Marking Scheme

Strictly Confidential

(For Internal and Restricted use only)

Secondary School Examination, 2024

SUBJECT NAME - SCIENCE (FOR VISUALLY IMPAIRED CANDIDATES ONLY)
[Q.P. CODE 31(B)]

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/(B)]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION A		
1	(A)/30°	1	1
2	(B)/ Virtual, erect and diminished	1	1
3	(D)/ 0·25 ampere	1	1
4	(B) /100 Ω	1	1
5	(C) /iii and iv	1	1
6	(C)/ 3, 4, 3, 2	1	1
7	(B) /weak acid and strong base	1	1
8	(D)/ HCl and CO_2	1	1
9	(B) /Potassium	1	1
10	(B)/ Ethene	1	1
11	(A) /Bread mould	1	1
12	(A) /Alveoli	1	1
13	(D)/ Axonal end	1	1
14	(C)/ Cotyledon, radicle, plumule	1	1
15	(A)/ Wrinkled green	1	1
16	(D) /ii and iii	1	1
17	(A) /Both (A) and (R) are true and (R) is the correct explanation of (A)	1	1
18	(A) /Both (A) and (R) are true, but (R) is the correct explanation of (A)	1	1
19	(B) /Both (A) and (R) are true, but (R) is ***not*** the correct explanation of (A)	1	1
20	(A) /Both (A) and (R) are true and (R) is the correct explanation of (A)	1	1
	SECTION B		

21	(a) Four properties:
	
	• Virtual
	• Erect
	• Size of the image = Size of the object
	• Image distance from the mirror = Object distance from the mirror
	• Laterally inverted
	
	                      (Any four)
	
	                  OR
	(b)
	(i) Pole: Central point of the reflecting surface of a spherical mirror.
	(ii) Centre of curvature: Centre of the sphere of which the reflecting surface of the spherical mirror forms a part.
	(iii) Radius of curvature: Radius of the sphere of which the reflecting surface of the spherical mirror forms a part.
		½ x 4	

	(iv)	Principal axis: Straight line joining the pole and the centre of curvature of a spherical mirror		½ x 4	
					2
22	• Concentric circles around the current carrying straight conductor.			1	
	• Right hand thumb rule: Imagine that you are holding the current carrying straight conductor in your right hand such that the thumb points towards the direction of current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field.			1	
					2
23	(a) (i)	• X – Gypsum / $CaSO_4 \cdot 2 H_2O$		½	
		• Y – Plaster of Paris / $CaSO_4 \cdot \dfrac{1}{2} H_2O$		½	
	(ii)	By adding water to Plaster of Paris (Y)		1	
		OR			
	(b) (i)	• X		½	
		• because it is an acid.		½	
	(ii)	• neutral		½	
		• because its solution turns universal indicator green.		½	
					2
24	• Aluminium is more reactive than iron.			1	
	• $3 FeSO_4 + 2 Al \longrightarrow Al_2 (SO_4)_3 + 3 Fe$			1	
					2
25	(a) Inhaled air contains a lot of dust and germs which are filtered by fine hair and mucus.			1	
	(b) It is to ensure that the trachea does not collapse when there is less air in it.			1	
					2
26	(a) (i) Thinking – Forebrain / Cerebrum (ii) Blood pressure – Medulla/hindbrain (iii) Maintaining posture and balance – Cerebellum/ hindbrain (iv) Salivation – Medulla/hindbrain			½ x 4	
		OR			
	(b) (i) Roots (ii) Shoots (iii) Shoots (iv) Growth of the pollen tube towards the ovule /Roots towards useful minerals			½ x 4	
					2

	SECTION C		

27	(a)
	(i) the current increases and the fuse melts which breaks the circuit. So, the appliance is saved from the damage
	
	(ii) Current used in household is alternating current (ac) whereas current from the dry cells / batteries are direct current (dc).
	
	(iii) The distant transmission loss of electric power can be minimized by alternating current (ac).
	 (or any other alternate answer)
	 OR
	(b)
	(i) (1) The conductor will get displaced towards the left
	    (2) The conductor will get displaced towards the left.
	    (3) Displacement of the conductor towards the right will increase
	
	(ii)
	• Fleming's left hand rule
	• Stretch the thumb, forefinger and the middle finger of your left hand such that they are mutually perpendicular to each other. If the forefinger points in the direction of magnetic field, and the middle finger points in the direction of electric current, then the thumb will point in the direction of motion or the force on the conductor.
		1
		
		1
		
		1
		
		½ x 3
		
		½
		
		1
			3

28	• After the rain shower during day time • In the sky opposite to the Sun • Refraction; dispersion of light; Internal reflection • Because there is no atmosphere (water droplets) for the refraction of light to occur.	½ ½ ½×3 ½	3
29	(a) • Electrolytic refining • Anode- impure metal • Cathode- strip of pure metal • Electrolyte- a soluble salt solution of the metal • On passing the current through the electrolyte, the pure metal from the anode dissolves into the electrolyte. An equivalent amount of pure metal from the electrolyte is deposited on the cathode. The impurities settle down at the bottom of the anode and are known as anode mud. **OR**	½ ½ ½ ½ 1	

	(b)			
		Roasting	Calcination	
		Heating of sulphide ore strongly in the presence of air.	Heating of carbonate ore strongly in limited supply of air.	1
		$2ZnS + 3O_2 \xrightarrow{Heat} 2ZnO + SO_2$	$ZnCO_3 \xrightarrow{Heat} ZnO + CO_2$	½ + ½
	• Heating of the oxide of the metal with suitable reducing agent (Carbon or highly reactive metals such as K, Na, Al, etc).			½
	• $ZnO + C \xrightarrow{Heat} ZnO + CO$ / $Fe_2O_3 + 2Al \rightarrow 2Fe + Al_2O_3$ **(or any other reaction)**			½
				3
30	(a)			
	• Ethanol /C_2H_5OH			½
	• As a dehydrating agent			½
	$C_2H_5OH \xrightarrow{Hot\ conc.H_2SO4} C_2H_4 + H_2O$			1
	(b) $C_2H_5OH + CH_3COOH \xrightarrow{acid} CH_3COOC_2H_5 + H_2O$			1
				3
31	(a)			
	• (i) Adrenaline			½
	• (ii) Adrenal gland			½
	• Heart beats faster; resulting in supply of more oxygen to our muscles			1
	• Blood to digestive system is reduced; due to contraction of muscles around small arteries.			1
	• Breathing rate increases; due to contraction of diaphragm and rib muscles. **(Any two)**			
	OR			
	(b)			
	• Auxin			1
	• In the presence of light coming from one direction, auxin diffuses towards shady side of the shoot.			1
	• This concentration of auxin stimulates the cells to grow longer on the side of shoot which is away from the light.			1
				3
32	• Yes			1

	• When pure tall pea plants (TT) are crossed with pure short pea plants (tt) only tall pea plants (Tt) are obtained in F_1 generation of pea plants.	½	
	• On selfing tall pea plants (Tt) of F_1, both tall and short pea plants are obtained in F_2 generation of pea plants.	½	
	• Reappearance of the short pea plants in F_2 generation shows that the short trait of pea plants was present in the individuals of F_1 but it could not get expressed.	1	3
33	(a) • Decomposers: The micro-organisms that breakdown complex organic matter (dead organisms/plants) into simpler substances/ inorganic matter.	1	
	• (i) by decomposing the garbage (dead plants and animals)/composting. (ii) recycle the nutrients that enter the soil and are used up again by plants.	1 1	
	OR (b) • A series of organisms feeding on one another at various trophic levels. / It is a simple representation of energy flow in nature/ecosystem.	1	
	• Grass → Grasshopper → Frog → Snake → Eagle (10,000 J) (1000 J) (100 J) (10 J) (1 J) **(Or any other example of food chain)**	1	
	• Justification: Only 10% of the energy present at one trophic level is transferred to the next higher trophic level. The loss of energy at each step is so great that very little usable energy remains after 4-5 trophic levels.	1	3
	SECTION D		
34	(a) (i) $R = \rho \dfrac{l}{A} \Rightarrow \rho = \dfrac{RA}{l}$	1	
	SI unit of resistivity $(\rho) = \dfrac{\text{SI unit of R} \times \text{SI unit of A}}{\text{SI unit of } l}$		
	$= \dfrac{ohm \times (metre)^2}{metre}$	½	
	$= $ ohm metre or Ω m	½	
	(ii) $l = 100$ m; $R = 20\ \Omega$; $r = 5$ mm $= \dfrac{5}{1000}$ m		

	$\therefore \text{ A} = \pi r^2 = 3 \cdot 14 \times \left(\dfrac{5}{1000}\right)^2 \text{m}^2$ $\therefore \rho = R \dfrac{A}{l}$ $= 20 \, \Omega \times \dfrac{3 \cdot 14 \times \left(\dfrac{5}{1000}\right)^2 \text{m}^2}{100 \text{ m}}$ $= 157 \times 10^{-7} \, \Omega \text{ m}$ **OR** (b) (i) When Q amount of charge flows through a potential difference of V, Then the amount of work done, $W = V Q$ ---------------(1) $\quad\quad\quad P = W/t$ $\quad\quad\quad = VQ/t \quad$ [From (1)] $\quad\quad\quad = V I \quad\quad [I = Q/t]$ --------------------------(2) Work done=heat produced, $H = P \times t$ $\quad\quad\quad\quad\quad\quad\quad = VIt \quad$ [From (2)] $\quad\quad\quad\quad\quad\quad\quad = I^2Rt$ [From Ohm's law; $V = IR$] (ii) $\quad$ Here, $R = 10 \, \Omega$, $I = 5$ A, $t = 2$ h, $P = ?$; $E = ?$ $P = I^2 R$ $\quad = (5A)^2 \times 10 \, \Omega = 25 \times 10$ W $\quad = 250$ W Energy / Work done $= P \times t$ $\quad\quad\quad\quad\quad\quad = 250$ W $\times 2$ h $= 500$ Wh $\quad\quad\quad\quad\quad\quad = 0 \cdot 5$ kWh	1 1 1 ½ ½ ½ ½ ½ ½ 1 ½ 1		5
35	• Chlor-alkali process • When electric current is passed through an aqueous solution of sodium chloride (brine), three products namely; sodium hydroxide (alkali) and two gases are obtained.	1 1		

	• At anode – chlorine gas At cathode - hydrogen gas	½ ½	
	Uses of chlorine: Water treatment/preparation of PVC/as disinfectants/preparation of CFCs/in Pesticides **(Any two)**	½ + ½	
	Uses of hydrogen: As a fuel /in margarine/Manufacturing of ammonia for fertilizer **(Any two)**	½ + ½	
			5
36	(a) (i) • A process of reproduction in which vegetative parts of a plant such as root, stem, leaves are used for growing new plants.	1	
	• Asexual reproduction • Only one parent is involved/ no gametes are formed in this process.	½ 1	
	(ii) Three advantages of this technique/process: • Plants genetically similar to the parent plants are obtained. • Plants that do not produce seeds are propagated by this technique. • Plants can bear flowers and fruits earlier than those produced from seeds. • Cheaper / less expensive **(Any three)**	½ × 3	
	(iii) Banana, Jasmine	½ + ½	
	OR (b) (i) Functions: (1) Oviduct Transfer of female gamete/egg from ovary Site of fertilization	½ ½	
	(2) Uterus Implantation of zygote Nourishment of the developing embryo/placenta formation	½ ½	

	(3) Ovary				
	Secretion of female hormone/estrogen		½		
	Production of female gamete/ ovum		½		
	(ii)		1		
	• with the help of placenta				
	• Placenta is a disc-like structure which is embedded in the uterine wall and transfer of glucose and oxygen takes place from the mother to the embryo.		1	5	

SECTION E

37	(i)	Real; inverted; diminished **(Any two)**	½ + ½	
	(ii)	Case 3: because object distance is twice the focal length	½ + ½	
	(iii) (a)	• Convex lens/ converging lens	1	
		• It provides the additional focussing power required for forming the image on the retina. **/** These lenses decrease the focal length of the eye lens, thereby forming the image on the retina.	1	
		OR		
	(iii) (b)	In case 1: $u = -25$ cm; $f = +50$ cm		
		Lens formula: $\dfrac{1}{f} = \dfrac{1}{v} - \dfrac{1}{u}$ $\quad \therefore \dfrac{1}{v} = \dfrac{1}{f} + \dfrac{1}{u}$	½	
		$\therefore \dfrac{1}{v} = \dfrac{1}{50} + \dfrac{1}{-25}$	½	
		$v = -50$ cm	1	4
38	(i)	Reaction No. (1): Exothermic	½ + ½	
	(ii)	Reaction No. (3): Colour change − Blue to pale (light) green	½ + ½	
	(iii)	(a) Reaction No. (2)	1	
		$2\,FeSO_4 \xrightarrow{\ heat\ } Fe_2O_3 + SO_2 + SO_3$	1	
		OR		

	(iii) (b) Sodium Sulphate + Barium chloride → Barium Sulphate + Sodium chloride * It is not a redox reaction because in this reaction, only exchange of ions takes place / and there is no gain or loss of oxygen or hydrogen. *Note: Award 1 mark to all the candidates for * marked part.*	1 1	 4

39	(i) Autotrophic nutrition
	     Heterotrophic nutrition
	
	(ii) The air (oxygen) we inhale is used for the breakdown of food(glucose) into carbon dioxide and water with the release of energy.
	
	(iii) (a)The loss of water in the form of vapour from the aerial parts of the plant is known as transpiration.
	
	Uses:
	     Helps in the absorption and upward movement of water and dissolved minerals in it from the roots to the leaves. /
	     Helps in temperature regulation / provides cooling effect.
	                                                                        (Any one)
	                              OR
	
	(iii) (b) Kidney → ureter → urinary bladder → urethra
	     Glucose, amino acids, salts, water **(Any two)**
		½
		½
		
		1
		
		1
		
		1
		
		1
		½ + ½
			
			4