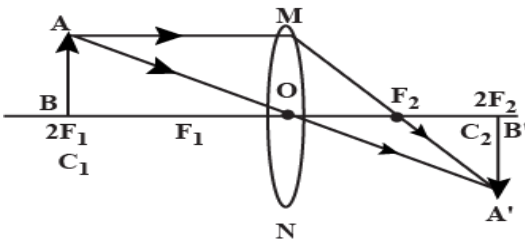
	OR (b) (i) • Oxygen is added to copper / Copper is oxidised • copper oxide / CuO (ii) By passing hydrogen gas over it Alternative answer (i) $2\text{Cu} + \text{O}_2 \xrightarrow{\Delta} 2\text{CuO}$ (ii) $\text{CuO} + \text{H}_2 \longrightarrow \text{Cu} + \text{H}_2\text{O}$	½ ½ 1	
22.	(a) Birds and mammals have high energy needs to maintain their body temperature. The separation of oxygenated and deoxygenated blood allows a highly efficient supply of oxygen to maintain their body temperature. (b) • Amphibians / reptiles; • Temperature of the environment.	1 ½ ½	2
23.	(a) Tt (b) Because only Dominant trait (Tall) is expressed in F1 generation / Tallness is dominant over recessive short trait. (c) F₂ generation – Tall : short 3 : 1	½ 1 ½	2
24.	(a) • It is formed after a rain shower. • It is always formed in a direction opposite to that of the Sun.  OR (b) (i) The phenomenon of the change in direction of propagation of light caused by large sized molecules/ caused by colloidal particles. (ii) When sunlight passes through the atmosphere, fine particles in the air scatter blue light (shorter wavelengths) more than the red colour (longer wavelengths).	½ ½ 1 1	2
25.	• Wire B. • For the conductors of the same dimensions greater the resistance, greater is the	1	

	resistivity.	1	2									
26.	- An aquarium is a man-made ecosystem in which natural cleansing agents like decomposers are not present, so needs periodic cleaning; - ponds and lakes are natural ecosystems which have natural cleansing agents. (Decomposers)	1 1	2									
SECTION—C												
27.	(a) White (b) Decomposition reaction / Photolytic decomposition $2\text{AgCl} \xrightarrow{\text{Sunlight}} 2\text{Ag} + \text{Cl}_2$ (c) used in black and white photography ; AgBr / Silver Bromide	$\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}, \frac{1}{2}$	3									
28.	<table><tr><td></td><td>Roasting</td><td>Calcination</td></tr><tr><td>1</td><td>It is carried out for sulphide ores.</td><td>It is carried out for carbonate ores.</td></tr><tr><td>2</td><td>Ore is heated in excess of air $2\text{ZnS} + 3\text{O}_2 \longrightarrow 2\text{ZnO} + 2\text{SO}_2$ OR $2\text{HgS} + 3\text{O}_2 \xrightarrow{\text{Heat}} 2\text{HgO} + 2\text{SO}_2$ OR $2\text{Cu}_2\text{S} + 3\text{O}_2 \xrightarrow{\text{Heat}} 2\text{Cu}_2\text{O} + 2\text{SO}_2$</td><td>Ore is heated in absence or limited supply of air. $\text{ZnCO}_3 \xrightarrow{\text{Heat}} \text{ZnO} + \text{CO}_2$ OR $\text{CaCO}_3 \xrightarrow{\text{heat}} \text{CaO} + \text{CO}_2$ OR $\text{PbCO}_3 \xrightarrow{\text{heat}} \text{PbO} + \text{CO}_2$</td></tr></table> Reduction with the help of carbon $\text{ZnO} + \text{C} \xrightarrow{\text{Heat}} \text{Zn} + \text{CO}$ Alternate answer With the help of heat $2\text{HgO(s)} \xrightarrow{\text{Heat}} 2\text{Hg (l)} + \text{O}_2\text{(g)}$ OR Auto reduction / Heating with its ore $2\text{Cu}_2\text{O} + \text{Cu}_2\text{S} \xrightarrow{\text{Heat}} 6\text{Cu (s)} + \text{SO}_2\text{(g)}$ (or Any other)		Roasting	Calcination	1	It is carried out for sulphide ores.	It is carried out for carbonate ores.	2	Ore is heated in excess of air $2\text{ZnS} + 3\text{O}_2 \longrightarrow 2\text{ZnO} + 2\text{SO}_2$ OR $2\text{HgS} + 3\text{O}_2 \xrightarrow{\text{Heat}} 2\text{HgO} + 2\text{SO}_2$ OR $2\text{Cu}_2\text{S} + 3\text{O}_2 \xrightarrow{\text{Heat}} 2\text{Cu}_2\text{O} + 2\text{SO}_2$	Ore is heated in absence or limited supply of air. $\text{ZnCO}_3 \xrightarrow{\text{Heat}} \text{ZnO} + \text{CO}_2$ OR $\text{CaCO}_3 \xrightarrow{\text{heat}} \text{CaO} + \text{CO}_2$ OR $\text{PbCO}_3 \xrightarrow{\text{heat}} \text{PbO} + \text{CO}_2$	$\frac{1}{2}$ $\frac{1}{2}$ 1 $\frac{1}{2}$ $\frac{1}{2}$	3
	Roasting	Calcination										
1	It is carried out for sulphide ores.	It is carried out for carbonate ores.										
2	Ore is heated in excess of air $2\text{ZnS} + 3\text{O}_2 \longrightarrow 2\text{ZnO} + 2\text{SO}_2$ OR $2\text{HgS} + 3\text{O}_2 \xrightarrow{\text{Heat}} 2\text{HgO} + 2\text{SO}_2$ OR $2\text{Cu}_2\text{S} + 3\text{O}_2 \xrightarrow{\text{Heat}} 2\text{Cu}_2\text{O} + 2\text{SO}_2$	Ore is heated in absence or limited supply of air. $\text{ZnCO}_3 \xrightarrow{\text{Heat}} \text{ZnO} + \text{CO}_2$ OR $\text{CaCO}_3 \xrightarrow{\text{heat}} \text{CaO} + \text{CO}_2$ OR $\text{PbCO}_3 \xrightarrow{\text{heat}} \text{PbO} + \text{CO}_2$										

29.	(a) (i) Glucose $\longrightarrow$ Pyruvic acid /Pyruvate In the cytoplasm (ii) It is used as fuel for all activities in a cell / ATP is broken down giving rise to a fixed amount of energy which drive endothermic reactions in the cell. (iii) When air is taken in and let out, the lungs always contain a residual volume of air so that there is sufficient time for the oxygen to be absorbed and for the carbon dioxide to be released / volume of air present in lung after exhalation. OR (b) • A potted plant is taken and kept in dark for 24 hrs to destarch it. • Cover a part of a leaf of the plant with black paper to prevent that area from getting sunlight. • Keep the plant in sunlight for 24 hours. • Pluck the leaf, remove the black paper, boil it in alcohol and dip the leaf in iodine solution for starch test. • The covered part showed no change in colour indicating that starch has not been produced due to the absence of sunlight. • The rest of the leaf turned blue black proving that starch is produced during photosynthesis and sunlight is essential for that.	$\frac{1}{2}$ $\frac{1}{2}$ 1 1 $\frac{1}{2} \times 6$	3
30.	• Adrenaline hormone; Adrenal gland • Response- • Heart beats faster resulting in supply of more oxygen to muscles • Breathing rate increases • Blood supply to digestive system and skin reduced. • Blood supply diverted to skeletal muscles. (Any 2)	$\frac{1}{2}, \frac{1}{2}$ 1×2	3
31.	(a) Here $h = 3$ cm; $f = -12$ cm, $u = -18$ cm, (Award full marks if data not written but calculations are correct) (i) $v = ?, h' = ?$ $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{-12 \text{ cm}} - \frac{1}{-18 \text{ cm}}$ $\therefore v = -36$ cm	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	

	(ii) $h' = -\frac{v}{u} \times h$ $h' = (-) \frac{-36\text{cm}}{-18\text{cm}} \times 3\text{cm} = -6\text{cm}$ OR (b)• Power of lens : Ability of a lens to converge or diverge light rays falling on it / Degree of convergence or divergence of light achieved by a lens / Reciprocal of focal length of lens in metre. (Any one) • It is diverging/concave lens • $P = \frac{1}{f(m)} = \frac{100}{f(cm)}$ $P = \frac{100}{-10\text{cm}} = -10\text{D}$ • Sign of magnification = + or positive	½ ½ 1 ½ ½ ½ ½	3
32.	• Overloading : Overloading of an electrical circuit happens when an excessive amount of electric current flows through the wires. • Two causes : (i) Contact between live and neutral wire/ short circuiting (ii) Connecting too many appliances to a single socket. (iii) Accidental hike in supply voltage (Any two points) (Any other) • Preventive measure : (i) To use wires of proper insulation/proper rating (ii) Not connecting too many appliances to a single socket. (iii) fuse wires (Any one)	1 ½ ½ 1	3
33.	• Some harmful substances like pesticides are used to protect crops. When these chemicals are washed down in the soil or water bodies, they are absorbed by plants along with water and minerals and by animals from water. When we consume these food items, the pesticides enter our body. (Alternate answer : If the child explains the question through food chain, credit marks.) • As human beings occupy the top level in any food chain, maximum concentration of these chemicals get accumulated in them.	2 1	3
SECTION— D			

34.	(a) ‘X’ – CH₃COOH / Ethanoic Acid / Acetic Acid ‘Y’ – C₂H₅OH / Ethanol ‘Z’ – CH₃COOC₂H₅ / Ethyl Ethanoate • $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow[\text{catlyst}]{\text{Acid}} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$ • Esterification Reaction • $\text{CH}_3\text{COOC}_2\text{H}_5 \xrightarrow{\text{NaOH}} \text{C}_2\text{H}_5\text{OH} + \text{CH}_3\text{COONa}$ • Saponification Reaction • It is used in the preparation of soap. OR (b) (i) • Methane / CH₄  • Covalent bond / Single Covalent bond/ Single bond (ii) Biogas; Compressed Natural gas / CNG (iii) • Alkanes ; • C_nH_{2n+2} (iv) Clean flame/blue flame	½ ½ ½ 1 ½ 1 ½ ½ ½ 1 ½ ½, ½ ½, ½ 1	5								
35.	(a) (i) <table border="1"><thead><tr><th>Nervous Control</th><th>Hormonal Control</th></tr></thead><tbody><tr><td>1. Messages are sent as an electrical impulse.</td><td>1. Messages are carried in the form of chemicals (hormone)</td></tr><tr><td>2. It is carried through Neurons.</td><td>2. It is carried through blood .</td></tr><tr><td>3. Nerve impulses produce rapid responses.</td><td>3. Hormones produce slow responses.</td></tr></tbody></table>	Nervous Control	Hormonal Control	1. Messages are sent as an electrical impulse.	1. Messages are carried in the form of chemicals (hormone)	2. It is carried through Neurons.	2. It is carried through blood .	3. Nerve impulses produce rapid responses.	3. Hormones produce slow responses.		
Nervous Control	Hormonal Control										
1. Messages are sent as an electrical impulse.	1. Messages are carried in the form of chemicals (hormone)										
2. It is carried through Neurons.	2. It is carried through blood .										
3. Nerve impulses produce rapid responses.	3. Hormones produce slow responses.										

	4. Nerve impulses produce short lived responses. 4. Hormones produce long lasting responses. (or Any other) (Any three)	1×3 1 1									
	(ii) • When growing shoot is exposed to unidirectional light, it results in auxin shifting towards the shaded side. • More auxin causes more growth of shoot in the shaded side resulting in the bending of stem towards source of light. OR (b) (i) <table><tr><th>Disorder</th><th>Gland</th></tr><tr><td>(I) Gigantism</td><td>Pituitary</td></tr><tr><td>(II) Delay in Puberty</td><td>Ovary</td></tr><tr><td>(III) Goitre</td><td>Thyroid</td></tr></table> (ii) The timing and amount of hormone released are regulated by feedback mechanisms. Example – • If the sugar level in the blood rises more insulin is produced. • As blood sugar level falls, insulin secretion is reduced.	Disorder	Gland	(I) Gigantism	Pituitary	(II) Delay in Puberty	Ovary	(III) Goitre	Thyroid	½ × 6 1 1 5	
Disorder	Gland										
(I) Gigantism	Pituitary										
(II) Delay in Puberty	Ovary										
(III) Goitre	Thyroid										
36.	(a) •  (Deduct ½ mark for not marking arrows) • Magnification = -1 (b) (i) u = − 16 cm; f : + 12 cm Formula $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$	1½ ½ ½ ½									

	Substitution Result $\frac{1}{v} = \frac{1}{u} + \frac{1}{f} = \frac{1}{-16 \text{ cm}} + \frac{1}{12 \text{ cm}} + \frac{+1}{48 \text{ cm}}$ or $V = +48 \text{ cm}$ or $v = +48 \text{ cm}$ (Award full marks if data not written but calculations are correct) (iv) $hi = \frac{v}{u} \times h_0$ $= \frac{+48 \text{ cm}}{-16 \text{ cm}} \times 2 \text{ cm}$ $= -6 \text{ cm}$ Image is 6 cm in size.	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	5
	SECTION—E		
37.	(a) (i) Groups A and B – less than 7 (ii) Group C – greater than 7 (b) pH paper and universal indicator. (c) • Copper vessel is tarnished due to formation of basic copper oxide. • Lemon juice being acidic react with copper oxide and the salt formed is washed away. OR (c) • An optimal pH is required for digestion. • Change in pH can cause tooth decay • Animals and plants defend themselves through change in pH. • Survival of aquatic life becomes difficult when pH of river water becomes low. (or any other) (Any two)	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}, \frac{1}{2}$ 2 1×2	4
38.	(a) Leishmania – Binary fission ; Plasmodium – Multiple fission (b) Sexual reproduction leads to more variations which are useful for ensuring the survival of a species. (c) (i) sugar solution provides nutrients for growth and multiplication whereas water does not do. (ii) Moisture is required for the growth of Rhizopus. OR (c) • Spirogyra • Fragmentation – Spirogyra simply breaks up into smaller pieces upon maturation. Each piece grows into a new individual.	$\frac{1}{2}, \frac{1}{2}$ 1 1 1 $\frac{1}{2}$ $\frac{1}{2}, 1$	4

39.	(a) • Both have same reading / $A_1 = A_3$ • Both are connected in series	$\frac{1}{2}$	4
	(b) Reading of $A_2 = \frac{1}{4}A$ as current is equally divided in the four identical	$\frac{1}{2}$	
	resistors . / Reading of $A_2 = \frac{1}{4}$ times Reading of A_3 . / $A_2 = 0.25 A$ / $A_2 < A_3$		
	(c) $\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2}$ / $R_p = \frac{R}{n}$	1	
	$\frac{1}{R_p} = \frac{1}{3 \Omega} + \frac{1}{3 \Omega}$	$\frac{1}{2}$	
	$R_p = \frac{3}{2} \Omega$	$\frac{1}{2}$	
	$V = IR$	$\frac{1}{2}$	
	$V_1 = 1A \times \frac{3}{2} \Omega = \frac{3}{2} V = 1.5V$	$\frac{1}{2}$	
	OR	$\frac{1}{2}$	
	$\frac{1}{R_p} = \frac{1}{3 \Omega} + \frac{1}{3 \Omega}$		
	$\therefore R_p = \frac{3}{2} \Omega$	$\frac{1}{2}$	
	$\frac{1}{R_p} = \frac{1}{3 \Omega} + \frac{1}{3 \Omega} + \frac{1}{3 \Omega}$		
	$\therefore R_{p2} = 1 \Omega$	$\frac{1}{2}$	
	$\frac{1}{R_p} = \frac{1}{3 \Omega} + \frac{1}{3 \Omega} + \frac{1}{3 \Omega} + \frac{1}{3 \Omega}$		
	$\therefore R_{p3} = \frac{3}{4} \Omega$		
	$\therefore R = R_{p1} + R_{p2} + R_{p3} = \left(\frac{3}{2} + 1 + \frac{3}{4} \right) \Omega = \frac{13}{4} \Omega / 3.25 \Omega$	$\frac{1}{2}$	
		$\frac{1}{2}$	
