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 **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/B]

Maximum Marks: 80

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
	SECTION—A		
1.	(d)	1	1
2.	(a)	1	1
3.	(b)	1	1
4.	(c)	1	1
5.	(b)	1	1
6.	(d)	1	1
7.	(c)	1	1
8.	(c)	1	1
9.	(a)	1	1
10.	(c)	1	1
11.	(b)	1	1
12.	(b)	1	1
13.	(a)	1	1
14.	(d)	1	1
15.	(b)	1	1
16.	(b)	1	1
17.	(d)	1	1
18.	(c)	1	1
19.	(a)	1	1
20.	(a)	1	1

		SECTION B		
21.	(a) • A balanced chemical equation which has equal number of atoms of each element on the side of reactants and products. • To obey the law of conservation of mass. **OR** (b) • Zinc being more reactive, displaces iron from iron sulphate solution due to the formation of zinc sulphate • $FeSO_4 + Zn \longrightarrow ZnSO_4 + Fe$	1 1 1 1	2
22.	Four processes which are essential for maintaining life – (i) nutrition (ii) respiration (iii) transportation (iv) excretion	½ × 4	2
23.	(a) • Haemoglobin present in RBC gets attached to the oxygen molecule and the blood becomes oxygenated. • The oxygenated blood is then distributed to all the body cells in human beings. **OR** (b) • Saliva is a fluid secreted in the mouth by the salivary glands. • Saliva contains an enzyme which breaks down starch of food into simple sugar.	1 1 1 1	2
24.	• Selective reabsorption • Nephrons • The amount of water and mineral salts required by the body are reabsorbed such as glucose, amino acid in the tubular part of nephron.	½ ½ 1	2
25.	(a) (i) (I) 25 cm (II) infinity / ∞ (ii) • myopia/near sightedness • concave lens/diverging lens **OR** (b) (i) Cornea – Most of the refraction of light rays falling on the eye. (ii) Iris – controls the size of the pupil. (iii) Retina – image is formed on it (iv) Ciliary muscles – To modify the curvature / focal length of the eye lens.	½, ½ ½, ½ ½ ½ ½ ½	2
26.	• Plants $\longrightarrow$ frogs $\longrightarrow$ snakes $\longrightarrow$ hawks • Hawks • Biomagnification/Biological Magnification	1 ½ , ½	2

		SECTION C		
27.	(a)	Pale green / green → brown	1	
	(b)	• Sulphur dioxide (SO_2) • Sulphur trioxide (SO_3)	½ ½	
	(c)	$2FeSO_4 \xrightarrow{\text{heat}} Fe_2O_3 + SO_2 + SO_3$	1	
	[Note: Do not cut marks if equation is not balanced]			3

28.	(a) (i) • Milk of Magnesia / $Mg(OH)_2$ (Magnesium hydroxide)
	            / $(Al(OH)_3$ (Aluminium hydroxide)
	            / $(NaHCO_3)$ (Sodium hydrogen carbonate)
	                               (any other example)
	   • neutralises excess acid produced in the stomach.		

		1 1	

	(ii) If water is added to acid, excessive heat is produced which may cause
	     burn / injury .Therefore, acid should be added to water drop-
	     by-drop with constant stirring.
	                              OR
		1	

	(b) (i) CO_2 / Carbon dioxide
	  (ii) • Lime water turns milky
	     • Due to formation of $CaCO_3$ which is insoluble in water.
	  (iii) • A clear solution is obtained when excess of CO_2 is passed.
	
	     • It is due to formation of calcium hydrogen carbonate / Calcium
	      bicarbonate / $Ca(HCO_3)_2$ which is soluble in water.
		1
		½
		½
		½
		
		½
			3

29.	(a)
	  • The movement of a plant part (shoot / root) in response to earth /
	    gravity is called geotropism.
	
	  • When a part of the plant grows towards gravity, it is called
	    Positive Geotropism.
	    Example : roots of a plant
	
	  • When a part of the plant grows away from gravity , it is called
	    negative geotropism.
	    Example: Shoot/ Stem of a plant
	
	                           OR
		1
		
		½
		½
		
		½
		½	

	(b) • Auxins	1	

	• 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 sources of light.		1	
	• Phototropism.		1	3
30.	(a) Two / 2		½	
	(b) • Parallel to the principal axis • Passing through the principal focus • Ray passing through centre of curvature • Ray incident obliquely to principal axis. **(any two points)**		½, ½	
	(c) • After reflection passes through the principal focus. • After reflection becomes parallel to the principal axis. • After reflection, reflected back along same path. • Reflected obliquely **(any two points)**		½, ½	
	(d) negative		½	3
31.	(a)			
	(i) Convex lens/Converging lens		½	
	(ii) Distance between the flame and screen = 1 m ∴ Lens is placed exactly in the middle and a distinct image of the flame is formed on the screen. Object distance = Image distance = 2f			
	∴ 2f + 2f = 4f = 1 m		½	
	∴ f = $\dfrac{1}{4}$ m = 25 cm / 0.25 m		1	
	(iii) Power = $\dfrac{1}{f(m)}$		½	
	= +4D		½	
	OR			
	(b)			
	(i) Absolute refractive index of a medium is the ratio of speed of light in vacuum (or air) to the speed of light in the medium. **/** Absolute refractive index $n_m = \dfrac{\text{Speed of light in vacuum (c)}}{\text{Speed of light in the medium } v_m}$		1	
	(ii) (I) $c = n_g \times v_g$		½	
	$= \dfrac{3}{2} \times 2 \times 10^8$ m/s $= 3 \times 10^8$ m/s		½	
	(II) $v_w = \dfrac{c}{n_w}$		½	

	$= \dfrac{3 \times 10^8 \text{ m/s}}{\dfrac{4}{3}} = \dfrac{9}{4} \times 10^8 \text{ m/s or } 2.25 \times 10^8 \text{ m/s}$	½		3
32.	• Solenoid –A coil of many circular turns of insulated copper wire wrapped closely in the shape of cylinder.	1		
	• A current carrying solenoid behaves like a strong bar magnet and when suspended freely, it stays in the geographical north-south direction.	1		
	• Used in making permanent magnets/electromagnets.	1		3
33.	• Ecosystem : A structural and functional unit of biosphere comprising all the living organism in an area interacting with non-living constituents of the environment.	1		
	• (i) Biotic components	½		
	• (ii) Abiotic components	½		
	• An aquarium is a man-made (artificial) and incomplete ecosystem without any decomposer as cleaning agent in contrast to a pond/lake which is natural, self-sustaining and complete ecosystem, with decomposers as cleaning agents.	1		3
	SECTION D			
34.	(a) (i) Propanoic acid	½		
	(ii) Benzene	½		
	(b) Homologous series : A series of carbon compounds having similar structure and chemical properties in which the successive members differ by – CH_2 group.	1		
	• CH_3OH, C_2H_5OH, C_3H_7OH	1		
	(c) An ester is formed	½		
	• Esterification	½		
	• $C_2H_5OH + CH_3OOH \xrightarrow{\text{Acid / H}^+} CH_3COOC_2H_5 + H_2O$	1		5
35.	(a)			
	(i) • Vegetative propagation is an asexual method of reproduction in which old vegetative parts of a plant body such as stem, leaves, roots are used for growing new plants without involving any reproductive organs .	1		
	Advantages -			
	• Can bear flowers and fruits much earlier than those produced from seeds.			
	• Plants that have lost the property to produce seeds can be grown			
	• Genetically similar plants can be grown			
	• Plants of superior quality may be grown			

| | It is a cheaper, easier and rapid method of propagation **(any 2)** | ½ , ½ | |

(ii)

	Binary fission	**Multiple fission**
(i)	It is the division of one cell into two similar/identical cells.	It is the process in which many daughter cell individuals are formed from a single individual parents cell.
(ii)	In this process, the nucleus first divides into two followed by the division of cytoplasm.	In this process, the nucleus of the cell divides repeatedly producing many nuclei.
(iii)	eg. amoeba	e.g. Plasmodium Malarial Parasite

1,1,1

OR

(b)

(i) (I) Ovary – Production of female gamete (ova) and female hormone.   1

    (II) Fallopian Tube – Site of fertilisation and to transfer of zygote into
        the uterus.   1

   (III) Uterus – Implantation of zygote and nourishment to the
        developing embryo.   1

(ii) • Menstruation: breakdown of uterine lining and its removal
      along with blood and mucus in a human female, when no
      fertilization takes place.   1

   • Uterine lining is required to nourish the embryo/fertilised egg. In the
     absence of fertilisation, the lining is not required and hence it sheds
     in the form of menstruation.   1   5

36.

(a)

• Consider a current I flowing through a resistor of resistance R having a
  potential difference V across its ends.

Let t be the time during which charge Q flows across

∴ Work done in moving charge $W = VQ$

∴ Power input to the circuit by the source $P = \dfrac{VQ}{t} = VI$

∴ Energy supplied by the source to the circuit in time $t = VIt$ ½

$$= IR \cdot It$$ ½

This energy is dissipated in the form of heat if the circuit is purely resistive.

$$\therefore H = I^2Rt$$ ½

This is the required expression for Joule's law of heating which implies that
the heat produced H in a resistor is

	(i) directly proportional to square of current (I^2) for given R	½	
	(ii) directly proportional to resistance (R) for given I	½	
	(iii) directly proportional to time t for which the current flows through the resistor	½	
	(b) H = 200 J, t = 1 s , R = 8 Ω		
	(i) Using the formula $H = I^2Rt$, we have $I^2 = \dfrac{H}{Rt}$ $$= \dfrac{200\ J}{8 \times 1\ \Omega\ t} =$$ $$= 25$$ $$\Rightarrow\ I = 5A$$	1	
	(ii) V = IR	½	
	$= 5A \times 8\ \Omega = 40V$	½	5

	SECTION E		
37.	(a) • due to absorption of heat.	1	
	(b) • In the presence of sunlight, silver bromide (AgBr) decomposes into silver (Ag) metal and bromine (Br₂) / $2AgBr \xrightarrow{h\nu} 2Ag + Br_2$ (**or any other example**)	1	
	(c) • Gas liberated at cathode – hydrogen (H_2)	½	
	• Gas liberated at anode – oxygen (O_2)	½	
	• Molar ratio of hydrogen and oxygen liberated on electrolysis of water is 2 : 1	1	
	OR		
	c) • Brown fumes are produced / Decomposition	1	
	• $2Pb(NO_3)_2 \xrightarrow{\text{heat}} 2PbO + 4\ NO_2 + O_2$	1	
	[Note: Do not cut marks if equation is not balanced]		4
38.	(a) • Oestrogen and Testosterone	½ , ½	
	(b) • Anti-stress hormone/ fight fright hormone /Deals with emergency situations like fear, anger, stress anxiety etc.	1	
	(c) • Growth Hormone: Regulates growth and development of the body	½ , ½	
	• Thyroxin Hormone: Regulates carbohydrate, fat and protein metabolism in the body.	½ , ½	
	OR		
	(c) It is the mechanism by which hormones are secreted in the precise quantity as needed by the body. Example If the sugar level in blood rises, they are detected by the cells of the pancreas which respond by producing more insulin. As the blood sugar level falls, insulin secretion is reduced.	2	
			4

39.					
	(a)	• Should be slightly more than f / between f and 2f		1	
	(b)	• Virtual • Inverted with respect to object • Magnified **(any two)**		½, ½	
	(c)	• Real • Inverted • Image is of the same size as the object **(any two)**		½, ½	
		m = -1 (Minus one)		1	
		OR			
	(c)	• Real • inverted • diminished **(any two)**		½, ½	
		m < 1 and negative		1	4

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