Marking Scheme
Strictly Confidential
Secondary School Examination, 2024
SUBJECT NAME SCIENCE (086) (Q.P. CODE 31/1/3)

General Instructions: -

1	You are aware that evaluation is the most important process in the actual and correct assessment of the candidates. A small mistake in evaluation may lead to serious problems which may affect the future of the candidates, education system and teaching profession. To avoid mistakes, it is requested that before starting evaluation, you must read and understand the spot evaluation guidelines carefully.
2	"Evaluation policy is a confidential policy as it is related to the confidentiality of the examinations conducted, Evaluation done and several other aspects. Its' leakage to public in any manner could lead to derailment of the examination system and affect the life and future of millions of candidates. Sharing this policy/document to anyone, publishing in any magazine and printing in 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.

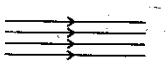
MARKING SCHEME

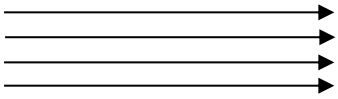
Secondary School Examination, 2024

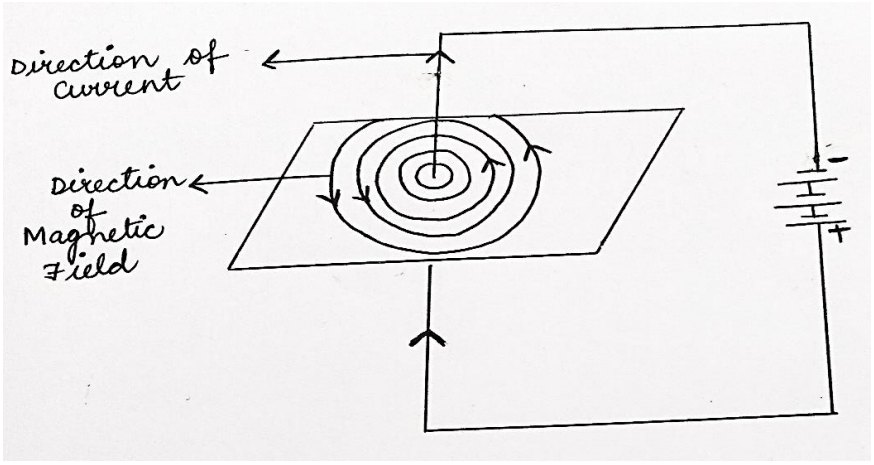
SCIENCE (Subject Code–086)

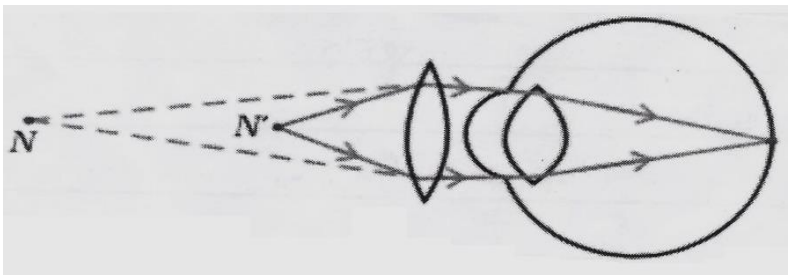
[Paper Code: 31/1/3]

Maximum Marks: 80

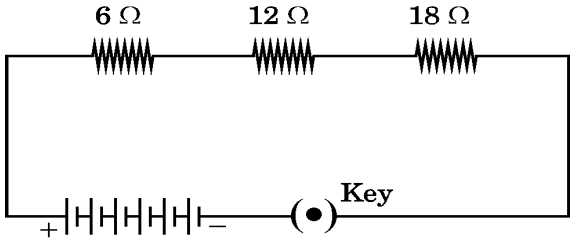
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(c) / 2 AgBr $\longrightarrow$ 2 Ag + Br_2	1	1
2	(b) / 2 $NaOH + Zn \longrightarrow Na_2ZnO_2 + H_2$	1	1
3	(d) / MnO_2 is reduced and HCl is oxidised	1	1
4	(d) / Na_2CO_3	1	1
5	(c) /Neuromuscular junction	1	1
6	(c) /Mercury and Bromine	1	1
7	(c) /At twice the focal length of the lens	1	1
8	(c) / (ii) and (iv)	1	1
9	(c) /amphoteric	1	1
10	(d) / (i) and (iv)	1	1
11	(b)/ (ii) and (iv)	1	1
12	(c)/ Vas deferens	1	1
13	(d) / Plasmodium	1	1
14	(d)/ The upper portion is of concave lens for the distant vision and lower part is of convex lens for the near vision.	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	(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	(c) /Assertion (A) is true, but Reason (R) is false.	1	1
	SECTION-B		
21	(A) (i)The communication between the central nervous system and the other parts of the body is facilitated by the peripheral nervous systems. (ii) protected in a bony box/skull//cranium/fluid filled balloon like structure which provides shock absorption. **OR**	1 1	

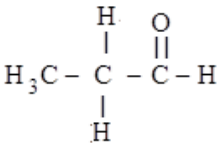
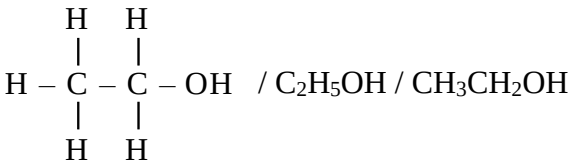
	(B) Chemotropism ; eg. growth of pollen tubes towards the ovules. Hydrotropism ; eg. growth of roots towards water.	½ ½ ½ ½	2
22	(i) Herbivores eating grass need a longer small intestine to allow the cellulose to be digested. Meat is easier to digest. Hence carnivores have shorter small intestine. (ii) **Pepsin** / **Trypsin** i. Secreted by the gastric glands present in the walls of stomach / Secreted in pancreas ii. Acts in acidic medium / Acts in alkaline medium **(Any one)**	1 1	2
23	$2\,BaCl_2(aq) + Al_2(SO_4)_3\,(aq) \longrightarrow 2\,AlCl_3(aq) + 3\,BaSO_4\,(s)$ It is a **precipitation reaction** because **insoluble $BaSO_4$** is formed and gets **precipitated / double displacement** reaction because in this **exchange of ions** takes place **between the reactants**. Name of the chemical reaction Reason	1 ½ ½	2
24	(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

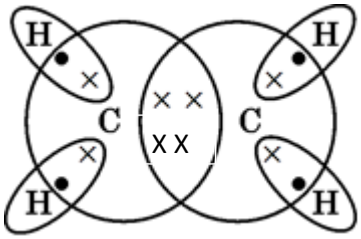
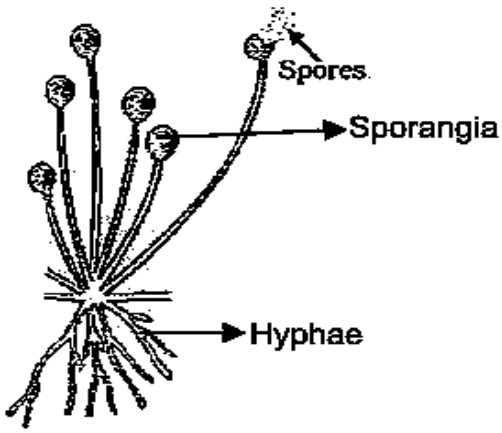
25	 **Direction of current** **Direction of Magnetic Field Lines**	1 ½ ½	2
26	u = - 10cm; f = +15 cm $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$ $\frac{1}{15} = \frac{1}{v} + \frac{1}{-10\ cm}$ $\frac{1}{v} = \frac{1}{15\ cm} + \frac{1}{10\ cm}$ v = + 6 cm Image is formed behind the mirror.	½ ½ 1	2
	SECTION-C		
27	(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)	1 1 ½ ½ 1 1 ½	

	• Succeeded in forging an agreement to freeze CFC production at 1986 levels / Manufacturing of CFC free refrigerators	½	3
28	(i) • Right - Hand Thumb Rule • If the wire carrying current is held in our **right hand** such that the **Thumb** points towards the **Direction of Current**, then the **fingers wrap around the conductor** in the **direction of field lines of the magnetic field.** (ii) • Fleming's Left - Hand Rule • Stretch the thumb, forefinger and middle finger of **left hand mutually perpendicular** to each other, such that **first finger** points in the direction of **Magnetic Field**, **second finger** in the direction of **Current,** then **thumb** in the **direction of motion or force** acting on the conductor.	½ 1 ½ 1	3
29	(i) Hypermetropia or Far-sightedness. Reason – Image is formed behind the retina. / Near point for the person is farther away from the normal near point (25 cm) (ii) • Focal length of the eye lens is too long. • The eyeball has become too small. (iii)  N = Near point of a hypermetropic eye N'= Near point of a normal eye	½ ½ ½ ½ 1	3
30	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
31	(i)Amphibians - frogs / Reptiles - lizards	½	

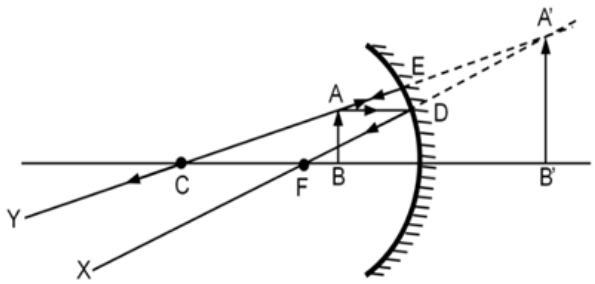
	• The body temperature depends on the temperature in the environment. Therefore they can tolerate some mixing of the oxygenated and de-oxygenated blood streams. (ii) Two functions: • Lymph carries digested and absorbed fat from intestine • Drains excess fluid from extra cellular space back into the blood.	½ 1 1	3
32	(i) Plaster of Paris ; Calcium Sulphate hemihydrate (ii) $CaSO_4 \cdot 2\,H_2O \xrightarrow{373\,K} CaSO_4 \cdot \frac{1}{2}H_2O + 1\frac{1}{2}\,H_2O$ (iii)Two uses : • Used for making toys • Materials for decoration • Making surfaces smooth • Supporting fractured bones **(Any two)** **(Any other alternate answer)**	½ + ½ 1 ½ + ½	3
33	(i) A reaction in which a single substance on absorption of energy. decomposes to give two or more substances. $2\,Pb(NO_3)_2 \xrightarrow{Heat} 2\,PbO + 4\,NO_2 + O_2$ (ii) Cathode : Anode (Mass ratio) 1 : 8	1 1 1	3
	SECTION-D		
34	(A)(i)(a) same current and same potential difference. (b) same current and same potential difference (c) same current but different potential difference (d) different current but same potential difference. (ii) (a)Minimum resistance – When resistors are in parallel $\frac{1}{R} = \frac{1}{24} + \frac{1}{24}$	½ x4 ½	

	$\therefore\ R_P\ =\ 12\,\Omega$	½	
	Power consumed $P_1\ =\ \frac{V^2}{R_P}$ $=\ \frac{6\,V\ \times\ 6\,V}{12\ \Omega}$ $=\ 3\,W$	½ ½	
	(b) $\therefore\ R_s\ =\ 24\,\Omega\ +\ 24\,\Omega\ =\ 48\,\Omega$ Power consumed $P_2\ =\ \frac{V^2}{R_s}$ $=\ \frac{6\,V\ \times\ 6\,V}{48\ \Omega}$ $=\ \frac{3}{4}W$ $from\ P_1\ and\ P_2$ $\therefore\ \frac{P_1}{P_2}\ =\ \frac{3}{\frac{3}{4}}=\ \frac{4}{1}$ $\Rightarrow\ P_p\ :\ P_s\ =\ 4\ :\ 1$	½ ½	
	OR		
	(B)  **12 V (Six cells of 2 V each)** (i)Current = $\frac{V}{R}\ =\ \frac{12}{(6+12+18)\,\Omega}\ =\ \frac{1}{3}\,A$ (ii)Potential difference across 18 Ω resistor = I × R = $\frac{1}{3}A\ \times 18\,\Omega\ =$ $6\,V$ (iii) Power consumed in 18 Ω resistor = V × I = $6\,V\ \times\ \frac{1}{3}A\ =\ 2\,W$	2 1 1 1	5
35	(A)		

	(i) A series of carbon compounds in which the same functional group substitutes for hydrogen in a carbon chain / Series of compounds having same functional group and similar chemical properties.	1	
	(ii) Because melting point and boiling point increase with molecular mass.	1	
	(iii) Because chemical properties of organic compounds are solely determined by their functional group which remains same in a homologous series.	1	
	(iv) (i) Aldehyde: Propanal	½	
	 / CH_3CH_2CHO	½	
	(ii) Ketone: Propanone	½	
	$H_3C-\underset{\underset{O}{\|\|}}{C}-CH_3$ / CH_3COCH_3	½	
	OR		
	(B) (i) Ethanol Structure:	½	
	 / C_2H_5OH / CH_3CH_2OH	1	
	(ii) Ethene is formed	½	
	$C_2H_5OH \xrightarrow{\text{Conc.}H_2SO_4\,443K\ (Heat)} H_2C = CH_2 + H_2O$ *Ethanol* Ethene Water	1	
	[Note: Deduct ½ marks if the conditions required are not mentioned in the equation]		
	• Concentrated Sulphuric acid acts as a dehydrating agent.	½	

	(iii) Ethene  	½ 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** **(B)** (i)  (a) Reproductive part – Sporangia (b) Non-reproductive part – Hypha/Hyphae.	½ ½ ½ ½ ½ ½ 1 1 1 ½ ½	

	• 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 1 1	5
	SECTION E		
37	(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. **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	½ ½ 1 ½ ½ 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
38	(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  **(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.	½ ½ ½ + ½ ½ ½ 1 ½ ½ 1	4
39	(i) Cathode – Pure copper Anode – Impure copper	½ ½	

	(ii) Acidified Copper Sulphate; $CuSO_4$	½ + ½	
	(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	1	
	• 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]**	1	
	OR		
	(iii) (B) In Beaker A : • The blue colour of the solution fades (or becomes colourless)	½	
	• Reason – Zn is more reactive than copper	½	
	In Beaker B: • No change in colour.	½	
	• Reason – Silver is less reactive than Copper	½	4

*****