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

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.**

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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.

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MARKING SCHEME

Secondary School Examination, 2023

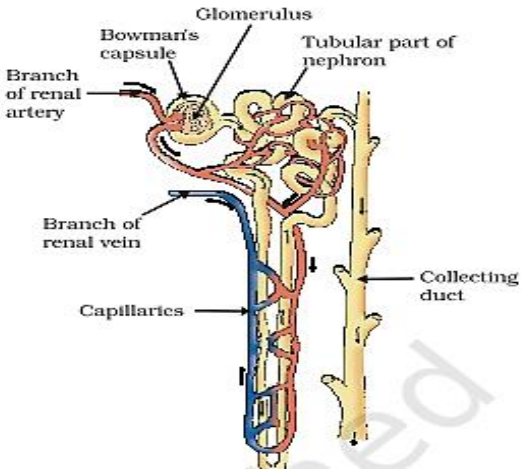
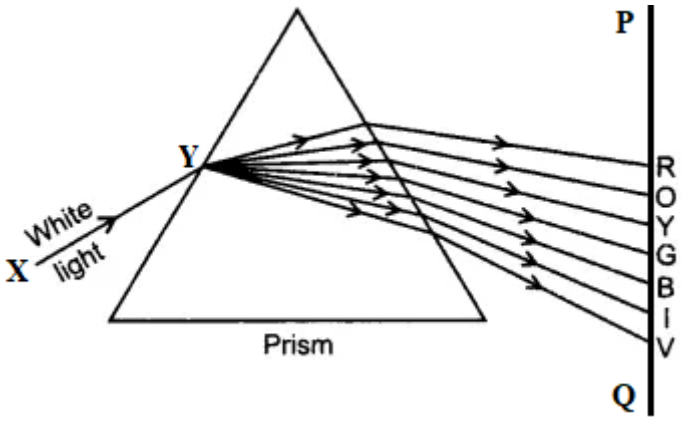
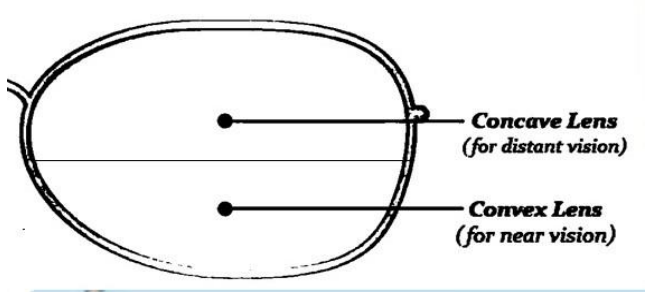
SCIENCE (Subject Code–086)

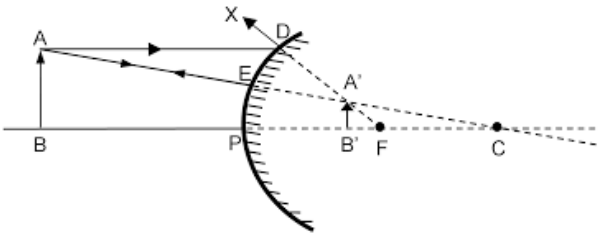
[Paper Code:31/1/1]

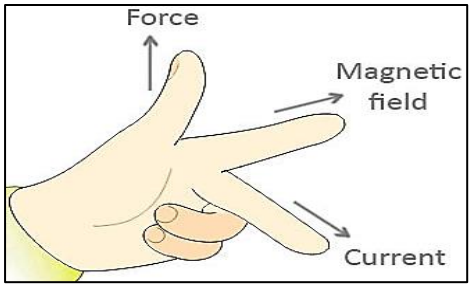
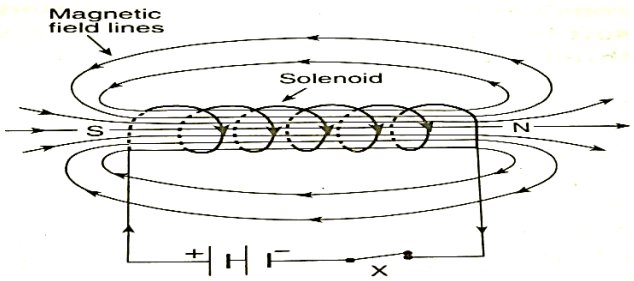
Maximum Marks: 80

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

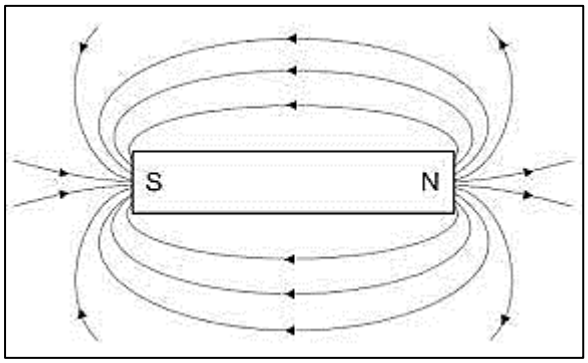
20.	(a)	1	1
	SECTION B		
21.	(a) (i) X: Plaster of Paris/Calcium sulphate hemihydrate. • $CaSO_4.\frac{1}{2}H_2O$ (ii) • Baking Soda – $NaHCO_3$ /Sodium hydrogen carbonate/ Sodium bicarbonate •Baking Powder – A mixture of $NaHCO_3$ /Baking soda + Tartaric acid/any mild edible acid **OR** (b) (i) $CuSO_4.5H_2O \xrightarrow{heat} CuSO_4 + 5H_2O$ (ii) $2NaHCO_3 \xrightarrow{heat} Na_2CO_3 + H_2O + CO_2$	½ ½ ½ ½ 1 1	2
22.	(a) • Lowers blood sugar levels • Diabetes (b) The rise in sugar level in blood produces more insulin. As the blood sugar level falls, secretion is reduced.	½ ½ 1	2
23.	(a) (i) Vena cava – deoxygenated blood from body to heart. (ii) Pulmonary artery – deoxygenated blood from heart to lungs. **OR** (b) **(i)** Glucose $\xrightarrow{\text{(in cytoplasm)}}$ Pyruvate $\xrightarrow[\text{(in mitochondria)}]{\text{presence of oxygen}}$ CO_2 + Water + Energy (ii) Glucose $\xrightarrow{\text{(in cytoplasm)}}$ Pyruvate $\xrightarrow[\text{(In human muscles cells)}]{\text{Lack of oxygen}}$ Lactic acid + Energy	½, ½ ½, ½ 1 1	2
24.	• Kidneys Structure: A cluster of thin-walled capillaries (glomerulus) associated with cup-shaped end of a tube called Bowman's capsule. This further extends into a tubular part which ends in collective ducts. /	½ 1	

	 • Function: Filtration of nitrogenous waste from blood to form urine. / Reabsorption of useful materials from the filtrate. / Osmoregulation **(Any one function)**	½	2
25	(a)  • Dispersion of white light • Cause: Different colours of light bend through different angles w.r.t. the incident ray. / Different colours have different wavelengths. **OR** (b) (i) It is due to gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens. (ii) Presbyopia/ Presbyopia + Myopia (iii) Bifocal /Concave + Convex lens/ Diagram  	1 ½ ½ ½, ½ ½ ½	2

26.	The chemicals sprayed on crops are washed down into the soil. From the soil these are absorbed by plants along with water and minerals, plants are eaten by animals. This way they enter in a food chain. As these chemicals are not degradable, these get accumulated progressively at each successive trophic level. This phenomena is called bio magnification.	2	2
	SECTION C		
27.	(a) (i) NH_3 (ii) H_2O (iii) CO (iv) H_2 **(Award full mark if part (ii)of (a) is attempted)** (b) A reaction in which the gain or loss of oxygen takes place simultaneously is called a redox reaction.	½ x 4 1	3
28.	(a) (i) Use of antacids (ii) Baking soda/mild base/dock plant. (b) pH will decrease, as curd is more acidic than milk.	1 1 ½+½	3
29.	(a) (i) Energy currency for cellular processes / ATP breaks down to give a fixed amount of energy which can drive the endothermic reactions taking place in the cell. (ii) Stomata and surface of leaves, stems and roots. (iii) Environmental conditions Requirements of the plant. **OR** (b) (i) Plants -Starch Animals- Glycogen (ii) Desert plants take up carbon dioxide at night and prepare an intermediate compound which is acted upon by the energy absorbed by the chlorophyll during the day.	1 1 ½ ½ 1 1 1	3
30.	(a)  A′ B′ is the image formed. **Credit full mark if attempted.** (b) Nature: Virtual and erect Position: Behind the mirror (between P and F)	1 ½ ½	

	Size: Diminished (c) Positive	½ ½	3
31.	(a) Red Coloured light is least scattered by fog or smoke and can be easily seen from a distance. / Red colour has high wavelength thus scattering is less. (b) There is no scattering of light due to lack of atmosphere. (c) Particles of colloid are big enough to scatter the beam of light.	1 1 1	3
32.	(a) (i) Flemings left-hand rule: Stretch the forefinger, the central finger and the thumb of your left hand in mutually perpendicular directions. If the forefinger shows the direction of the magnetic field and the central finger that of the current, then the thumb will point towards the direction of motion of the conductor or direction of force /  (ii) (1) Force on electron is maximum in Fig (i) because the direction of motion of electron/current is at right angle/perpendicular to that of magnetic field. (2) Force on electron is minimum in Fig (iii) because the electron is moving along / parallel to the direction of magnetic field **OR** (b) (i) (1)  Magnetic field lines of a current carrying solenoid	1 ½, ½ ½, ½ 1	

(2)



Magnetic field lines of a bar magnet

1

(ii)

Magnetic field of a solenoid	Magnetic field of a bar magnet
1. The strength of the magnetic field can be changed by changing the current.	1. The strength of the magnetic field for a bar magnet cannot be changed.
2. The direction of magnetic field can be reversed by reversing the direction of current.	2. The direction of magnetic field for a bar magnet cannot be changed.
3. It is a temporary magnetic field.	3 It is a permanent magnetic field.

½, ½

(Any two) 3

33. (a) (i) Kitchen Garden → A man made ecosystem / non-sustainable 1
Forest → Ecosystem maintained by nature / self-sustainable

(ii) In a jar containing water we can provide oxygen through a pump and add a few aquatic plants and animals to make it a self-sustaining system. 1

Justification –

- Oxygen is replenished continuously.
- Aquatic plants serve as food. 1

(or any other example)

OR

(b) (i) Plants ⟶ Rats ⟶ Snakes ⟶ Hawks 1

(ii) Energy available at second trophic level = 20,000 J

Energy transferred from second to third trophic level = 2000 J 1

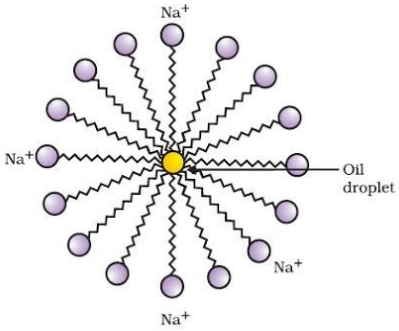
Energy transferred from third to fourth trophic level = 200 J 1 3

SECTION D

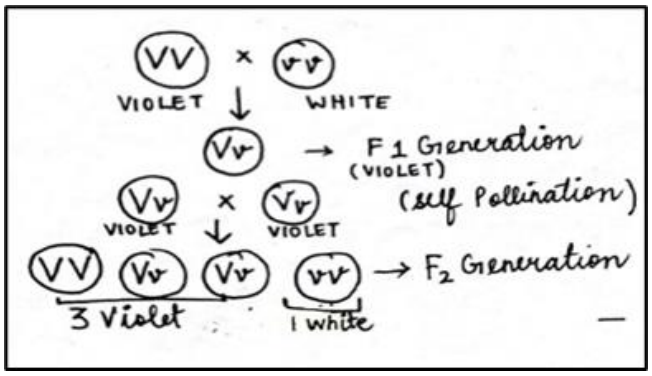
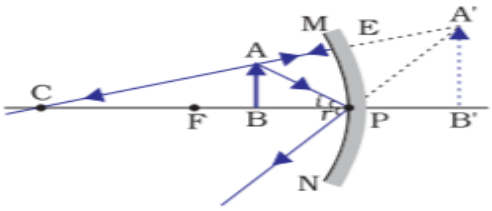
34. (a) (i) A: CH_3CH_2OH / Ethanol / Ethyl alcohol ½

B: $CH_2 = CH_2$ / Ethene ½

C: $CH_3 - CH_3$ / Ethane ½

	(ii) $CH_3CH_2OH \xrightarrow[443\ K]{conc.\ H_2SO_4} CH_2{=}CH_2 + H_2O$ A B (iii) Carbon dioxide and water are produced and a large amount of heat is released / $C_2H_6 + O_2 \rightarrow 2CO_2 + 3H_2O$ + Heat (Award full marks even if equation is not balanced.) (iv) Conversion of vegetable oil into fats. (v) Sodium ethoxide and hydrogen **OR** (b) (i)  (ii) (1) • Test tube 'Y'. • Detergents are effective in hard water. (2) • Test tube 'X' • Reaction between soap and calcium and magnesium salts of hard water form insoluble scum / due to formation of scum / insoluble ppt.	1 1 ½ 1 2 ½, 1 ½, 1	5
35.	(a) Sepals/calyx and petals/ corolla (b) Self-pollination: Transfer of pollen grain from anther to stigma in the same flower or another flower of the same plant. Cross pollination: Transfer of pollen grain from anther to stigma of one flower to another of two different plants. • Significance. 1. Necessary for seed formation. 2. Stimulates development of fruits. 3. Cross pollination brings about genetic variation 4. Leads to fertilization ***(any two)*** (c) Ovule – seed , Ovary – Fruit.	½, ½ 1 1 ½ ½ ½, ½	5

36.	(a) When heating is at maximum rate. Power, P = 880 W Voltage, V = 220 V Current, $I = \frac{P}{V} = \frac{880}{220} = 4A$ Resistance, $R = \frac{V}{I} = \frac{220}{4} = 55\ \Omega$ When heating is at minimum rate Power, P = 330W Voltage, V = 220 V Current, $I = \frac{P}{V} = \frac{330}{220} = \frac{3}{2} = 1.5A$ Resistance, $R = \frac{V}{I} = \frac{220}{115} = 146.6\ \Omega$ (b) When electric current is passed through a resistor, electrical energy is dissipated and appears as heat energy. (c) $H = I^2Rt$/ $H=VIt$	½, ½ ½, ½ ½ ½ 1 1	5
	SECTION E		
37.	(a) $2Cu + O_2 \longrightarrow 2CuO$ (b) • Because they react with both acids and bases to produce salt and water. • Al_2O_3/ ZnO **(any one)** (c) (i) $Na_2O(s) + H_2O(l) \longrightarrow 2NaOH\ (aq)$ (ii) $Al_2O_3 + 2NaOH \longrightarrow 2NaAlO_2 + H_2O$ **OR** (c) (i) $S + O_2 \longrightarrow SO_2$ (ii) Sulphur dioxide (iii) Acidic (iv) No change	1 ½ ½ 1 1 ½ ½ ½ ½	4
38.	(a) Tall – Dwarf (Height of plant) White – Purple (Colour of flower) ***(or any other)*** (b) Dominant Trait – are expressed even if one copy of dominant trait exists. Recessive Trait – Whose expression is suppressed by a dominant gene/ Expressed when two copies of recessive traits are present. (c) 9 : 3 : 3 : 1	½ ½ ½ ½ 1	

	Interpretation: Traits are independently inherited. **OR** (c)  ***(or with punnet square diagram)***	1 ½×4	4
39	(a) Torches, search light, vehicles head lights, shaving mirrors, dentist's mirror, Solar furnaces. ***(any two)*** (b) f = 15cm R = 2 f R = 2 × 15 cm = 30 cm (c)  **(Note: ½ mark to be deducted for not drawing the arrows.)** **OR** (c) (i) h = + 10cm u = - 100 cm v = - 100 cm $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$ $\frac{1}{100}-\frac{1}{100}==\frac{1}{f}$ $\frac{-2}{100}=\frac{1}{f}$ f = -50 cm **Alternate answer for (i)** Since u = v Therefore, object is placed at centre of curvature (C) f = $\frac{R}{2}$	½, ½ ½ ½ 2 ½ ½	

	f = $\frac{-100}{2}$ f = -50 cm (ii) m = $\frac{-v}{u}$ = $\frac{-(-100)}{100}$ = -1	½, ½	4

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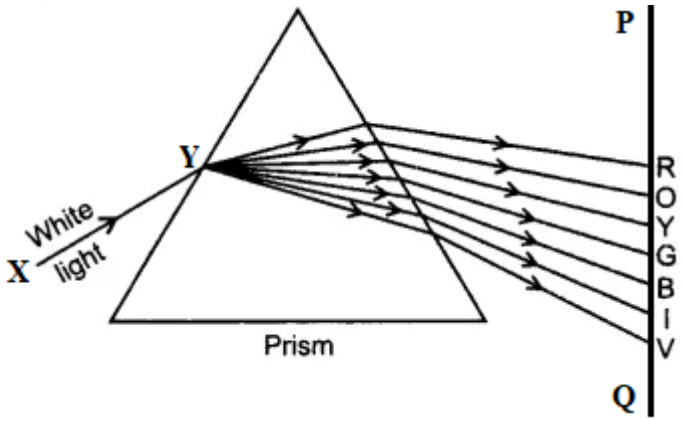
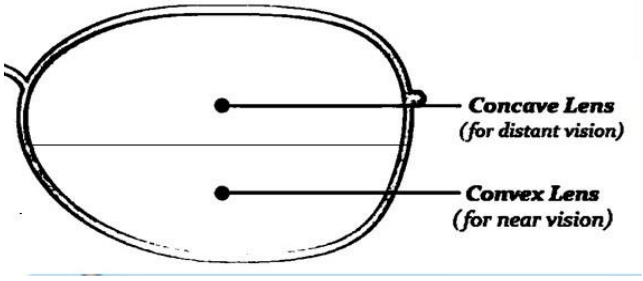
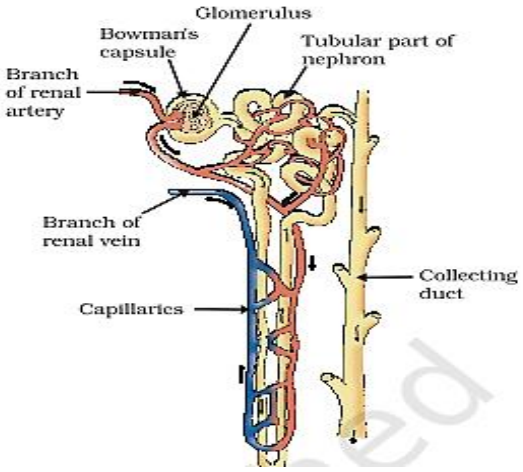
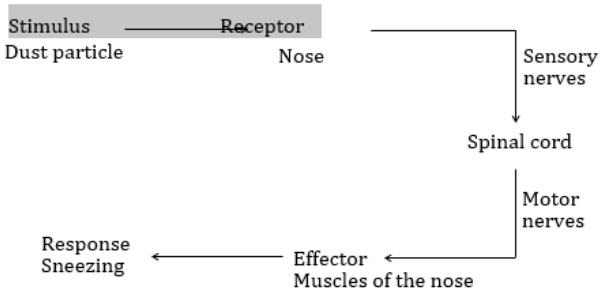
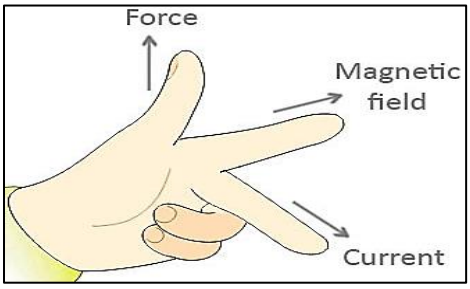
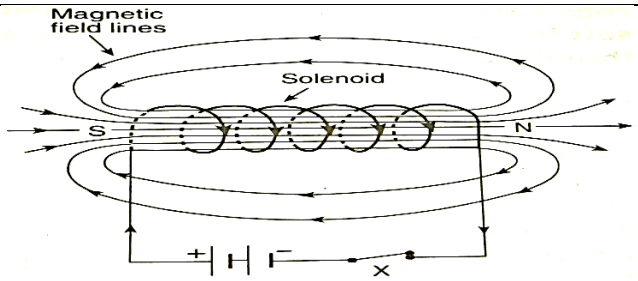
7.	(b)	1	1
8.	(b)	1	1
9.	(d)	1	1
10.	(a)	1	1
11.	(d)	1	1
12.	(d)	1	1
13.	(c)	1	1
14.	(b)	1	1
15.	(a)	1	1
16.	(d)	1	1
17.	(a)	1	1
18.	(d)	1	1
19.	(c)	1	1
20.	(a)	1	1
	SECTION B		

21.	• They help in the breakdown of organic matter/ dead and decaying matter into simple inorganic raw materials. • Help in natural replenishment of nutrient in soil. • Help in keeping the environment clean. **(Any two)**	1,1	2
22.	(a)  • Dispersion of white light • Cause: Different colours of light bend through different angles w.r.t. the incident ray. / Different colours have different wavelengths. **OR** (b) (i) It is due to gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens. (ii) Presbyopia/ Presbyopia + Myopia (iii) Bifocal /Concave + Convex lens/ Diagram  	1 ½ ½ ½, ½ ½ ½	2
23.	• Kidneys • Structure: A cluster of thin-walled capillaries (glomerulus) associated with cup-shaped end of a tube called Bowman's capsule. This further extends into a tubular part which ends in collective ducts. /	½ 1	

	 • Function: Filtration of nitrogenous waste from blood to form urine. / Reabsorption of useful materials from the filtrate. / Osmoregulation **(Any one function)**	½	2
24.	Fruit is acidic in nature because acid turns blue litmus red.	1,1	2
25.	•  **Or explaind in the form of paragraph.**	2	2
26.	(a) (i)X: Plaster of Paris/Calcium sulphate hemihydrate. • $CaSO_4.\frac{1}{2}H_2O$ (ii) • Baking Soda – $NaHCO_3$ /Sodium hydrogen carbonate/ Sodium bicarbonate •Baking Powder – A mixture of $NaHCO_3$ /Baking soda + Tartaric acid/any mild edible acid **OR** (b) (i) $CuSO_4.5H_2O \xrightarrow{heat} CuSO_4 + 5H_2O$ (ii) $2NaHCO_3 \xrightarrow{heat} Na_2CO_3 + H_2O + CO_2$	½ ½ ½ ½ 1 1	2

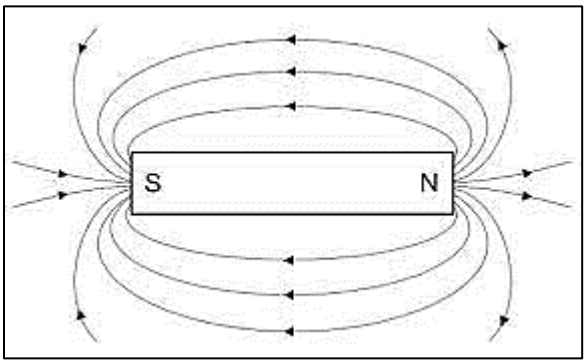
	SECTION C		
27.	(a) (i) Kitchen Garden → A man made ecosystem / non-sustainable Forest → Ecosystem maintained by nature / self-sustainable (ii)In a jar containing water we can provide oxygen through a pump and add a few aquatic plants and animals to make it a self-sustaining system. Justification – • Oxygen is replenished continuously. • Aquatic plants serve as food. ***(or any other example)*** **OR** (b) (i) Plants ⟶ Rats ⟶ Snakes ⟶ Hawks (ii) Energy available at second trophic level = 20,000 J Energy transferred from second to third trophic level = 2000 J Energy transferred from third to fourth trophic level = 200 J	1 1 1 1 1 1	3
28.	(a) (i) Flemings left-hand rule: Stretch the forefinger, the central finger and the thumb of your left hand in mutually perpendicular directions. If the forefinger shows the direction of the magnetic field and the central finger that of the current, then the thumb will point towards the direction of motion of the conductor or direction of force /  (ii) (1) Force on electron is maximum in Fig (i) because the direction of motion of electron/current is at right angle/perpendicular to that of magnetic field. (2) Force on electron is minimum in Fig (iii) because the electron is moving along / parallel to the direction of magnetic field **OR** (b) (i) (1)	1 ½, ½ ½, ½	



Magnetic field lines of a current carrying solenoid

1

(2)



Magnetic field lines of a bar magnet

1

(ii)

Magnetic field of a solenoid	Magnetic field of a bar magnet
1. The strength of the magnetic field can be changed by changing the current.	1. The strength of the magnetic field for a bar magnet cannot be changed.
2. The direction of magnetic field can be reversed by reversing the direction of current.	2. The direction of magnetic field for a bar magnet cannot be changed.
3. It is a temporary magnetic field.	3 It is a permanent magnetic field.

½, ½

(Any two)

3

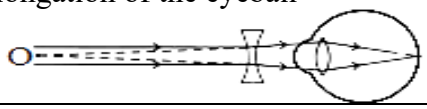
29.

•Defect : Myopia/Short sightedness — 1

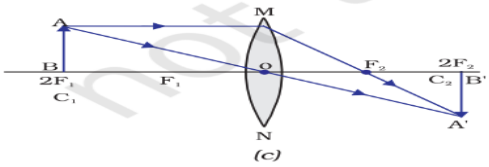
Two Causes :

• Excessive curvature of the eye lens — ½

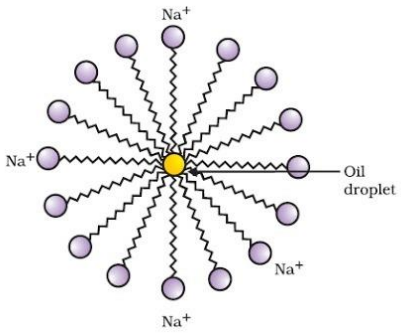
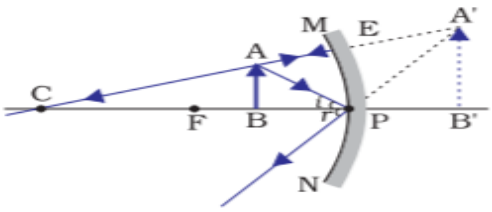
• Elongation of the eyeball — ½

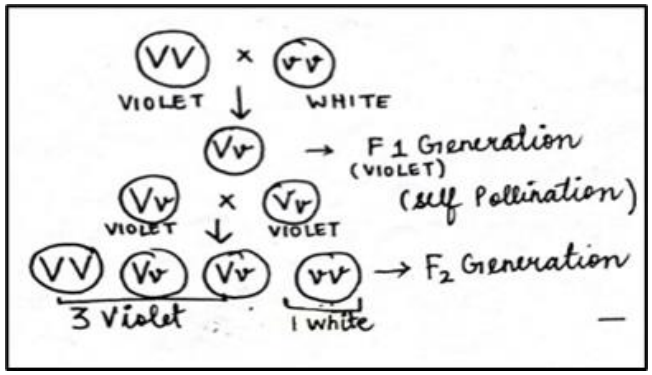


1

	(Deduct ½ mark if arrows are not drawn.)		3
30.	(a) (i) As the image is of same size ∴ Object distance = 2F = 30 cm ∴ The image will be formed on the right side of lens at 2F' = 30 cm The distance between the object and its image = 60 cm (ii) f = 15cm (iii)  (c)	½ ½ 1 1	3
31.	(a) (i) Energy currency for cellular processes / ATP breaks down to give a fixed amount of energy which can drive the endothermic reactions taking place in the cell. (ii) Stomata and surface of leaves, stems and roots. (iii) Environmental conditions Requirements of the plant. **OR** (b) (i) Plants -Starch Animals- Glycogen (ii) Desert plants take up carbon dioxide at night and prepare an intermediate compound which is acted upon by the energy absorbed by the chlorophyll during the day.	1 1 ½ ½ 1 1 1	3
32.	Calcium phosphate / Calcium hydroxyapatite ($Ca_3(PO_4)_2$) Tooth decay starts when the pH of the mouth is lower than 5.5. Bacteria present in the mouth produces acid by degrading sugar and food particles. Using Toothpaste / Cleaning the mouth after every meal.	½ ½ 1 1	3
33.	(a) (i) NH_3 (ii) H_2O (iii) CO (iv) H_2 **(Award full mark if part (ii)of (a) is attempted)** (b) A reaction in which the gain or loss of oxygen takes place simultaneously is called a redox reaction.	½ ½ ½ ½ 1	3

	SECTION D		
34	(a) When heating is at maximum rate. Power, P = 880 W Voltage, V = 220 V Current, $I = \frac{P}{V} = \frac{880}{220} = 4A$ Resistance, $R = \frac{V}{I} = \frac{220}{4} = 55\ \Omega$ When heating is at minimum rate Power, P = 330W Voltage, V = 220 V Current, $I = \frac{P}{V} = \frac{330}{220} = \frac{3}{2} = 1.5A$ Resistance, $R = \frac{V}{I} = \frac{220}{115} = 146.6\ \Omega$ (b) When electric current is passed through a resistor, electrical energy is dissipated and appears as heat energy. This is known as the heating effect or electric current. (c) $H = I^2Rt$/ $H=VIt$	½,½ ½,½ ½ ½ 1 1	5
35.	(a) The lining of uterus breaks down and comes out through vagina in the form of blood and mucus. (b) The sex chromosome in sperm is either X or Y while the sex chromosome in a human egg is only X. (c) (i). Surgical Method - In prevents sperm transfer and fertilisation. (ii). Barrier Method - Sperm does not reach the egg/prevents STD's (iii).Use of oral pills - Eggs are not released because hormonal balance is changed. **(or any other)**	1 1 ½, ½ ½, ½ ½, ½	5
36.	(a) (i) A: CH_3CH_2OH / Ethanol / Ethyl alcohol B: $CH_2 = CH_2$ / Ethene C: $CH_3 - CH_3$ / Ethane (ii) $CH_3CH_2OH \xrightarrow[443\ K]{conc.\ H_2SO_4} CH_2{=}CH_2 + H_2O$ A B	½ ½ ½ 1	

	(iii) Carbon dioxide and water are produced and a large amount of heat is released / $C_2H_6 + O_2 \rightarrow 2CO_2 + 3H_2O$ + Heat **(Award full marks even if equation is not balanced.)** (iv) Conversion of vegetable oil into fats. (v) Sodium ethoxide and hydrogen **OR** (b) (i)  (ii) (1) • Test tube 'Y'. • Detergents are effective in hard water. (2) • Test tube 'X' • Reaction between soap and calcium and magnesium salts of hard water form insoluble scum / due to formation of scum / insoluble ppt.	1 ½ 1 2 ½+1 ½+1	5
	SECTION E		
37.	(a) Torches, search light, vehicles head lights, shaving mirrors, dentist's mirror, Solar furnaces. ***(any two)*** (b) f = 15cm R = 2 f R = 2 × 15 cm = 30 cm (c)  (Note: ½ mark to be deducted for not drawing the arrows.) **OR** (c) (i) h = + 10cm	½,½ ½ ½ 2	

	u = - 100 cm v = - 100 cm $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$ $\frac{1}{100}$ - $\frac{1}{100}$ = = $\frac{1}{f}$ $\frac{-2}{100}=\frac{1}{f}$ f = -50 cm **Alternate Answer for (i)** Since u = v Therefore, object is placed at centre of curvature (C) f = $\frac{R}{2}$ f = $\frac{-100}{2}$ f = -50 cm (ii) m = $\frac{-v}{u}=\frac{-(-100)}{100}$ = -1	½ ½ ½,½	4
38.	(a) Tall – Dwarf (Height of plant) White – Purple (Colour of flower) ***(or any other)*** (b) Dominant Trait – are expressed even if one copy of dominant trait exists. Recessive Trait – Whose expression is suppressed by a dominant gene/ Expressed when two copies of recessive traits are present. (c) 9 : 3 : 3 : 1 Interpretation: Traits are independently inherited. **OR** (c)  ***(or with punnet square diagram)***	½,½ ½ ½ 1 1 ½×4	4

39	(a) $2Cu + O_2 \longrightarrow 2CuO$	1	
	(b) • Because they react with both acids and bases to produce salt and water.	½	
	• Al_2O_3/ ZnO ***(any one)***	½	
	(c) (i) $Na_2O(s) + H_2O(l) \longrightarrow 2NaOH\ (aq)$	1	
	(ii) $Al_2O_3 + 2NaOH \longrightarrow 2NaAlO_2 + H_2O$	1	
	OR		
	(c) (i) $S + O_2 \longrightarrow SO_2$	½	
	(ii) Sulphur dioxide	½	
	(iii) Acidic	½	
	(iv) No change	½	4

***

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

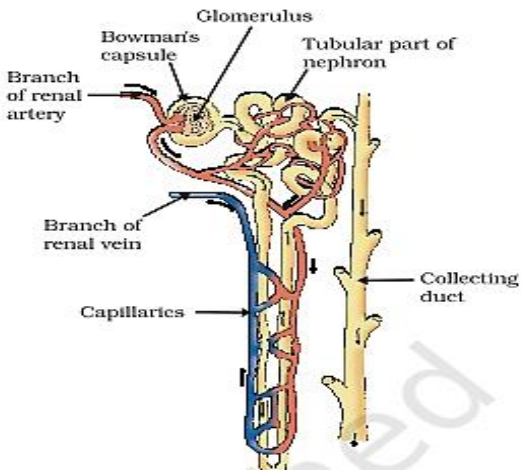
Secondary School Examination 2023

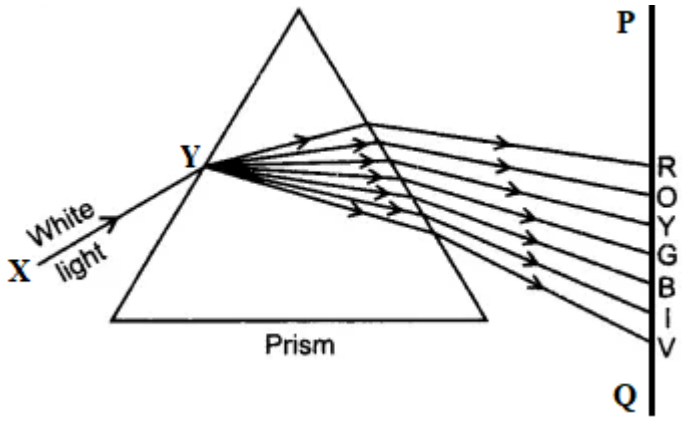
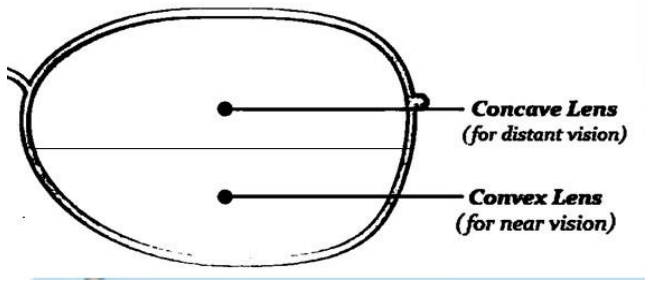
SCIENCE (Subject Code–086)

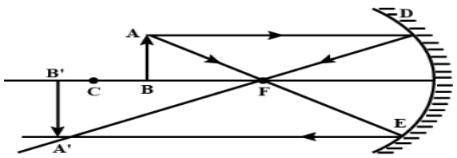
[Paper Code:31/1/3]

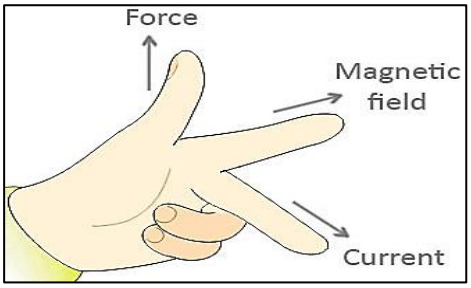
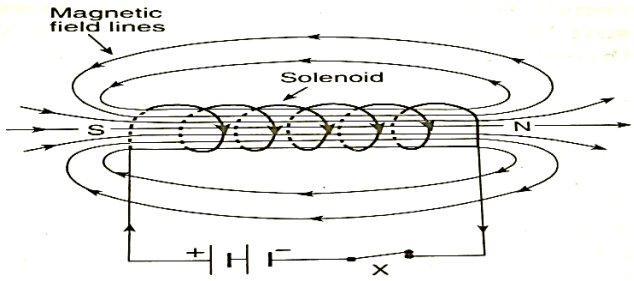
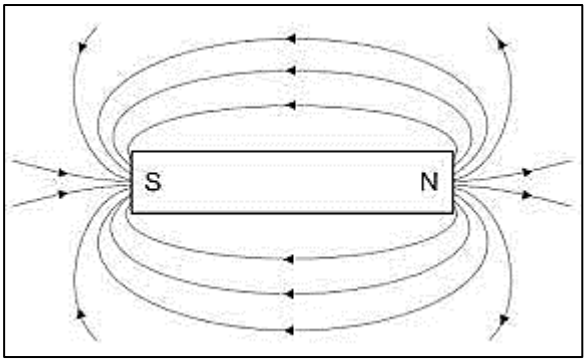
Maximum Marks: 80

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

20.	(b)	1	1
	SECTION B		
21.	• Auxin • When light is coming from one side of the plant, auxin diffuses towards the shady side of the shoot. This stimulates the cells of the shoot to grow longer and bend towards light.	1 1	 2
22.	(a) (i) X: Plaster of Paris/Calcium sulphate hemihydrate. • $CaSO_4.\frac{1}{2}H_2O$ (ii) • Baking Soda – $NaHCO_3$ /Sodium hydrogen carbonate/ Sodium bicarbonate •Baking Powder – A mixture of $NaHCO_3$ /Baking soda + Tartaric acid/any mild edible acid **OR** (b) (i) $CuSO_4.\ 5H_2O \xrightarrow{heat} CuSO_4 + 5H_2O$ (ii) $2NaHCO_3 \xrightarrow{heat} Na_2CO_3 + H_2O + CO_2$	½ ½ ½ ½ 1 1	 2
23.	• Kidneys • Structure: A cluster of thin-walled capillaries (glomerulus) associated with cup-shaped end of a tube called Bowman's capsule. This further extends into a tubular part which ends in collective ducts. /  • Function:	½ 1 ½	

	Filtration of nitrogenous waste from blood to form urine. / Reabsorption of useful materials from the filtrate. / Osmoregulation **(Any one function)**		2
24.	• Lead and Tin / Pb+Sn • Low melting point	1 1	2
25.	•UV rays reach the earth and cause ill effects like skin cancer in human beings. •(a) Minimize the use of CFC's (b) Forging on agreement to freeze CFC production at 1986 levels.	1 ½ ½	2
26.	(a)  • Dispersion of white light • Cause: Different colours of light bend through different angles w.r.t. the incident ray. / Different colours have different wavelengths. **OR** (b) (i) It is due to gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens. (ii) Presbyopia/ Presbyopia + Myopia (iii) Bifocal /Concave + Convex lens/ Diagram  	1 ½ ½ ½, ½ ½ ½	2

	SECTION C		
27.	(a) $Na_2CO_3.10H_2O$ / washing soda / sodium carbonate decahydrate (b) $NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$ $2NaHCO_3 \xrightarrow{heat} Na_2CO_3 + H_2O + CO_2$ $Na_2CO_3 + 10H_2O \rightarrow Na_2CO_3.10H_2O$ (c) 10	1 ½ ½ ½ ½	3
28.	(a) (i) NH_3 (ii) H_2O (iii) CO (iv) H_2 **(Award full mark if part (ii)of (a) is attempted)** (b) A reaction in which the gain or loss of oxygen takes place simultaneously is called a redox reaction.	½ ½ ½ ½ 1	3
29.	(a) Concave Mirror / Converging Mirror (b) (i). $m = \frac{-v}{u} = -\frac{(-60)}{(-15)} = -4$ (ii). 45 cm from the object (c)  **(Note: ½ mark to be deducted for not drawing the arrows.)**	½ ½+½ ½ 1	3
30.	(a) (i) Energy currency for cellular processes / ATP breaks down to give a fixed amount of energy which can drive the endothermic reactions taking place in the cell. (ii) Stomata and surface of leaves, stems and roots. (iii) Environmental conditions Requirements of the plant. **OR** (b) (i) Plants -Starch Animals- Glycogen (ii) Desert plants take up carbon dioxide at night and prepare an intermediate compound which is acted upon by the energy absorbed by the chlorophyll during the day.	1 1 ½ ½ 1 1 1	3
31.	(a) (i) Flemings left-hand rule:		

	Stretch the forefinger, the central finger and the thumb of your left hand in mutually perpendicular directions. If the forefinger shows the direction of the magnetic field and the central finger that of the current, then the thumb will point towards the direction of motion of the conductor or direction of force / 	1	
	(ii) (1) Force on electron is maximum in Fig (i) because the direction of motion of electron/current is at right angle/perpendicular to that of magnetic field. (2) Force on electron is minimum in Fig (iii) because the electron is moving along / parallel to the direction of magnetic field	½,½	
	OR	½,½	
	(b) (i) (1)  Magnetic field lines of a current carrying solenoid	1	
	(2)  Magnetic field lines of a bar magnet	1	

(ii)

Magnetic field of a solenoid	Magnetic field of a bar magnet
1. The strength of the magnetic field can be changed by changing the current.	1. The strength of the magnetic field for a bar magnet cannot be changed.
2. The direction of magnetic field can be reversed by reversing the direction of current.	2. The direction of magnetic field for a bar magnet cannot be changed.
3. It is a temporary magnetic field.	3 It is a permanent magnetic field.

(Any two)

½+½ | 3

32. (a) (i) Kitchen Garden → A man made ecosystem / non-sustainable — 1
Forest → Ecosystem maintained by nature / self-sustainable

(ii) In a jar containing water we can provide oxygen through a pump and add a few aquatic plants and animals to make it a self-sustaining system. — 1

Justification –
- Oxygen is replenished continuously.
- Aquatic plants serve as food. — 1

(or any other example)

OR

(b) (i) Plants ⟶ Rats ⟶ Snakes ⟶ Hawks — 1

(ii) Energy available at second trophic level = 20,000 J — 1

Energy transferred from second to third trophic level = 2000 J — 1

Energy transferred from third to fourth trophic level = 200 J — 1 | 3

33. • Myopia / Short Sightedness — ½

•

(b) Myopic Eye

1

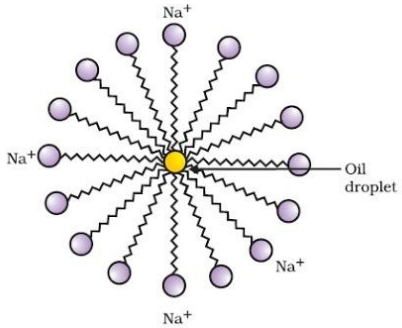
• Two Causes :

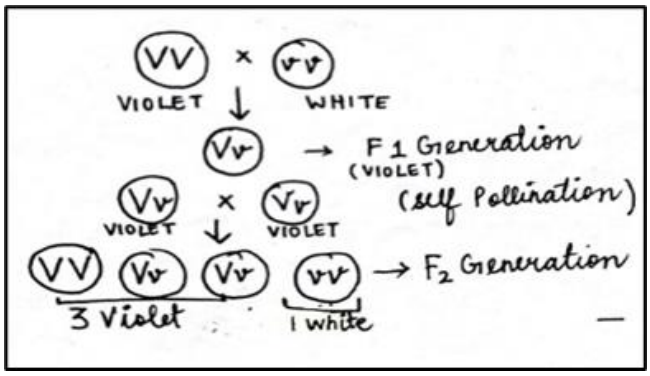
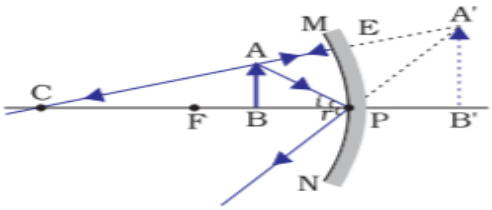
(i). Excessive curvature of the eye lens — ½

(ii). Elongation of eye ball — ½

• Concave lens / Diverging lens — ½ | 3

	SECTION D		
34	(a) (i) Testis – To produce male gametes/sperm/Male hormone/Testosterone (Any one). (ii) Scrotum – To provide optimal temperature to testis for the formation of sperm. (iii) Vas deferens – Transport the sperm to urethra. (iv) Seminal vesicles – To secrete the fluid which provides nutrition and medium for the transport of sperms. (b) <u>Placenta</u> – A disc shaped specialized tissue embedded in the uterine wall which connects the mother to the embryo. It contains villi on the embryo's side and blood spaces on the mother's side. Function: – Helps in exchange of nutrients, gases and waste materials between the mother and embryo/foetus.	½ ½ ½ ½ 2 1	5
35.	(a) When heating is at maximum rate. Power, P = 880 W Voltage, V = 220 V Current, $I = \frac{P}{V} = \frac{880}{220} = 4A$ Resistance, $R = \frac{V}{I} = \frac{220}{4} = 55\ \Omega$ When heating is at minimum rate Power, P = 330W Voltage, V = 220 V Current, $I = \frac{P}{V} = \frac{330}{220} = \frac{3}{2} = 1.5A$ Resistance, $R = \frac{V}{I} = \frac{220}{115} = 146.6\ \Omega$ (b) When electric current is passed through a resistor, electrical energy is dissipated and appears as heat energy. (c) $H = I^2Rt$/ $H=VIt$	½,½ ½,½ ½ ½ 1 1	5
36.	(a) (i) A: CH_3CH_2OH / Ethanol / Ethyl alcohol B: $CH_2 = CH_2$ / Ethene C: $CH_3 - CH_3$ / Ethane (ii) $CH_3CH_2OH \xrightarrow[443\ K]{conc.\ H_2SO_4} CH_2{=}CH_2 + H_2O$ A B	½ ½ ½ 1	

	(iii) Carbon dioxide and water are produced and a large amount of heat is released / $C_2H_6 + O_2 \rightarrow 2CO_2 + 3H_2O$ + Heat **(Award full marks even if equation is not balanced.)** (iv) Conversion of vegetable oil into fats. (v) Sodium ethoxide and hydrogen **OR** (b) (i)  (ii) (1) • Test tube 'Y'. • Detergents are effective in hard water. (2) • Test tube 'X' • Reaction between soap and calcium and magnesium salts of hard water form insoluble scum / due to formation of scum / insoluble ppt.	1 ½ 1 2 ½,1 ½,1	5
37.	(a) Tall – Dwarf (Height of plant) White – Purple (Colour of flower) ***(or any other)*** (b) Dominant Trait – are expressed even if one copy of dominant trait exists. Recessive Trait – Whose expression is suppressed by a dominant gene/ Expressed when two copies of recessive traits are present. (c) 9 : 3 : 3 : 1 Interpretation: Traits are independently inherited. **OR** (c)	½,½ ½ ½ 1 1	

	 ***(or with punnet square diagram)***	½×4	4
38.	(a) Torches, search light, vehicles head lights, shaving mirrors, dentist's mirror, Solar furnaces. ***(any two)*** (b) f = 15cm R = 2 f R = 2 × 15 cm = 30 cm (c)  (Note: ½ mark to be deducted for not drawing the arrows.) **OR** (c) (i) h = + 10cm u = - 100 cm v = - 100 cm $\frac{1}{v}+\frac{1}{u}=\frac{1}{f}$ $-\frac{1}{100}-\frac{1}{100}==\frac{1}{f}$ $\frac{-2}{100}=\frac{1}{f}$ f = -50 cm **Alternate answer for (i)** Since u = v Therefore, object is placed at centre of curvature (C) f = $\frac{R}{2}$	½+½ ½ ½ 2 ½ ½	

	$f = \frac{-100}{2}$ f = -50 cm (ii) $m = \frac{-v}{u} = \frac{-(-100)}{100} = -1$	½, ½	4
39	(a) $2Cu + O_2 \longrightarrow 2CuO$ (b) • Because they react with both acids and bases to produce salt and water. • Al_2O_3/ ZnO ***(any one)*** (c) (i) $Na_2O(s) + H_2O(l) \longrightarrow 2NaOH\ (aq)$ (ii) $Al_2O_3 + 2NaOH \longrightarrow 2NaAlO_2 + H_2O$ **OR** (c) (i) $S + O_2 \longrightarrow SO_2$ (ii) Sulphur dioxide (iii) Acidic (iv) No change	1 ½ ½ 1 1 ½ ½ ½ ½	4

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