CASE STUDY

QUESTION 36

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TGT(Maths)
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Aditya decided to complete his Physics Project. He purchased three resistors 5 Ω, 10 Ω and 30 Ω from the shop. Later he purchased a 6 V battery, switch (which works as key) and an ammeter to complete his circuit as shown below:
(i) Find the current through 5 Ω.
(a) 1.2 A  (b) 1.5 A  (c) 1 A  (d) 2 A

Current through 5Ω

\[ I_1 = \frac{V}{R_1} = \frac{6}{5} = 1.2 \text{ A}. \]

(ii) Find the current through 10 Ω.
(a) 0.6 A  (b) 0.2 A  (c) 1 A  (d) 0.5 A

Current through 10 Ω

\[ I_2 = \frac{V}{R_2} = \frac{6}{10} = 0.6 \text{ A}. \]
(iii) Find the current through 30 Ω.
(a) 0.6 A    (b) 0.2 A    (c) 1 A    (d) 0.5 A

Current through 30 Ω

\[ I_3 = \frac{V}{R_3} = \frac{6}{30} = 0.2 \text{ A.} \]

(iv) Find the total current in the circuit.
(a) 1.2 A    (b) 1.5 A    (c) 1 A    (d) 2 A

The total current through the circuit is

\[ I = I_1 + I_2 + I_3 \]
\[ = 1.2 + 0.6 + 0.2 = 2 \text{ A.} \]
(v) Find the total resistance of the circuit.
(a) 2 Ω  (b) 4 Ω  (c) 3 Ω  (d) 5 Ω

\[
\frac{1}{R_p} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3}
\]

\[
= \frac{1}{5} + \frac{1}{10} + \frac{1}{30}
\]

\[
= \frac{6 + 3 + 1}{30} = \frac{10}{30} = \frac{1}{3}
\]

\[\therefore R_p = 3 \, \Omega\]
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