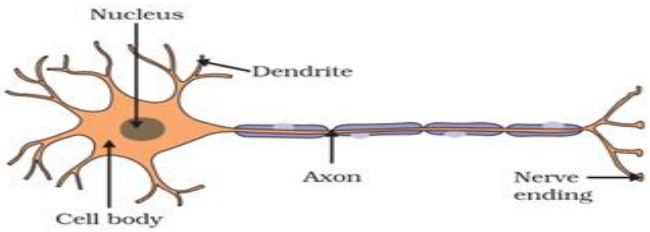
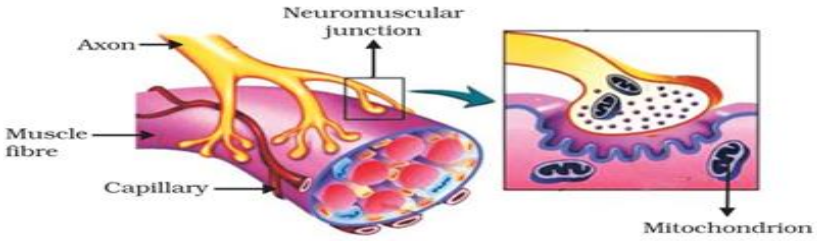
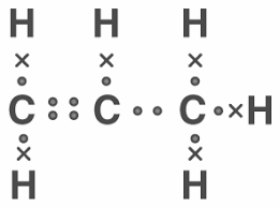
SCIENCE – Code no. 086
MARKING SCHEME
CLASS – X (2025-26)

Section – A		
1	C. Cuscuta, ticks, lice, leeches and tapeworm; as all of these are parasites.	1
2	B. Lactic acid + Energy	1
3	D. Blood pressure: Medulla in hindbrain	1
4	D. insulin from pancreas	1
5	A. BB x bb	1
6	B. (ii), (iii), (iv)	1
7	C. Use of plastic as packaging material.	1
8	A. Both A and R are true, and R is the correct explanation of A.	1
9	D. A is false but R is true	1
10	It is completely wrong to say that plants do not produce any excretory products. However, plants use completely different strategies for excretion than those of the animals. They get rid of these wastes in different manner (any two): i. Oxygen, a photosynthetic waste, is removed through stomata. ii. Excess water is removed by transpiration through stomata. iii. Other metabolic wastes are either stored in dead cells, resins and gums or are removed through falling of old leaves. iv. Many waste products are stored in cellular vacuoles	2
11	*Students to attempt either option A or B.* A. (i) There are two chambers in the heart of fish. The blood is pumped to the gills, is oxygenated there and passes directly to the rest of the body. (ii) There are four chambers in the heart of a human being. Separation of the right side and the left side of the heart by septum prevents mixing of oxygenated and de-oxygenated bloods **OR** B. Xylem moves water and minerals obtained from the soil through roots to all other parts of the plant in a unidirectional manner// Transpiration takes place from leaf which causes a transpirational pull in the tracheids and vessels of xylem facilitating upward movement of water// roots	2

	actively uptake ions from the soil, leading to difference in concentration gradient, thereby water moves into the roots to eliminate this difference/ creating a steady movement of water into root xylem.	
12	Tree food chain- tree, zebra, tiger /Any other food chain Grassland food chain- grass, zebra, tiger / Any other food chain Food web- Join the two food chains at a common point (zebra)	2
13	• All information from our environment is detected by the specialised tips of some nerve cells. The information acquired at the end of the dendritic tip of a nerve cell (Fig. a), sets off a chemical reaction that creates an electrical impulse. • This impulse travels from the dendrite to the cell body, and then along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals. • These chemicals cross the gap, or synapse, and start a similar electrical impulse in a dendrite of the next neuron. This is how nervous impulses travel in the body. (Fig b).  (a)  (b) **Figure** (a) Structure of neuron, (b) Neuromuscular junction	3
14	A. RY, Ry, rY, ry B. The traits which are independently inherited are as follows Tall round: 81 Tall wrinkled: 27 Short round: 27 Short wrinkled: 9 (Ratio :- 9 : 3 : 3 : 1)	3
15	*Students to attempt either subpart A or B.* A. Eggs are rich in proteins. The digestion of proteins is initiated in the stomach. Gastric glands present in the wall of the stomach release	4

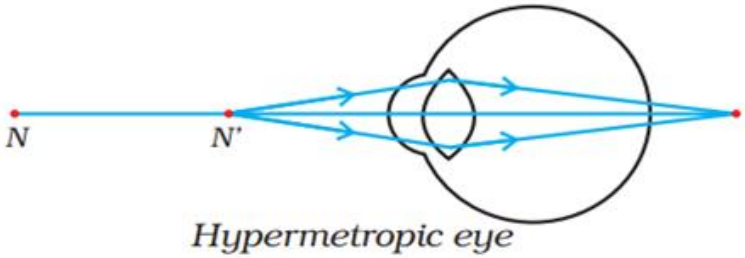
	hydrochloric acid, a protein digesting enzyme called pepsin and mucus. The hydrochloric acid creates an acidic medium which facilitates the action of enzyme pepsin. **OR** B. Eggs contain fats. Bile juice from the liver breaks down large fat globules into smaller ones for increasing the efficiency of the enzymes and making the medium alkaline. Emulsified fats are digested by lipase secreted by pancreas. C. Sweet potatoes are rich in starch. The saliva secreted by salivary glands present in buccal cavity contain an enzyme called salivary amylase that breaks down starch which is a complex molecule to give sugar. D. Small Intestine will have a maximum amount of digested food as the process of digestion is completed in the small intestine. *For Visually impaired students* D. The digested food is taken up by the inner lining of the intestine with the help of finger-like projections or villi which increase the surface area for the absorption.	
16	*Student to attempt either option A or B.* (i) Puneet should not choose seeds as banana plants have lost the capacity to produce seeds. He should go for vegetative propagation of banana (by stem cutting). (ii) Errors and variations in DNA copying cause variation. Variation is good as it can help a population tide over unfavourable conditions by survival of some variants. It is bad as parents' desirable characters are lost/ sometimes variants are not able to survive in the new conditions/ the variant is not able to use the cellular apparatus efficiently. ***OR*** (i) Watermelon has unisexual flowers, the male and female flowers are separate. The presence of pollinators will facilitate cross pollination between the flowers increasing the chance of fertilization and number of fruits being produced. Without pollinators the probability of pollen falling on stigma reduces in a unisexual flower, especially if they are far apart thus the number of fruits produced will be less. (ii) The three changes observed are: • Ovule develops a tough coat and becomes seed. • Ovary grows and ripens to form fruit. • Petals, sepals, stamen, style and stigma may shrivel and fall off.	5
Section – B		
17	D. Both equations 1 and 2 are redox reactions, p= 2 and q=10	1
18	B. (I) and (III)	1

<table>
<tr><td>19</td><td>B. Iron nail is coated with a brown coating in test tube ‘P’ and silver coating in test tube ‘Q’.</td><td>1</td></tr>
<tr><td>20</td><td><table><tr><td>B.</td><td>Red</td><td>Yellow</td></tr></table></td><td>1</td></tr>
<tr><td>21</td><td>D. Sodium hydroxide</td><td>1</td></tr>
<tr><td>22</td><td>B. insoluble calcium carbonate converts to water soluble calcium bicarbonate.</td><td>1</td></tr>
<tr><td>23</td><td>D. NaCl</td><td>1</td></tr>
<tr><td>24</td><td>D. A is false but R is true</td><td>1</td></tr>
<tr><td>25</td><td>A. The pin will drop but will take less time to drop because silver is a better conductor of heat than aluminium.
B. No, aluminium wire will not melt because metals have high melting points.</td><td>2</td></tr>
<tr><td>26</td><td><u>Attempt either option A or B.</u>
A.
(i) No, ‘X’ is highly reactive and will catch fire.
(ii) Sodium.
It is extracted from molten sodium chloride by electrolytic reduction
Cathode: $Na^+ + e^- \rightarrow Na$
Anode: $2Cl^- \rightarrow Cl_2 + 2e^-$
(Potassium is also a correct option)
OR
B.
(i) Copper gets oxidised/corroded to basic copper carbonate which is greenish in colour.
(ii) No, iron will rust and the reddish layer of rust will come off exposing iron to air, the dome will not be stable. Copper on the other hand on corrosion forms a protective layer which does not allow further corrosion.
(iii) Copper is a highly malleable metal, its thin sheets can be used to give different shapes of roofs, like the shape of a dome.</td><td>3</td></tr>
<tr><td>27</td><td>A. She was expecting Oxygen gas to be formed at the anode and hydrogen at the cathode.
B. Distilled water is a poor conductor of electricity.
C. Adding few drops of H_2SO_4 or some NaCl (or any other strong electrolyte).
<u>For visually impaired students</u>
A. Redox reaction</td><td>3</td></tr>
</table>

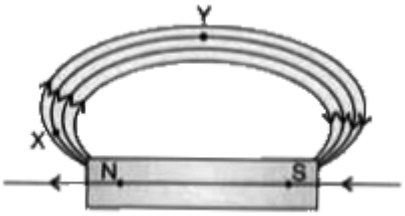
	B. Decomposition reaction and endothermic reaction C. Combination reaction and exothermic reaction	
28	A. (b) < 40, because concentrated H_2SO_4 gives more H+ ions than dilute acid. B. 3 mL of H_2SO_4 will be 60 drops, which will neutralise 6 mL of NaOH <table><tr><th>S. No.</th><th>Volume of dil NaOH taken (mL)</th><th>Drops of dil H_2SO_4 used</th></tr><tr><td>1</td><td>2</td><td>20 (1 mL)</td></tr><tr><td>2</td><td>3</td><td>30 (1.5 mL)</td></tr><tr><td>3</td><td>4</td><td>40 (2 mL)</td></tr><tr><td>4</td><td>6</td><td>3 mL = 60 drops</td></tr></table>**OR** Colour will change from colourless to pink. Phenolphthalein in colourless in acids and turns pink in basic solution. C. $2NaOH + H_2SO_4 \rightarrow Na_2SO_4 + 2H_2O$ (a) neutralisation and double displacement reaction. Base NaOH is getting neutralised and forming salt + water. It is double displacement as Na^+ ions are being replaced by H^+ and OH^- by SO_4^{2-}. It is not precipitation reaction because Na_2SO_4 is soluble in water.	4
29	*Student to attempt either option A or B.* A. (a) x = 3, y = 6 (b) Propene (c)  (d) Propanol (e) $C_3H_6 + H_2 \xrightarrow{Ni} C_3H_8$ $CH_2=CH-CH_3 + H_2 \xrightarrow{Ni} CH_3-CH_2-CH_3$ **OR** B. (a) Ionic bond (b) Q_2P (c) Basic, metallic oxides are basic in nature. (d) $2C_2H_5OH + 2Q \rightarrow 2C_2H_5OQ + H_2$ (e) CP_2 *For visually impaired students* A. (a) x = 3, y = 6	5

	(b) Propene (c) Unsaturated hydrocarbon (d) Propanol (e) $C_3H_6 + H_2 \xrightarrow{Ni} C_3H_8$ **OR** B. (a) Covalent bond (b) Ionic bond (c) CaO, due to presence of free ions in molten state. (d) CaO is solid while CO_2 is a gas. (e) 4	
Section – C		
30	D. I and III	1
31	A. As sunlight passes through the atmosphere, ***Rayleigh scattering causes*** shorter wavelengths, such as blue and violet, to scatter more than other colors, but our eyes are more sensitive to blue than violet.	1
32	C. A is true but R is false	1
33	A. The optical instrument shown in the figure is a concave lens. B. The image formed is a virtual image. C. To find the focal length for of a concave lens, we can use the lens formula: $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ where: • $u =$ - 20 cm (object distance, taken as negative for concave lenses), • $v =$ - 10 cm (image distance, also taken as negative since the image formed by a concave lens is virtual). Solution: 1. Substitute the values into the lens formula: $\frac{1}{f} = \frac{1}{-10} - \frac{1}{-20}$ 2. Simplify the terms: $\frac{1}{f} = \frac{1}{-10} - \frac{1}{-20}$ 3. Find a common denominator: $\frac{1}{f} = -\frac{2}{20} + \frac{1}{20} = -\frac{1}{20}$ 4. Solve for f: $f =$ - 20 cm	2

	- - - - - - - - - - - - *For visually impaired students* A. A convex lens can form a virtual image when the object is placed between the lens and its focal point. B. A convex lens can focus parallel rays of sunlight to a single point, known as the **focal point**. Sunlight contains energy, and when this light is concentrated at a small point, the energy density increases significantly. This focused light energy raises the temperature at the focal point, which can become high enough to ignite a piece of paper placed at that point.	
34	*Student to attempt either A or B.* A. (i) $R = \frac{R_1 R_2}{R_1 + R_2} = \frac{8 \times 8}{8 + 8} = 4\ ohms$ (ii) $I = \frac{V}{R} = \frac{8}{(4+4)} = 1\ A$ **OR** B. (i) $\frac{1}{R_P} = \frac{1}{R_1} + \frac{1}{R_2} = \frac{1}{24} + \frac{1}{24} = \frac{2}{24}$ R_p = 12 ohms $R_T = R_p + 12$ = 24 ohms $I = \frac{V}{R} = \frac{6}{24} = 0.25\ A$ (ii) Same readings of A_1 and A_2 - - - - - - - - - - - - *For visually impaired students* A. (i) Maximum Resistance: • To get the maximum resistance, connect all four resistors in series. • The total resistance R_{max} in series is the sum of the individual resistance: $R_{\max} = R + R + R + R = 4R$ (ii) Minimum Resistance: • To get the minimum resistance, connect all four resistors in parallel.	2

	• The total resistance R_{min} in parallel is given by: $$\frac{1}{R_{min}} = \frac{1}{R} + \frac{1}{R} + \frac{1}{R} + \frac{1}{R} = \frac{4}{R}$$ $$R_{min} = \frac{R}{4}$$ **OR** B. $$R = \frac{\rho \cdot l}{A}$$ Given: • Initial length, $l = 2\,\text{m}$ • Cross-sectional area, $A = 0.5\,\text{mm}^2 = 0.5 \times 10^{-6}\,\text{m}^2$ • Resistivity of copper, $\rho = 1.7 \times 10^{-8}\,\Omega \cdot \text{m}$ Step 1: Calculate the initial resistance R_1 and l = 2 m $$R_1 = \frac{\rho \cdot l}{A} = \frac{1.7 \times 10^{-8}\,\Omega \cdot \text{m} \times 2\,\text{m}}{0.5 \times 10^{-6}\,\text{m}^2}$$ $$R_1 = \frac{3.4 \times 10^{-8}}{0.5 \times 10^{-6}}\,\Omega = 0.068\,\Omega$$ Step 2: Calculate the new resistance R_2 and l = 4 m (double length) $$R_2 = \frac{\rho \cdot (2l)}{A} = 2 \times R_1 = 2 \times 0.068\,\Omega = 0.136\,\Omega$$ The resistance of the wire when the length is double is 0.136 Ω	
35	(i) Hypermetropia is the deficiency in vision and the lens is convex lens. (ii)  *Hypermetropic eye* - - - - - - - - - - - - *<u>For visually impaired students</u>* (i) Dispersion of light is the phenomenon in which white light separates into its component colors (spectrum) when it passes through a medium, such as a prism. Different colours of light lend through different angles with respect to incident light, thus becoming district.	3

	(ii) Dispersion occurs when light passes from one medium to another where the speed of light is different for each wavelength. For example, in a prism, each color of light has a different refractive index due to varying wavelengths, causing each color to bend at different angles as they exit the prism. Dispersion only happens if the medium has a variable refractive index across different wavelengths, like glass or water. (iii) Presbyopia is caused by the gradual loss of flexibility in the lens of the eye, which occurs with aging. This reduced flexibility prevents the lens from changing shape effectively to focus on close objects, making it difficult to see them clearly.	
36	(i) Show that the cross-sectional area of the wire is about 5 x 10^{-7} m^2. The cross-sectional are *A* of a wire with diameter *d* is given by: $$A = \pi \left(\frac{d}{2}\right)^2$$ Substitute, d = 0.80 x 10^{-3} m: $$A = \pi \left(\frac{0.80 \times 10^{-3}}{2}\right)^2$$ $$A = \pi \left(0.40 \times 10^{-3}\right)^2$$ $$A = \pi \times (0.16 \times 10^{-6})\,\mathrm{m}^2$$ $$A \approx 3.14 \times 0.16 \times 10^{-6}\,\mathrm{m}^2$$ $$A \approx 5.024 \times 10^{-7}\,\mathrm{m}^2$$ Thus, the cross-sectional are *A* is approximately 5 x 10^{-7} m^2. (ii) To find the length l of the wire, we can use the formula of resistance: $$R = \frac{\rho \cdot l}{A}$$ Rearrange to solve for l : $$l = \frac{R \cdot A}{\rho}$$ Substitute the values: $$l = \frac{0.12 \cdot 5 \times 10^{-7}}{1.8 \times 10^{-8}}$$ $$l = \frac{6 \times 10^{-8}}{1.8 \times 10^{-8}}$$ $$l = \frac{6}{1.8}\,\mathrm{m}$$ $$l = 3.33\,\mathrm{m}$$ The student needs a length of approximately 3.33 m of given copper wire to make a 0.12 Ω resistor.	3

37	• Closeness of magnetic field lines is directly related to strength of magnetic field. • Strength of magnetic field at point X (pole) is more than point Y. • If the student redraws the diagram he/she should mark arrows correctly from North to South.  	3
38	A. Convex Lens B. Real and Inverted *Student to attempt either subpart C or D.* C. To find the object distance (u) for the lens, we can use the lens formula: $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ where: • *f* = 50 mm (focal length), • *v* = 60 mm (image distance), • *u* is the object distance, which we need to calculate. Rearranging the formula to solve for u: $\frac{1}{u} = \frac{1}{v} - \frac{1}{f}$ Substitute the values: $\frac{1}{u} = \frac{1}{60} - \frac{1}{50}$ Calculate each term: $\frac{1}{u} = \frac{50 - 60}{3000} = \frac{-10}{3000} = -\frac{1}{300}$ Thus, the negative sign indicates that the object is located 300 mm in front of the lens (on the opposite side from the image). So, the object distance is: u = 300 mm **OR** D. image height = - 20 mm object height = 80 mm The magnification (m) of the lens is given by: $m = \frac{\text{image height}}{\text{object height}}$ Substituting the values: $m = \frac{-20mm}{80\ mm} = -\frac{1}{4}$	4

Thus, the magnification m = − 0.25 mm.

Magnification is also given by:

$$m = \frac{v}{u}$$

where:

- v is the image distance
- u = −150 mm

Rearrange to solve for v:

v = m × u = −0.25 × −150 mm = 37.5 mm

So, the image distance v = 37.5 mm.

The lens formula is:

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

Substituting the values of v and u:

$$\frac{1}{f} = \frac{1}{37.5} + \frac{1}{150}$$

Converting to a common denominator:

$$\frac{1}{f} = \frac{4+1}{150} = \frac{5}{150} = \frac{1}{30}$$

Thus, f = 30 mm

Answer: The focal length of the camera lens is 30 mm.

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For visually impaired students

A. Concave Lens for Flashlight and Convex Lens for solar cooker.
B. Concave lens diverges the light rays which is needed for a wider reach of the flashlight. Convex lens converges the rays which helps to raise the temperature of the place where rays converge.

Student to attempt either subpart C or D

C. To find the focal length (f) of the lens, we can use the information about the object distance (u) and the magnification (m).

Given:

- Object distance, u = − 40 cm
- The image is twice the size of the object, so the magnification,

$$m = -2$$

Since the magnification $m = \frac{v}{u}$, we can rearrange this to find the image distance v:

$$v = m \times u$$

	Substitute the values for m and u: $v = -2 \times -40 = 80$ cm The lens formula is : $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ Substitute $v = 80\ cm$ and $u = -40\ cm$: $\frac{1}{f} = \frac{1}{80} - \frac{1}{-40} = \frac{1}{80} + \frac{1}{40}$ Convert to a common denominator: $\frac{1}{f} = \frac{1+2}{80} = \frac{3}{80}$ Thus, $f = \frac{80}{3} = 26.67$ cm (approximately) Answer : The focal length of the lens is approximately 26.67 cm. **OR** D. • Object distance, u = - 20 cm • Image distance v = - 10 cm (since the image is on the same side as the object) We can use the lens formula to calculate the focal length (f) : $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$ Substitute the values of v and u : $\frac{1}{f} = \frac{1}{-10} - \frac{1}{-20} = \frac{1}{-10} + \frac{1}{20}$ Finding a common denominator: $\frac{1}{f} = \frac{-2}{20} + \frac{1}{20} = -\frac{1}{20}$ Thus, $f = -20$ cm Answer: The focal length of the lens is - 20 cm, indicating it is a diverging lens (concave lens).	
39	<u>*Students to attempt either option A or B.*</u> A. (i) Power across the 100 Ω resistance = 81 W $P = I^2R = 81\ W$ $\therefore I^2 = \frac{81}{100}$ $\therefore I = \sqrt{\frac{81}{100}} = \frac{9}{10} = 0.9\ A$	5

(ii) Voltage across the 25 Ω resistors = $V_2 = IR_{eqv}$
for the 25 Ω resistors

$$\frac{1}{R_{eqv}} = \frac{1}{25} + \frac{1}{25} = \frac{2}{25}$$

$$\therefore R_{eqv} = \frac{25}{2} = 12.5\,\Omega$$

$$\therefore V_2 = 0.9\,A \times 12.5\,\Omega = 11.25\,V$$

(iii) Voltage across 100 Ω = $V_{100} = IR = 0.9\,A \times 100\,\Omega = 90\,V$

$$\therefore V_1 = 90\,V + 11.25\,V = 101.25\,V$$

OR

B.

(i) $P = \frac{V^2}{R}$

$$\therefore R = \frac{V^2}{P} = \frac{240 \times 240}{1200} = 48\,\Omega$$

(ii) For S_1 and S_3 closed

– Current in C

$V = IR\ (Ohm's\ Law)$

$$\therefore I = \frac{V}{R} = \frac{240\,V}{48\,\Omega} = 5\,A$$

– Current in A and B

$$V = IR\ (Ohm's\ Law)$$

$$\therefore I = \frac{V}{R} = \frac{240\,V}{96\,\Omega} = 2.5\,A$$

(iii) Power across A for S_1, S_2, S_3 closed

$$P_A = I^2R = 5^2 \times 48 = 1200\,W = 1.2\,KW$$

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For visually impaired students

A.

(i) In household circuits, the fuse is connected in series with all appliances to ensure that it can cut off the entire circuit in case of excessive current, preventing hazards like fires or damage. This way, any overload or short circuit causes the fuse to blow, protecting all appliances.
Appliances are connected in parallel to ensure each receives the same voltage from the mains and can operate independently. This setup allows appliances to work simultaneously and efficiently, with each drawing only the current it needs, without affecting others.

Give Data:

- Power of heater, P_{heater} = 1500 W
- Power of Fan, P_{fan} = 500 W

- Supply Voltage, V = 220 V
- Fuse rating = 10 A

Step 1: Calculate the Current Drawn by Each Appliance

Using the formula = $I = \frac{P}{V}$:

1. Current drawn by the heater:

$$I_{\text{heater}} = \frac{P_{\text{heater}}}{V} = \frac{1500\,\text{W}}{220\,\text{V}}$$

I_{heater} = 6.82 A (rounded to two decimal places)

2. Current drawn by the fan:

$$I_{fan} = \frac{P_{fan}}{V} = \frac{500\ W}{220\ V}$$

I_{fan} = 2.27 A (rounded to two decimal places)

Step 2 : Calculate the total curent in the circuit

Since the heater and fan are connected in parallel, the total curent I_{total} is the sum of the currents through each appliance:

$$I_{\text{total}} = I_{\text{heater}} + I_{\text{fan}}$$

$$I_{\text{total}} = 6.82\,\text{A} + 2.27\,\text{A}$$

$$I_{\text{total}} = 9.09\,\text{A}$$

Step 3: Compare with the Fuse Rating
The fuse is rated for 10 A, and the total current drawn by the heater and fan together is 9.09 A.

Since 9.09 A < 10 A, the fuse will not blow and is appropriate for this circuit, as the total current is within the fuse's capacity.

OR

B.

Given data:

- Resistor R_1 = 6 Ω
- Resistor R_2 = 12 Ω
- Voltage V = 24 V
- Time t = 5 Minutes = 5 x 60 = 300 seconds

Step 1: Calculate the Current through each Resistor

Since the resistors are connected in parallel, the voltage across each resistor is the same as the battery voltage, V = 24 V.

Using Ohm's Law, $I = \frac{V}{R}$:

Current through R_1

$$I_1 = \frac{V}{R_1} = \frac{24\,\text{V}}{6\,\Omega} = 4\,\text{A}$$

Current through R_2:

$$I_2 = \frac{V}{R_2} = \frac{24\,\text{V}}{12\,\Omega} = 2\,\text{A}$$

Step 2: Calculate the Heat Generated in Each Resistor

Using Joule's Law of Heating, $H = I^2Rt$:

- Heat generate in R_1:

$$H_1 = I_1^2 \times R_1 \times t = (4\,\text{A})^2 \times 6\,\Omega \times 300\,\text{s}$$

$$H_1 = 16 \times 6 \times 300 = 28800\,\text{J}$$

- Heat generate in R_2:

$$H_2 = I_2^2 \times R_2 \times t = (2\,\text{A})^2 \times 12\,\Omega \times 300\,\text{s}$$

$$H_2 = 4 \times 12 \times 300 = 14400\,\text{J}$$

- Total Heat Generated *H:*

$$H_{\text{total}} = H_1 + H_2 = 28800\,\text{J} + 14400\,\text{J} = 43200\,\text{J}$$

So, the total heat generated in both resistor is **43200 J.**

Step 3 : Determine if each Resistor is safe

The power dissipated by each resistor can be calculated using $P = V \times I$

- Power dissipated by R_1 :

$$P_1 = V \times I_1 = 24\,\text{V} \times 4\,\text{A} = 96\,\text{W}$$

- Power dissipated by R_2:

$$P_2 = V \times I_2 = 24\,\text{V} \times 2\,\text{A} = 48\,\text{W}$$

Given that the power rating of each resistor is 100 W:

- R_1 is operating at 96 W, which is within the 100 W limit. Hence, it is safe.
- R_2 is operating at 48 W, which is also within the 100 W limit. Hence, it is safe.

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