

**SCHOOL EXAMINATION, 2025**

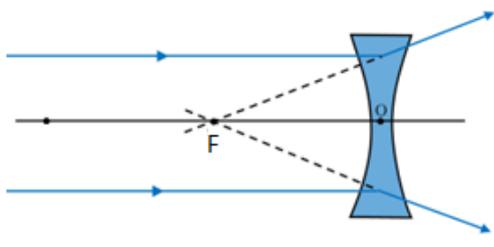
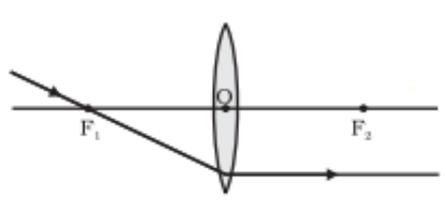
**SOLUTIONS**

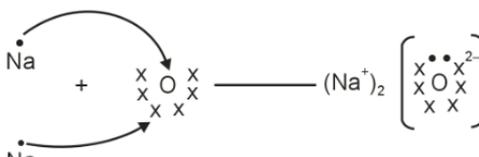
**CLASS: X SCIENCE (Subject Code-086)**

**[ Paper Code: SET 31/2/1 ]**

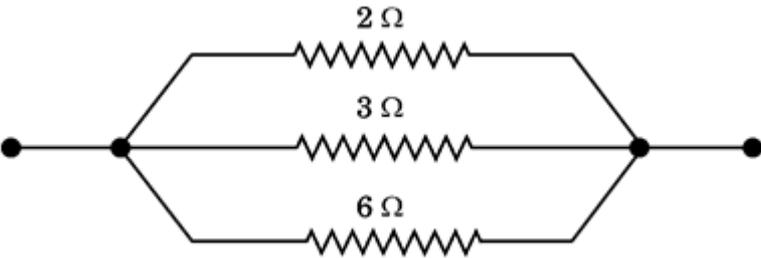
**Maximum Marks: 80**

Q. No.	EXPECTED ANSWERS / VALUE POINTS	Marks	Total Marks
<b>SECTION A</b>			
1	(D) / $\text{CH}_4 + 2\text{O}_2 \longrightarrow \text{CO}_2 + 2\text{H}_2\text{O} + \text{Energy}$	1	1
2	(C) / Sodium	1	1
3	(C) / 7.0 to 7.8	1	1
4	(B) / When it is heated with iron (III) oxide, molten iron is obtained.	1	1
5	(C) / Brass and Bronze	1	1
6	(D) / Amount of water in guard cells	1	1
7	(B) / Capillaries	1	1
8	(C) / Change in amount of water in cells	1	1
9	(B) / Vegetative buds produced in the notches of the leaf	1	1
10	(C) / Ovary and testis both	1	1
11	(A) / $\frac{10}{9}$	1	1
12	(B) / -20 cm	1	1
13	(D) / 1 and 6	1	1
14	(B) / 110 W	1	1
15	(C) / 9 $\Omega$	1	1
16	(C) / DDT, Polyester, Glass	1	1
17	(B) / Both A and R are true, but R is <i>not</i> the correct explanation of A.	1	1
18	(A) / Both A and R are true and R is the correct explanation of A.	1	1
19	(C) / A is true, but R is false.	1	1
20	(A) / Both A and R are true and R is the correct explanation of A.	1	1
<b>SECTION B</b>			
21	(a) Displacement reaction $2\text{AgNO}_3 + \text{Cu} \longrightarrow 2\text{Ag} + \text{Cu}(\text{NO}_3)_2$ (b) Electrolytic refining	1/2 1/2 1	2
22	(a) (1) and (4)  (b) (i) melting point increases with increasing molecular mass.  (ii) Solubility shows regular gradation/ decreases with increase in molecular mass.	1  1/2 1/2	2
23	<ul style="list-style-type: none"> <li>• Pons, Medulla, Cerebellum</li> <li>• Medulla</li> </ul>	1/2 1/2 1/2 1/2	2
24	(a) (i) Protects the seed (ii) Food storage area of the seed/ reserve food material	1/2 1/2	

	(iii) Develops into root on germination of seed/future root (iv) Develops into shoot on germination of seed/future shoot <b>OR</b> (b) In a test tube take 10g sugar, add 100 ml of water and a pinch of yeast granules. Keep it in warm place for 1-2 hours.	½ ½ 2		2
25	(a) Concave lens   <b>OR</b> (b) (i)  (ii) Principal focus /Focus	1  1  1  1		2
26	$P = 750 \text{ W}, V = 220 \text{ V}$  • Current drawn by kettle, $I = \frac{P}{V}$ $= 750 \text{ W}/220 \text{ V}$ $= 3.4 \text{ A}$  • No, this kettle cannot be used. • The current drawn by the kettle is more than the fuse rating (3A). So, the fuse will melt and break the circuit.	½  ½  1		2
<b>SECTION C</b>				
27	(a) (i) A single reactant (substance) breaks down to give two or more products.  • $\text{CaCO}_3 (\text{s}) \xrightarrow{\text{Heat}} \text{CaO}(\text{s}) + \text{CO}_2(\text{g})$ • $2\text{AgCl} (\text{s}) \xrightarrow{\text{Sunlight}} 2\text{Ag}(\text{s}) + \text{Cl}_2(\text{g})$ • $2\text{H}_2\text{O} (\text{l}) \xrightarrow{\text{Electric Current}} 2\text{H}_2(\text{g}) + \text{O}_2(\text{g})$  (any other suitable example)	½  ½  ½  ½		

	<p>(ii) because energy (heat) is released.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b)</p> <ul style="list-style-type: none"> <li>In combination reaction single product (substance) is formed from two or more reactants (substances) whereas in decomposition reaction a single reactant (substance) breaks down to give two or more products (substances). So, the two are opposite.</li> <li>Example of combination reaction  <math display="block">\text{C(s)} + \text{O}_2(\text{g}) \longrightarrow \text{CO}_2(\text{g}) + \text{Heat}</math> <p style="text-align: center;">Carbon    Oxygen                      Carbon dioxide</p> </li> <li>Example of decomposition reaction  <math display="block">\text{CaCO}_3(\text{s}) \xrightarrow{\text{Heat}} \text{CaO(s)} + \text{CO}_2(\text{g})</math> <p style="text-align: center;">Calcium carbonate                      Calcium Oxide    Carbon dioxide</p> </li> </ul> <p style="text-align: center;">(any other suitable example) (Do not deduct marks if physical state not given)</p>	1 1 1 1	3
28	<p>Na                      O 2, 8, 1                      2, 6</p> <p>(i)</p> <p style="text-align: center;">• <b>Na</b></p> <p>(ii)</p> <p style="text-align: center;">•• <b>O</b> : ••</p> <ul style="list-style-type: none"> <li>Formation of sodium oxide Na<sub>2</sub>O</li> </ul>  <p>Anion: <b>O<sup>2-</sup></b> Cation: <b>Na<sup>+</sup></b></p>	½ ½ 1 ½	3
29	<p>(a) Hormones are chemical messengers (substances) which regulate body functions / Hormones are the biochemical substances produced in one part of the body and move to the target organ or tissue to regulate body function.</p> <p>(b) Example: If the sugar level in blood rises, it is detected by cells of pancreas which respond to produce more insulin to lower blood sugar level. As the blood sugar level falls, it is detected by the cells of pancreas and insulin secretion is reduced.</p> <p style="text-align: right;"><b>(or any other example)</b></p>	1 2	3
30	<p>(a) Dominant trait – free earlobe: F f Recessive trait – Attached earlobe: ff.</p>		

	<p><b>Parents</b></p> <p style="text-align: center;"> <b>Woman - free earlobe (Ff)</b>                      <b>Man - attached earlobe (ff)</b> </p> <p style="text-align: center;">Gamete -</p> <p style="text-align: center;"> <b>F<sub>1</sub> Progeny</b>  <b>free earlobe</b>                      <b>attached earlobe</b> </p> <p>50%                      50%</p> <p style="text-align: center;">Progeny- Ff : ff</p> <p style="text-align: center;">(Award marks if answer is written in explanation form)</p> <p>(b) Gene combinations of:</p> <p>Father – ‘ff’</p> <p>Mother – ‘Ff’</p> <p style="text-align: center;">(award marks if any other letter denoting the trait is used)</p>	<p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>	<p>3</p>
<p>31</p>	<p>(i) Nature: Virtual and erect</p> <p>(ii) Given <math>h' = + 8.0 \text{ cm}</math>, <math>h = + 2.0 \text{ cm}</math>, <math>u = - 6 \text{ cm}</math></p> $m = \frac{h'}{h} = \frac{v}{u}$ $= \frac{8.0\text{cm}}{2.0\text{cm}} = \frac{v}{-6 \text{ cm}}$ <p>or <math>v = - 24 \text{ cm}</math></p> <p>Thus, the image is at a distance of 24 cm from the lens.</p> <p>(iii) Lens formula <math>\frac{1}{v} - \frac{1}{u} = \frac{1}{f}</math></p> $\frac{1}{-24} - \frac{1}{-6} = \frac{1}{f}$ $\frac{-1}{24} + \frac{1}{6} = \frac{1}{f}$ $\frac{1}{8} = \frac{1}{f}$ <p style="text-align: center;"><math>f = 8 \text{ cm}</math></p> <p>Thus the focal length of the lens = 8 cm</p>	<p>1</p> <p>1/2</p> <p>1/2</p> <p>1/2</p> <p>1/2</p>	<p>3</p>
<p>32</p>	<p>(i)</p> <p style="text-align: center;">In series, <math>R_s = R_1 + R_2 + R_3</math></p> $= (2 + 3 + 6) \Omega = 11 \Omega$	<p>1/2</p> <p>1/2</p> <p>1/2</p>	

(ii)	 <p>In parallel, <math display="block">\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}</math> <math display="block">= \frac{1}{2} + \frac{1}{3} + \frac{1}{6}</math> <math display="block">= \frac{3+2+1}{6}</math> <math display="block">R_p = 1.0 \Omega</math></p>	1/2	
33	<ul style="list-style-type: none"> <li>Ozone (O<sub>3</sub>) shields the surface of earth from Ultra violet (UV) radiation which are highly damaging to organisms (may cause skin cancer).</li> <li>Ultra violet (UV) radiations split apart some molecular oxygen (O<sub>2</sub>) into free oxygen (O) atoms. These atoms then combine with molecular oxygen to form ozone. /           <math display="block">O_2 \xrightarrow{UV} O + O</math> <math display="block">O + O_2 \rightarrow O_3 \text{ (Ozone)}</math> </li> <li>Chlorofluorocarbons (CFCs)/ freons</li> </ul>	1 1 1	3
<b>SECTION D</b>			
34	<p>(a) (i) X- Ethanoic acid/ Acetic acid</p> $  \begin{array}{c}  \text{H} \\    \\  \text{H}-\text{C}-\text{C} \begin{array}{l} \nearrow \text{O} \\ \searrow \text{OH} \end{array} \\    \\  \text{H}  \end{array}  $ <p style="text-align: center;">/ CH<sub>3</sub>COOH</p> <p>(ii) pH of 'X' will be higher than that of a mineral acid.</p> <p>(iii) Esterification reaction</p> $CH_3COOH + CH_3CH_2OH \xrightleftharpoons{\text{Acid}} CH_3-COOCH_2CH_3 + H_2O$ <p>(X)</p> <p style="text-align: center;">(or reaction with any other alcohol)</p> <p>(iv) <math>2CH_3COOH + Na_2CO_3 \longrightarrow 2CH_3COONa + CO_2 + H_2O</math></p> <p>(X) Sodium acetate/sodium ethanoate</p> <p style="text-align: center;">(balancing of equation is not mandatory)</p>	1/2 1 1/2 1 1/2	

**OR**

(b) (i)

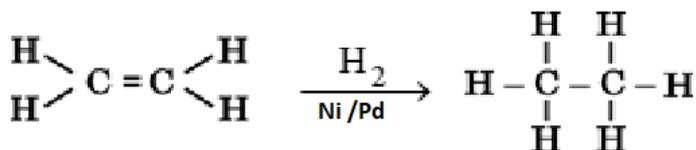
Saturated hydrocarbons	Unsaturated hydrocarbons
Compounds which have single covalent bond between all carbon atoms. / Compounds with general formula $C_nH_{2n+2}$	Compounds which have at least one double or triple bond between carbon and carbon atom. / Compounds with general formula $C_nH_{2n}$ and $C_nH_{2n-2}$
Example: Propane $\begin{array}{ccccccc} & H & H & H & & & \\ &   &   &   & & & \\ H & - C & - C & - C & - H & & \\ &   &   &   & & & \\ & H & H & H & & & \end{array}$ / $CH_3CH_2CH_3$  (any other)	Example: Propene- $CH_2=CH-CH_3$ / $\begin{array}{ccccccc} & & & H & & & \\ & & &   & & & \\ H & - C & = C & - C & - H & & \\ &   &   &   & & & \\ & H & H & H & & & \end{array} /$ Propyne $H-C \equiv C-C-H$ $\begin{array}{ccccccc} & & & & & H & \\ & & & & &   & \\ H & - C & \equiv C & - C & - H & & \\ & & &   & & & \\ & & & H & & & \end{array}$ (any other)

1

1

(ii)

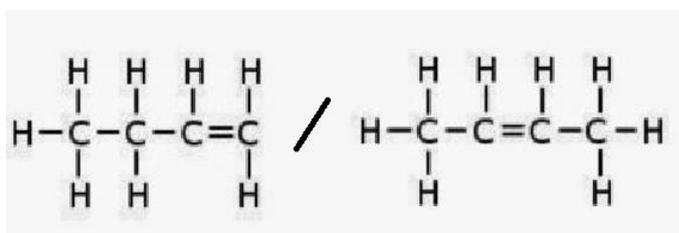
- Addition of hydrogen in the presence of Ni or Pd / Hydrogenation /



(any other)

- It is used in the hydrogenation of vegetable oil.

(iii) Butene



1

1

1/2

1/2

5

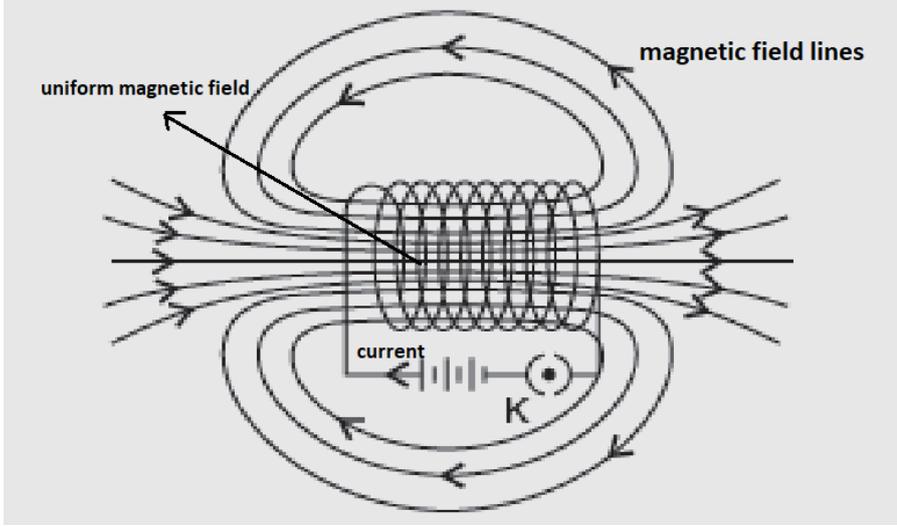
35

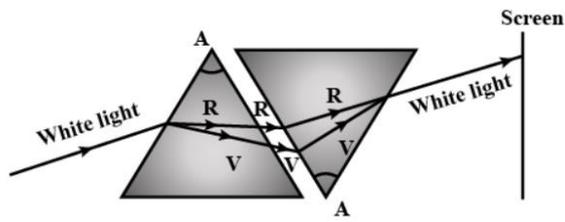
(a)

(i) Animals (Herbivores) eating grass need a longer small intestine to digest cellulose. Meat is easier to digest, hence meat eating animals (Carnivores) have shorter small intestine.

2

	<p>(ii) Role of Pancreas – Secrete pancreatic juice which contains trypsin for digesting proteins, lipase for breaking down emulsified fats.</p> <p>Role of Bile- Bile emulsifies fats and makes the medium alkaline in the small intestine so that pancreatic enzymes can act.</p> <p>(iii) The inner lining of the small intestine has numerous finger-like projections called villi which increase the surface area for absorption of food. The villi are richly supplied with blood vessels which take the absorbed food to each and every cell of the body.</p> <p style="text-align: center;"><b>OR</b></p> <p>(b) (i) ‘Rings of cartilage’ ensures that the air passage does not collapse in absence of air.</p> <p>(ii)</p> <p>Ribs are lifted → Diaphragm flattens → Chest cavity become larger → Air is sucked into the lungs (Alveoli) and we breathe in</p> <p>(iii) Due to lack of oxygen in our muscle cells (anaerobic respiration), pyruvate is converted into lactic acid, build-up of lactic acid in our muscles causes cramps.</p>	1	
		1	
		1	
		1	
		1	
		2	
		2	
			5
36	<p>(a) (i)</p> <div style="text-align: center;"> </div> <p>(ii) Right hand thumb rule Statement of the rule - Imagine holding a current carrying straight conductor in the right hand such that the thumb points towards the direction of current, then the fingers will wrap around the conductor in the direction of the field lines of the magnetic field.</p> <p>(iii)</p> <ul style="list-style-type: none"> <li>• According to Fleming’s left-hand rule, stretch the thumb, forefinger and middle finger of your 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.</li> <li>• Out of the plane/ upwards</li> </ul>	1½	
		½	
		1	
		1	
		1	

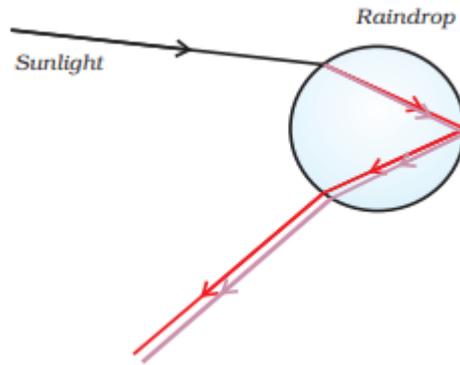
	<b>OR</b>		
	<p>(b) (i) Solenoid is a coil of many turns of insulated copper wire wrapped closely in the shape of a cylinder.</p>  <p style="text-align: right;">Diagram Marking (i), (ii) and (iii)</p>	1	
	(ii) By inserting a piece of magnetic material like soft iron inside the current carrying solenoid.	1	
<b>SECTION E</b>			
37	<p>(a) P – pH 0 to 4 Q – pH 12 to 14</p> <p>(b) (i) By adding sodium hydroxide (or any other base) (ii) By adding hydrochloric acid (or any other mineral or strong acid)</p> <p>(c)</p> <p>(i) • Hydronium ion (<math>\text{H}_3\text{O}^+/\text{H}^+</math>) ion concentration increases. • Colour will change from yellow/orange to red/pink</p> <p style="text-align: center;"><b>OR</b></p> <p>(c) (ii) • low pH/ between 1 to 3 • by the use of antacids/milk of magnesia/sodium hydrogen carbonate • Magnesium hydroxide/<math>\text{Mg}(\text{OH})_2</math></p>	<p><math>\frac{1}{2}</math> <math>\frac{1}{2}</math> <math>\frac{1}{2}</math> <math>\frac{1}{2}</math> 1 1 1 <math>\frac{1}{2}</math> <math>\frac{1}{2}</math></p>	4
38	<p>(a) Oviduct/ fallopian tube</p> <p>(b) The lining of uterus thickens (it becomes spongy) and is richly supplied with blood to nourish the growing embryo.</p> <p>(c) (i) The uterine lining slowly breaks down and comes out as blood and mucous along with unfertilized egg. Hence, menstruation will occur.</p> <p style="text-align: center;"><b>OR</b></p> <p>(c) (ii) With the help of special tissue called Placenta which is embedded in uterine wall. It provides oxygen, nutrients from mother to embryo.</p>	<p>1 1 2 2</p>	4
39	<p>(a) Dispersion of light</p> <p>(b) Different colours of light bend through different angles with respect to the incident ray as they pass through a prism.</p> <p>(c) (i) Two identical prisms are placed in inverted position with respect to each other as shown. When spectrum produced by prism A is passed through the prism B, a beam of white light emerges from the other side of the prism B.</p>	<p>1 1</p>	



(award full marks even if only labelled ray diagram is given)

OR

(c)(ii)



(deduct ½ marks if arrows are not marked)

2

2

4