Marking Scheme
Strictly Confidential
(For Internal and Restricted use only)
Secondary School Examination, 2024
SUBJECT: SCIENCE (086) (Q.P. CODE 31/1/2)

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 delibration 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 0 – 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 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.

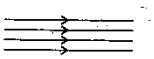
MARKING SCHEME

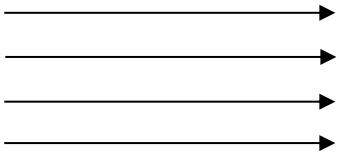
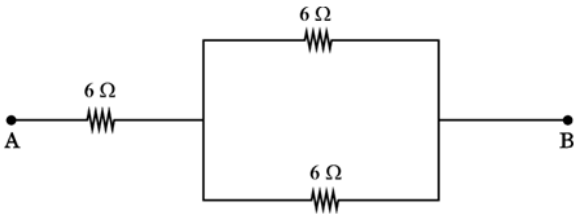
Secondary School Examination, 2024

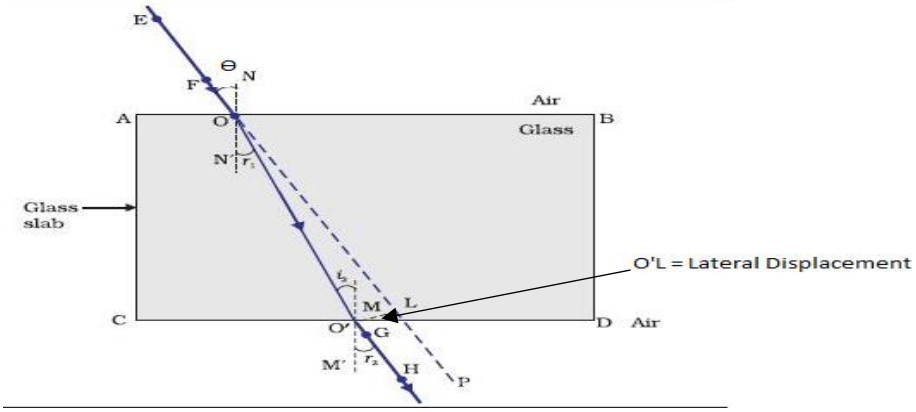
SCIENCE (Subject Code–086)

[Paper Code: 31/1/2]

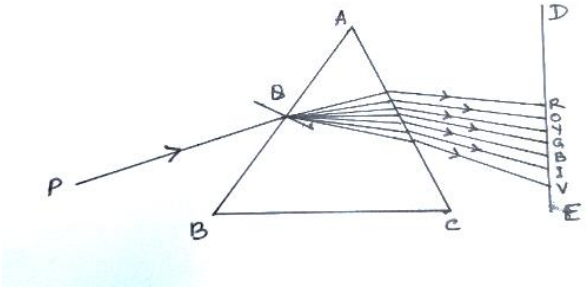
Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(c) / $2\ AgBr \longrightarrow 2\ Ag + Br_2$	1	1
2	(c) /amphoteric	1	1
3	(d) / Na_2CO_3	1	1
4	(d) /Butyne, C_4H_6	1	1
5	(c) /Mercury and Bromine	1	1
6	(d) / MnO_2 is reduced and HCl is oxidised	1	1
7	(b) / $2\ NaOH + Zn \longrightarrow Na_2ZnO_2 + H_2$	1	1
8	(d) / Features will remain the same even if the protein changes.	1	1
9	(c) /Neuromuscular junction	1	1
10	(d) / (i) and (iv)	1	1
11	(c) / (ii) and (iii)	1	1
12	(d) / Plasmodium	1	1
13	(c) /At twice the focal length of the lens	1	1
14	(d) /Retina	1	1
15	(a) / 	1	1
16	(c) /Tiger, grass, snake, frog	1	1
17	(c) /Assertion (A) is true, but Reason (R) is false.	1	1
18	(c) /Assertion (A) is true, but Reason (R) is false.	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	(i) If they intersect then at the point of intersection, there would be two directions of magnetic field or compass needle would point towards two directions, which is not possible. (ii) Uniform magnetic field is represented by equidistant parallel straight lines	1 ½	

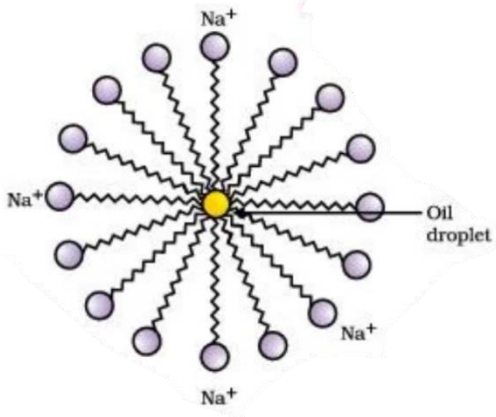
		½	2
22	(A) When two 6 Ω resistances are connected in parallel and the third resistance of 6Ω is connected in series combinations to this, then equivalent resistance will be 9 Ω /  **[Award marks for writing the statement or drawing the diagram]** $\frac{1}{R_P} = \frac{1}{6\,\Omega} + \frac{1}{6\,\Omega}$ $\therefore\ R_P = 3\,\Omega$ Rs = 6 + 3 = 9Ω **OR** (B) Equivalent resistance = $R_1 + R_2 = 1\,\Omega + 2\,\Omega = 3\,\Omega$ $I = \frac{V}{R} = \frac{6\text{ V}}{1\,\Omega + 2\,\Omega} = \frac{6\text{ V}}{3\,\Omega} = 2\text{ A}$ Electric power, $P = I^2R$ $= (2A)^2 \times 2\,\Omega = 4 \times 2\text{ W} = 8\text{ W}$	1 1 ½ ½ ½ ½	2

23	 Lateral displacement labelling	1½ ½	2
24	(A) Medulla – Hindbrain Function– Control blood pressure/salivation/vomiting or any other Cerebrum – Forebrain Function–Thinking/intelligence/memory (any other) **OR** (B)Auxins • When tendril of pea plant comes in contact with any support, the part of the tendril in contact with the object does not grow as rapidly as part of the tendril away from it. This causes the tendril to circle around the object and cling to it.	½ ½ ½ ½ 1 1	2
25	Kidney ⟶ Ureter ⟶ Urinary bladder ⟶ Urethra • Reabsorption of nutrients/amino acids, glucose and water will not take place	1 1	2
26	(i) $3BaCl_2\,(aq) + Al_2(SO_4)_3\,(aq) \longrightarrow 3BaSO_4\,(s) + 2\,AlCl_3\,(aq)$ Equation Balancing (ii) $2\,Al(s) + 3\,H_2O(g) \longrightarrow Al_2O_3(s) + 3\,H_2\,(g)$ Equation Balancing	½ ½ ½ ½	2

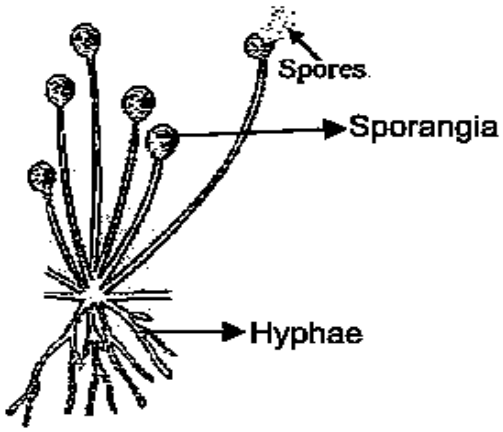
	SECTION C		
27	(i) The taste of tomato juice will be slightly **sour**; The pH 4.6 indicates that tomato juice is **an acid** and acids are sour in taste. (ii) Acids that give **more H^+ ions / H_3O^+** are Strong Acids Bases that give **less OH^- ions** are Weak Bases. (iii) Living animals can survive within a **pH range of 7·0 to 7·8**. So, if the pH of river water becomes low due to **acid rain (pH < 5·6)**, then survival of aquatic animals becomes difficult.	½ ½ ½ ½ 1	3
28	(i) Change in colour: The solution will become green in colour. $Fe(s) + CuSO_4(aq) \longrightarrow FeSO_4 + Cu(s)$ Blue Green (**or any other reaction** which shows change in colour) (ii) Change in temperature: The temperature will increase. $NaOH(aq) + HCl(aq) \longrightarrow NaCl(aq) + H_2O(l) + Heat$ (**or any other reaction** which shows change in temperature) (iii) Formation of precipitate: Yellow precipitate of PbI_2 is formed. $Pb(NO_3)_2(aq) + 2\,KI(aq) \longrightarrow PbI_2(s) + 2\,KNO_3(aq)$ Yellow (**or any other reaction** which shows formation of precipitate)	½ ½ ½ ½ ½ ½	3
29	Reflex action is a **sudden/spontaneous/immediate** action **in response to** the **environment/stimulus** e.g. sneezing. Stimulus → Receptors (Nose) → Sensory neuron → Spinal cord (Relay neuron) → Motor neuron → Effector (Muscles) → Response **(any other example)**	1 2	3
30	(i) Leaves with green (Chlorophyll) and non-green patches (white or yellow patches) e.g. croton/money plant/ any other (ii) Leaf becomes colorless;	½ ½ ½	

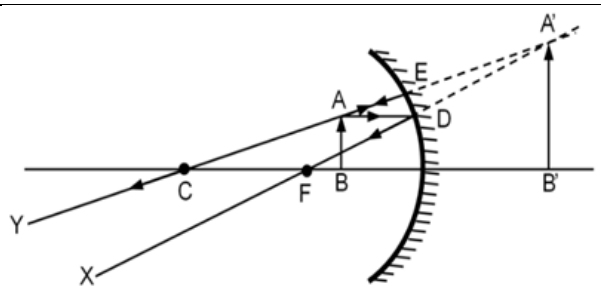
	The solution becomes green (iii) Starch. Chlorophyll helps the plant to absorb energy of the sunlight for the process of photosynthesis	½ ½ ½	3
31	(A) • Number of **plants/organisms** of **first trophic level** will **increase.** • Number of **lions**/ **third trophic level** will **decrease**. • No • As the organisms of that level will **find alternative foods** and will **not starve** to death / food web is more stable where other animals as prey may be available. **OR** (B) • Gas 'X' is **Ozone** • Ozone **shields** the surface of the earth from **ultra-violet (UV) radiations** from the sun. • CFCs (Chlorofluorocarbons) • Succeeded in forging an agreement to freeze CFC production at 1986 levels / Manufacturing of CFC free refrigerators	1 1 ½ ½ 1 1 ½ ½	3
32	 • Phenomenon: Dispersion of light • Cause : Different colours of white light bend through different angles with respect to incident ray./ Different colours of white light have different wavelength therefore bend by different angles. • Refractive index of glass is highest for violet colour. • Justification :For same $\angle i$ the $\angle r$ is minimum for the violet light. $\left(\frac{Sin\ i}{Sin\ r}\right)$ *or* refractive index *is highest*	1 ½ ½ ½	3
33	(i) • Electric fuse and Earth wire (ii) I = P/V	½+½ ½	

	$= \frac{200\cancel{0}\ \text{W}}{22\cancel{0}\ \text{V}} = 9{\cdot}09\ \text{A}$ Since, current drawn by the oven is greater than the rated value of current, (9·09A > 5A), the fuse wire melts/ the electric oven stops working.	½ 1	3
	SECTION-D		
34	(A) (i)Functional Group: A hetero atom or group of atoms attached to the carbon chain, which gives specific properties to the carbon compounds. (I) Ketone (II) Carboxylic acid (ii)Ethanoic acid is formed $C_2H_5OH \xrightarrow[\text{Acidified } K_2Cr_2O_7 + \text{Heat}]{} CH_3COOH$ • oxygen is added to ethanol and converts /oxidises ethanol to ethanoic acid. (iii) $CH_3COOH + NaOH \longrightarrow CH_3COONa + H_2O$ **OR** (B) (i) Soaps are prepared by heating an ester (animal fat / vegetable oil) with a base such as sodium hydroxide. $CH_3COOC_2H_5 \xrightarrow{NaOH} CH_3COONa + C_2H_5OH$ Sodium ethanoate (ii) Ionic (hydrophilic) end of the soap interacts with water while the carbon chain(hydrophobic) interacts with oil. Thus micelles are formed. Emulsion is formed in the water. Soap micelles pull out the dirt and oil in water.	1 ½ ½ ½ 1 ½ 1 1 1 2	

		1	5
35	(A) (i) • Electric power : Rate at which electrical energy is dissipated or consumed / Rate of supplying energy to maintain the flow of current through a circuit. • $P = \frac{V^2}{R}$ (ii) (a) (1 unit = 1kWh) Power, $P = \frac{Electrical\ energy\ consumed}{Time}$ $= \frac{11kWh}{5h}$ = 2.2kW **or** 2200 W (b) $I = \frac{P}{V}$ $= \frac{2200}{220}$ = 10A (c) $R = \frac{V^2}{P}$ $= \frac{(220)^2}{2200}$ = 22 Ω **(Alternate formula can be used)** **OR**	1 1 ½ ½ ½ ½ ½ ½	

	(B) (i) $R = \rho \frac{l}{A}$ $\rho = \frac{R \times A}{l}$ $= \text{Ohm} \times \frac{(\text{metre})^2}{\text{metre}}$ = ohm meter / Ωm (ii) Here l = 3 m, A = 4×10^{-7} m^2, R = 60 Ω $\rho = \frac{R \times A}{l}$ $= \frac{60 \times 4 \times 10^{-7}}{3}$ $= 80 \times 10^{-7}$ Ωm (iii) • Resistivity will not change. • because Resistivity does not depend on the dimension of the conductor / It only depends on the nature of the material.	1 1 1 1 1	5
36	(A) (i) • Chemical Method/Oral pills Side effects: Change the hormonal balance of the body. • Barrier method / Loop / Copper–T Side effects: Irritation in uterus. • Surgical method / Fallopian tube in female is blocked; Side effects – may cause infections. (ii) (a) Fertilized egg/zygote gets implanted in the lining of uterus and starts dividing. (b) If the egg is not fertilized, the thick and spongy lining of the uterus breaks and comes out through the vagina as blood and mucous. **OR**	½ ½ ½ ½ ½ ½ 1 1	

	(B) (i)  (a) Reproductive part – Sporangia (b) Non-reproductive part – Hypha/Hyphae. • Dry slice of bread does not provide moisture and nutrients necessary for the germination and multiplication of Rhizopus. (ii) • Budding: • Hydra uses regenerative cells for reproduction. A bud develops as an outgrowth due to repeated cell division at one specific site and develop into tiny individuals. On maturation, these buds detach from the parent and become new individuals. ***Alternate answer:*** • Regeneration: • It is carried out by specialised cells. If hydra is cut or broken into many pieces, many of these pieces grow into separate individuals. **[Note: Award marks for either of the processes and its explanation]**	1 ½ ½ 1 1 1 1	5
	SECTION E		
37	(i) • Mirror A. • as the object is placed beyond the centre of curvature of the mirror. (ii) Same size/ Real / Inverted (Any two) (iii) (A) Nature-Virtual and erect Size-magnified	½ ½ ½ + ½ ½ ½	

	 **(Deduct ½ mark if direction of rays are not marked)** **OR** (iii) (B) Here $f = -12$ cm, $u = -18$ cm, $v = ?$ Mirror formula $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ or $\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$ $\frac{1}{v} = \frac{1}{-12} - \frac{1}{-18}$ v = - 36cm In front of the mirror at a distance of 36 cm from the pole of the mirror.	1 ½ ½ 1	4
38	(i) • In F_1 generation, all plants were tall / No short plants were observed • No medium height plants / No halfway characteristics were observed / Only dominant parental traits were seen and not the mixture of the two. (ii) **Dominant trait** / **Recessive trait** Single copy of dominant trait is enough to get it expressed/always expressed / Only expressed when present in pair. **(Any other point)** (iii) (A) • Self-pollination / Self-fertilisation/ Selfing of F_1 plants • Ratio – Round Yellow : Wrinkled Green 9 : 1 • Traits are inherited independently.	½ ½ 1 ½ ½ 1	

	OR (iii) (B) If pea plants with yellow seeds are crossed with plants of green seeds, it is found that in F_1 generation all the plants have yellow seeds. When F_1 plants are self-pollinated, it is found that in F_2 generation, plants with yellow seeds and plants with green seeds are obtained. This shows that both the traits are inherited but only one trait is visible in F_1 progeny while the other remains unexpressed. **[Note: Award marks if explained by taking one characteristic / Or explained the same diagrammatically]**	2	4
39	(i) Cathode – Pure copper Anode – Impure copper (ii) Acidified Copper Sulphate; $CuSO_4$ (iii) (A) • Pure copper from the anode dissolves into electrolyte and an equivalent amount of pure metal from the electrolyte is deposited on cathode / At anode : $Cu \longrightarrow Cu^{++} + 2e^-$ At cathode : $Cu^{++} + 2e^- \longrightarrow Cu$ (Pure) • The soluble impurities go into the solution whereas insoluble impurities settle down at the bottom of the anode. **[Note: Award marks if explained with a suitable labelled diagram]** **OR** (iii) (B) In Beaker A : • The blue colour of the solution fades (or becomes colourless) • Reason – Zn is more reactive than copper In Beaker B: • No change in colour. • Reason – Silver is less reactive than Copper	½ ½ ½ + ½ 1 1 ½ ½ ½ ½	4

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