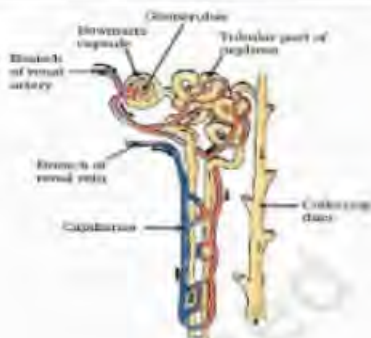


**MARKING SCHEME**  
Secondary School Examination, 2023  
**SCIENCE (Subject Code-086)**  
[ Paper Code:31/1/1]

**Maximum Marks: 80**

Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
<b>SECTION—A</b>			
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
<b>SECTION B</b>			
21.	(a) (i) X: Plaster of Paris/Calcium sulphate hemihydrate. • $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ (ii) • Baking Soda - $\text{NaHCO}_3$ /Sodium hydrogen carbonate/ Sodium bicarbonate • Baking Powder - A mixture of $\text{NaHCO}_3$ /Baking soda + Tartaric acid/any mild edible acid <b>OR</b> (b) (i) $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \xrightarrow{\text{heat}} \text{CuSO}_4 + 5\text{H}_2\text{O}$ (ii) $2\text{NaHCO}_3 \xrightarrow{\text{heat}} \text{Na}_2\text{CO}_3 + \text{H}_2\text{O} + \text{CO}_2$	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{6}$ $\frac{1}{2}$ 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.	$\frac{1}{2}$ $\frac{1}{2}$ 1	2
23.	(a) (i) Vena cava - deoxygenated blood from body to heart. (ii) Pulmonary artery - deoxygenated blood from heart to lungs. <b>OR</b> (b) (i) $\text{Glucose} \xrightarrow{\text{(in cytoplasm)}} \text{Pyruvate} \xrightarrow[\text{(in mitochondria)}]{\text{presence of oxygen}} \text{CO}_2 + \text{Water} + \text{Energy}$ $\text{Glucose} \xrightarrow{\text{(in cytoplasm)}} \text{Pyruvate} \xrightarrow[\text{Cells}]{\text{Lack of oxygen}} \text{Lactic acid} + \text{Energy}$ (ii)	$\frac{1}{2}$ , $\frac{1}{2}$ $\frac{1}{2}$ , $\frac{1}{2}$ 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. /	$\frac{1}{2}$ 1	



• **Function:**

Filtration of nitrogenous waste from blood to form urine. /

Reabsorption of useful materials from the filtrate. /

Osmoregulation

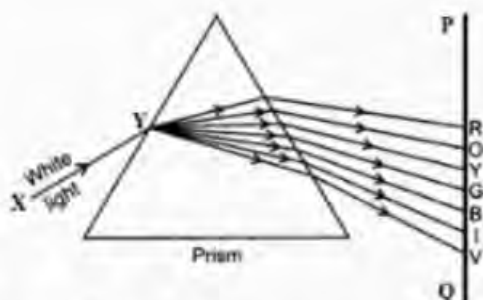
(Any one function)

½

2

25

(a)



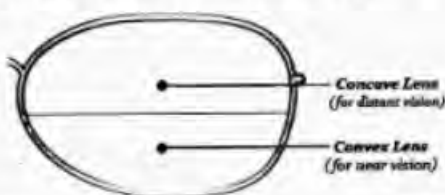
- Dispersion of white light
- Cause: Different colours of light bend through different angles w.r.t. the incident ray. / Different colours have different wavelengths.

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

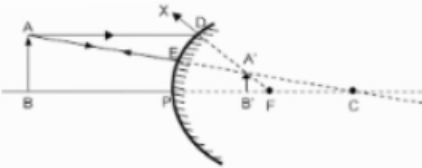
½

½, ½

½

½

2

26.	<p>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.</p> <p>As these chemicals are not degradable, these get accumulated progressively at each successive trophic level. This phenomena is called bio magnification.</p>	2	2
<b>SECTION C</b>			
27.	<p>(a) (i) <math>\text{NH}_3</math> (ii) <math>\text{H}_2\text{O}</math> (iii) <math>\text{CO}</math> (iv) <math>\text{H}_2</math></p> <p><b>(Award full mark if part (ii) of (a) is attempted)</b></p> <p>(b) A reaction in which the gain or loss of oxygen takes place simultaneously is called a redox reaction.</p>	$\frac{1}{2} \times 4$	3
28.	<p>(a) (i) Use of antacids (ii) Baking soda/mild base/dock plant.</p> <p>(b) pH will decrease, as curd is more acidic than milk.</p>	1 1 $\frac{1}{2} + \frac{1}{2}$	3
29.	<p>(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.</p> <p style="text-align: center;"><b>OR</b></p> <p>(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.</p>	1  1 $\frac{1}{2}$ $\frac{1}{2}$  1 1 1	3
30.	<p>(a)</p>  <p>A' B' is the image formed.</p> <p><b>Credit full mark if attempted.</b></p> <p>(b) Nature: Virtual and erect Position: Behind the mirror (between P and F)</p>	1  $\frac{1}{2}$ $\frac{1}{2}$	

Size: Diminished  
(c) Positive

$\frac{3}{2}$

$\frac{4}{2}$

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) Fleming's 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.

$\frac{3}{2}, \frac{3}{2}$

- (2) Force on electron is minimum in Fig (iii) because the electron is moving along / parallel to the direction of magnetic field

$\frac{3}{2}, \frac{3}{2}$

OR

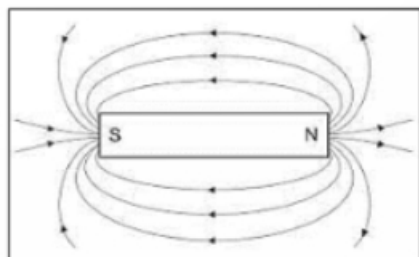
- (b) (i) (1)



Magnetic field lines of a current carrying solenoid

1

(2)



Magnetic field lines of a bar magnet

(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)

33. (a) (i) Kitchen Garden  $\rightarrow$  A man made ecosystem / non-sustainable Forest  $\rightarrow$  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  $\rightarrow$  Rats  $\rightarrow$  Snakes  $\rightarrow$  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

**SECTION D**

34. (a) (i) A:  $\text{CH}_3\text{CH}_2\text{OH}$  / Ethanol / Ethyl alcohol  
 B:  $\text{CH}_2 = \text{CH}_2$  / Ethene  
 C:  $\text{CH}_3 - \text{CH}_3$  / Ethane

1

 $\frac{1}{2}, \frac{1}{2}$ 

3

1

1

1

1

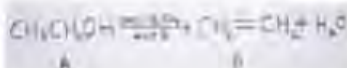
1

1

3

 $\frac{1}{2}$  $\frac{1}{2}$  $\frac{1}{2}$

(ii)



1

(iii) Carbon dioxide and water are produced and a large amount of heat is released /



(Award full marks even if equation is not balanced.)

1

(iv) Conversion of vegetable oil into fats.

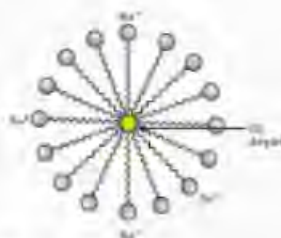
½

(v) Sodium ethoxide and hydrogen

1

OR

(b) (i)



2

(ii) (1) • Test tube 'Y'.

• Detergents are effective in hard water.

½, 1

(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.

½, 1

5

35. (a) Sepals/calyx and petals/ corolla

½, ½

(b) Self-pollination: Transfer of pollen grain from anther to stigma in the same flower or another flower of the same plant.

1

Cross pollination: Transfer of pollen grain from anther to stigma of one flower to another of two different plants.

1

• Significance.

1. Necessary for seed formation.

½

2. Stimulates development of fruits.

½

3. Cross pollination brings about genetic variation

4. Leads to fertilization

(any two)

(c) Ovule – seed, Ovary – Fruit.

½, ½

5

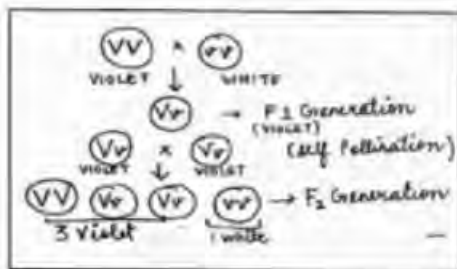
36.	<p>(a) When heating is at maximum rate.            Power, <math>P = 880 \text{ W}</math>            Voltage, <math>V = 220 \text{ V}</math>            Current, <math>I = \frac{P}{V} = \frac{880}{220} = 4\text{A}</math>            Resistance, <math>R = \frac{V}{I} = \frac{220}{4} = 55 \Omega</math></p> <p>When heating is at minimum rate            Power, <math>P = 330\text{W}</math>            Voltage, <math>V = 220 \text{ V}</math>            Current, <math>I = \frac{P}{V} = \frac{330}{220} = \frac{3}{2} = 1.5\text{A}</math>            Resistance, <math>R = \frac{V}{I} = \frac{220}{1.5} = 146.6 \Omega</math></p> <p>(b) When electric current is passed through a resistor, electrical energy is dissipated and appears as heat energy.</p> <p>(c) <math>H = I^2Rt</math> / <math>H = VIt</math></p>	<p><math>\frac{1}{2}</math>, <math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math>, <math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p>1</p>	5
<b>SECTION E</b>			
37.	<p>(a) <math>2\text{Cu} + \text{O}_2 \longrightarrow 2\text{CuO}</math></p> <p>(b) • Because they react with both acids and bases to produce salt and water.            • <math>\text{Al}_2\text{O}_3</math> / <math>\text{ZnO}</math> <span style="float: right;">(any one)</span></p> <p>(c) (i) <math>\text{Na}_2\text{O}(\text{s}) + \text{H}_2\text{O}(\text{l}) \longrightarrow 2\text{NaOH}(\text{aq})</math>            (ii) <math>\text{Al}_2\text{O}_3 + 2\text{NaOH} \longrightarrow 2\text{NaAlO}_2 + \text{H}_2\text{O}</math></p> <p style="text-align: center;"><b>OR</b></p> <p>(c) (i) <math>\text{S} + \text{O}_2 \longrightarrow \text{SO}_2</math>            (ii) Sulphur dioxide            (iii) Acidic            (iv) No change</p>	<p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p> <p>1</p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p>	4
38.	<p>(a) Tall - Dwarf (Height of plant)            White - Purple (Colour of flower) <span style="float: right;">(or any other)</span></p> <p>(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.</p> <p>(c) 9 : 3 : 3 : 1</p>	<p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p><math>\frac{1}{2}</math></p> <p>1</p>	



Interpretation: Traits are independently inherited.

OR

(c)



(or with punnet square diagram)

1

$\frac{1}{2} \times 4$

4.

- 39 (a) Torches, search light, vehicles head lights, shaving mirrors, dentist's mirror, Solar furnaces. (any two)

$\frac{1}{2}, \frac{1}{2}$

(b)  $f = 15\text{cm}$

$R = 2f$

$R = 2 \times 15\text{cm} = 30\text{cm}$

$\frac{1}{2}$

$\frac{1}{2}$

(c)



(Note:  $\frac{1}{2}$  mark to be deducted for not drawing the arrows.)

2

OR

(c)

(i)  $h = +10\text{cm}$

$u = -100\text{cm}$

$v = -100\text{cm}$

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{-100} - \frac{1}{100} = \frac{1}{f}$$

$$\frac{-2}{100} = \frac{1}{f}$$

$f = -50\text{cm}$

$\frac{1}{2}$

**Alternate answer for (i)**

Since  $u = v$

Therefore, object is placed at centre of curvature (C)

$$f = \frac{u}{2}$$

$\frac{1}{2}$

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