

MARKING SCHEME

Secondary School Examination, 2023

SCIENCE (Subject Code-086)

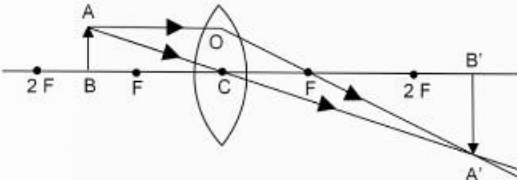
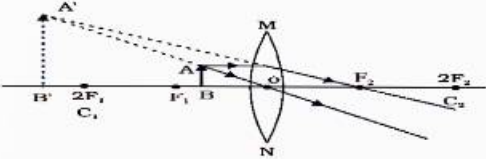
[Paper Code: 31/5/1]

Maximum Marks: 80

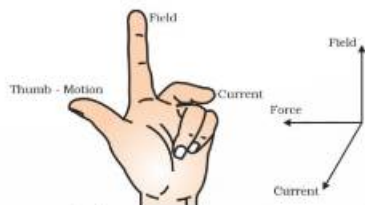
Q. No.	EXPECTED ANSWER / VALUE POINTS	Marks	Total Marks
SECTION-A			
1	(a)	1	1
2	(c)	1	1
3	(a)	1	1
4	(d)	1	1
5	(c)	1	1
6	(c)	1	1
7	(a)	1	1
8	(b)	1	1
9	(b)	1	1
10	(c)	1	1
11	(c)	1	1
12	(d)	1	1
13	(b)	1	1
14	(b)	1	1
15	(d)	1	1
16	(c)	1	1
17	(a)	1	1
18	(c)	1	1
19	(d)	1	1
20	(b)	1	1
SECTION B			
21	(a) (i) X = $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ /Gypsum / Calcium sulphate dihydrate Y = $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$ /Plaster of Paris/ Calcium sulphate hemi-hydrate	$\frac{1}{2}$ $\frac{1}{2}$	

	(ii) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O} + 1 \frac{1}{2} \text{H}_2\text{O} \longrightarrow \text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ OR (b) (i) M, it is an acidic solution (ii) Neutral M is an acid and N is a base./Neutralization reaction	1 $\frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
22	(i) Dendron / Dendrite – Information is acquired (ii) Axon – Through which information travels as an electrical impulse.	$\frac{1}{2}, \frac{1}{2}$ $\frac{1}{2}, \frac{1}{2}$	2
23	(a) (i) Absorption of light energy by chlorophyll. (ii) Conversion of light energy to chemical energy and splitting of water molecules into hydrogen and oxygen. (iii) Reduction of carbon dioxide to carbohydrates. OR (b) (i) Excess water is excreted by transpiration. (ii) Oxygen as waste product of photosynthesis is excreted through stomata. (iii) Shedding of leaves. (any two)	$\frac{1}{2}$ 1 $\frac{1}{2}$ 1,1	2
24	Gastric gland – Pepsin Pancreas – Trypsin	$\frac{1}{2} \times 4$	2
25	(a) Hypermetropia/Far sightedness (b) •Focal length is too long •Size of eyeball is small. •Convex lens/Converging lens	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	2
26	The energy at first trophic level will be 5,00,000 J. The energy at third trophic level will 5000 J. 10% can be taken as the average value for the amount of organic matter/energy that is present at each step and reaches the next level of consumers.	$\frac{1}{2}$ $\frac{1}{2}$ 1	2
SECTION C			
27	(a) Reactions in which there is an exchange of ions between the reactants. (b) (i) • $\text{HCl} + \text{NaOH} \longrightarrow \text{NaCl} + \text{H}_2\text{O}$ (or any other reaction) •Acid reacts with base forming salt and water. (ii) • $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \longrightarrow \text{BaSO}_4 + 2\text{NaCl}$ (or any other reaction) •Insoluble substance or precipitate(BaSO_4) is formed.	1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	3
28	(a) Bacteria present in the mouth produce acids by degradation of sugar and food particles remaining in the mouth after eating. (b) X : $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$ / Washing soda /	1 $\frac{1}{2}$	

	<p>Sodium carbonate decahydrate</p> <p>Uses :</p> <ul style="list-style-type: none"> Glass, soap and paper industries Manufacture of borax Cleaning agent Removing permanent hardness of water <p>(any two)</p> <p>(c) The water of crystallisation is removed./</p> $\text{CuSO}_4 \cdot 5\text{H}_2\text{O} \xrightarrow{\text{heat}} \text{CuSO}_4 + 5\text{H}_2\text{O} \uparrow$ <p>(white)</p>	<p>$\frac{1}{2}, \frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	<p>3</p>
29	<p>(a)</p> <ul style="list-style-type: none"> Take 1 ml 1% starch solution in two test tubes A and B. Add 1 ml saliva in test tube A and leave both test tubes undisturbed for 20 – 30 minutes. Now add a few drops of iodine to both the test tubes. The colour of iodine does not change in the test tube A as starch is converted to sugar by enzymes present in saliva. The colour of iodine changes to blue-black in test tube B because it contains only starch solution. <p>[Note: If quantity is not mentioned do not deduct marks] (or any other activity)</p> <p>(b) (1) Bile changes the acidic medium of food to alkaline medium so that the pancreatic enzymes can act on it.</p> <p>(2) It also emulsifies fats. / Breaks down the large fat globules into smaller particles.</p> <p>(any one)</p>	<p>$\frac{1}{2} \times 4$</p> <p>1</p>	<p>3</p>
30	<p>(a) Given,</p> <p>Height of object (h) = 5 cm</p> <p>Object distance (u) = - 20 cm</p> <p>Focal length (f) = - 18 cm</p> <p>Image distance (v) = ?</p> <p>(i)</p> <p>(1) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$</p> $\frac{1}{v} = \frac{1}{u} + \frac{1}{f} = \frac{1}{-20} + \frac{1}{-18} = - \left[\frac{18 + 20}{360} \right]$ $= \frac{-38}{360}$ $\Rightarrow v = \frac{-360}{38} = -9.47 \text{ cm}$ <p>(2) $m = \frac{v}{u} = \frac{-9.47}{-20} = 0.47$</p> <p>(ii) For convex lens : $m > 1$, for concave lens $m < 1$</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}, \frac{1}{2}$</p> <p>$\frac{1}{2}, \frac{1}{2}$</p>	

	OR		
	<p>(3) (i) $20\text{ cm} > u > 10\text{ cm}$ / Between 10 cm and 20 cm (ii) Object distance less than 10 cm / $10 > u > 0$</p> <p>(i)</p>  <p>(ii)</p>  <p style="text-align: center;">(Deduct $\frac{1}{2}$ mark for not marking the direction of ray)</p>	<p>$\frac{1}{2}$ $\frac{1}{2}$</p> <p>1</p> <p>1</p>	3
31	<p>(a) (i) Retina behaves like a light sensitive screen on which image of an object is formed.</p> <p>(ii) Pupil : regulates and controls the amount of light entering the eye.</p> <p>(b) When ciliary muscles relax or contract they change the curvature of eye lens and hence the focal length to focus objects at varying distances from the eye.</p> <p>[Alternate answer of (b): It regulates the focal length or thickness of the lens.]</p>	<p>1</p> <p>1</p> <p>1</p>	3
32	<p>(a) (i) (1) Increased. (2) Increased. (3) The direction of displacement is reversed</p> <p>(ii) • Fleming's left-hand rule</p> <ul style="list-style-type: none"> • According to this rule, stretch the thumb, forefinger and middle finger of left hand such that they are mutually perpendicular. If the first finger points in the direction of magnetic field and the second finger in the direction of current, then the thumb will point in the direction of motion or the force acting on the conductor. 	<p>$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p>	

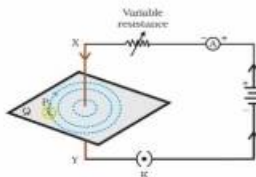
Alternate answer of the statement



All the physical quantities mentioned in the diagram should be perpendicular to each other.

OR

(b) •



- Pattern
- Direction of current
- Magnetic field direction

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

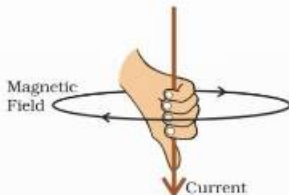
(Note: If the variable resistor and ammeter are not drawn, do not deduct marks.)

- Right hand thumb Rule
- Imagine that we are holding a current carrying straight conductor in our right hand such that the thumb points towards the direction of current. Then our finger will wrap around the conductor in the direction of the field lines of the magnetic field.

$\frac{1}{2}$

1

Alternate answer of the statement:



3

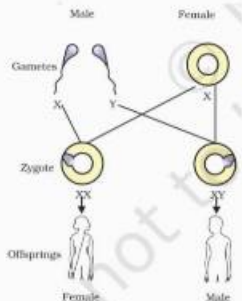
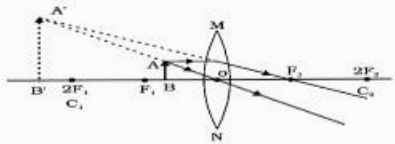
- 33
- UV radiations act on the oxygen molecule (O_2) and then split oxygen molecule into free (nascent) oxygen.
 - These free oxygen atoms combine with oxygen molecule (O_2) to form ozone (O_3)

1

1

	<p>Alternate answer:</p> $\text{O}_2 \xrightarrow{\text{UV}} \text{O} + \text{O}$ $\text{O} + \text{O}_2 \longrightarrow \text{O}_3$ <p>Damage to ozone layer :</p> <ul style="list-style-type: none"> • UV radiations reach the Earth and cause harmful effects like skin cancer in human beings. 	$\frac{1}{2} + \frac{1}{2}$	3
	SECTION D		
34	<p>(a) (i) X : $\text{CH}_3\text{CH}_2\text{OH}$ / Ethyl alcohol / Ethanol</p> <p>Y : CH_3COOH / Acetic acid / Ethanoic acid</p> <p>Z : $\text{CH}_3\text{COOC}_2\text{H}_5$ / Ethyl ethanoate / Ethyl acetate</p> <p>(ii)</p> <p>(1) $\text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Acidified K}_2\text{Cr}_2\text{O}_7} \text{CH}_3\text{COOH}$</p> <p>(2) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow[\text{heat}]{\text{Conc. H}_2\text{SO}_4} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$</p> <p>(iii) (1) Oxidising agent / provides oxygen</p> <p>(2) Dehydrating agent / helps in removing water</p> <p>(iv) Saponification reaction</p> <p style="text-align: center;">OR</p> <p>(b) (i) $\text{C}_2\text{H}_5\text{OH} \xrightarrow[443 \text{ K}]{\text{Conc. H}_2\text{SO}_4} \text{C}_2\text{H}_4 + \text{H}_2\text{O}$</p> <p>(ii) $\text{H}_2\text{C}=\text{CH}_2 \xrightarrow[\text{Ni/Pd}]{\text{H}_2} \text{CH}_3-\text{CH}_3$</p> <p>(iii) $\text{C}_2\text{H}_6 + \text{Cl}_2 \xrightarrow{\text{Sunlight}} \text{C}_2\text{H}_5\text{Cl} + \text{HCl}$</p> <p>(iv) $\text{CH}_3\text{CH}_2\text{OH} \xrightarrow[\text{Acidified K}_2\text{Cr}_2\text{O}_7]{\text{Alkaline KMnO}_4} \text{CH}_3\text{COOH}$</p> <p>(v) $\text{CH}_3\text{COOH} + \text{C}_2\text{H}_5\text{OH} \xrightarrow{\text{Acid}} \text{CH}_3\text{COOC}_2\text{H}_5 + \text{H}_2\text{O}$</p>	$\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 1 $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$ 1 1 1 1 1 1	5
35	<p>(a) (i) Outside the abdominal cavity in scrotum, sperm formation requires a lower temperature than the normal body temperature.</p> <p>Function:</p> <ul style="list-style-type: none"> • Formation of sperms / male gamete • Production of testosterone / male sex hormone 	$\frac{1}{2}$, $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	

	<p>(ii) (1) The fertilized egg (zygote) starts dividing to form embryo and gets implanted in the lining of uterus.</p> <p>(2) The inner lining of uterus slowly breaks and comes out through the vagina as blood and mucus.</p> <p>(iii) Vas deferens is blocked / Vasectomy in males. Fallopian tube is blocked / Tubectomy in females.</p> <p style="text-align: center;">OR</p> <p>(b) (i) (1) Buds present on the leaf margins in notches begin to grow to give rise to a new plant – Vegetative propagation</p> <p>(2) Each part of Planaria grows into complete organism – Regeneration.</p> <p>(3) The spores begin to grow after reaching a suitable moist surface – Spore formation.</p> <p>(ii)</p> <ul style="list-style-type: none"> • Zygote divides several times to form an embryo within the ovule. • Ovule develops a tough coat and is converted into seed. • Ovary grows rapidly and ripens to form a fruit. • Petals, sepals, stamens, style and stigma may shrivel and fall off. 	<p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$, $\frac{1}{2}$</p> <p>$\frac{1}{2}$, $\frac{1}{2}$</p> <p>$\frac{1}{2}$, $\frac{1}{2}$</p> <p>$\frac{1}{2} \times 4$</p>	5
36	<p>(a) The potential difference V across the ends of a given metallic wire in an electric circuit is directly proportional to the current flowing through it provided its temperature remains the same. / $V \propto I$ or $V = IR$ (temperature remaining constant)</p> <p>(b) Resistance Resistance is the property of a conductor to resist the flow of charges.</p> $R = \text{slope} = \frac{y_2 - y_1}{x_2 - x_1} / \frac{V}{I} = \frac{6 - 0}{0.8 - 0}$ $= \frac{60}{8} = 7.5 \Omega$ <p>(c) $1 \text{ kWh} = 1000 \frac{J}{\text{sec}} \times 3600 \text{ sec}$ $1 \text{ kWh} = 3.6 \times 10^6 \text{ J}$</p>	<p>1</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p>	5
SECTION E			
37	<p>(a) Cinnabar ; HgS (Sulphide form)</p> <p>(b) It forms Zinc oxide (Calcination)</p> <p>Alternate answer:</p> $\text{ZnCO}_3 (\text{s}) \xrightarrow{\text{heat}} \text{ZnO} + \text{CO}_2$ <p>(c) (I) Aluminium, Thermit Reaction</p> <p>(II) $\text{Fe}_2\text{O}_3 + 2\text{Al} \longrightarrow 2\text{Fe} + \text{Al}_2\text{O}_3 + \text{Heat}$</p> <p style="text-align: center;">OR</p> <p>(c) • Sodium has more affinity for oxygen than carbon / Sodium is highly reactive.</p> <ul style="list-style-type: none"> • At cathode $\text{Na}^+ + \text{e}^- \longrightarrow \text{Na}$ • At anode $2\text{Cl}^- \longrightarrow \text{Cl}_2 + 2\text{e}^-$ 	<p>$\frac{1}{2}$, $\frac{1}{2}$</p> <p>1</p> <p>$\frac{1}{2}$, $\frac{1}{2}$</p> <p>1</p> <p>1</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	4

<p>38</p>	<p>(a) If X chromosome of male sperm fuses with X chromosome of female ova, girl child is born. If Y chromosome of male sperm fuses with X chromosome of female ova, boy child is born.</p> <p>Alternate answer:</p>  <p>(b) Because one is a normal sized 'X' while the other is a short one 'Y'.</p> <p>(c)</p> <ul style="list-style-type: none"> • During formation of germ cell/gametes the chromosome number is reduced to half. • When two germ cells from two individuals combine to form a new individual, they restore the original number of chromosomes. <p style="text-align: center;">OR</p> <p>(c) Example 1 : Reptiles – The temperature at which fertilized eggs are kept determines whether the animals developing in the eggs will be male or female. Example 2 : Snails – Individuals can change sex during their lifetime.</p>	<p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>1</p> <p>2</p> <p>$\frac{1}{2}, \frac{1}{2}$</p> <p>$\frac{1}{2}, \frac{1}{2}$</p>	<p>4</p>
<p>39</p>	<p>(a) Convergent</p> <p>(b) $f(m) = \frac{1}{p} = \frac{1}{-2.5} = -0.4 \text{ m or } -40 \text{ cm}$</p> <p>(c)</p>  <p style="text-align: center;">OR</p> <p>(c) • Convex lens – magnified Concave lens – diminished</p> <ul style="list-style-type: none"> • Convex – object between O and F • Concave – object anywhere between optical centre and infinity. 	<p>1</p> <p>$\frac{1}{2}, \frac{1}{2}$</p> <p>2</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p>	<p>4</p>
