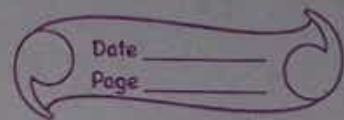


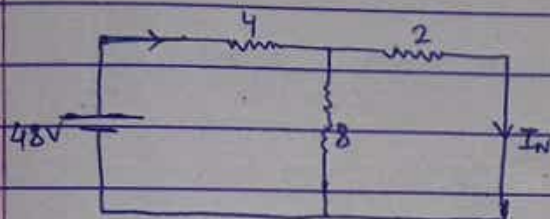
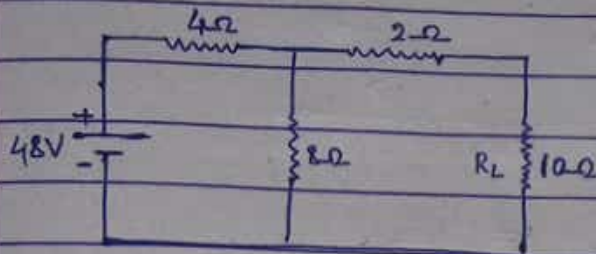
NAME: Himanshu Dixit

BATCH: B10

ENROLL NO.: 21103262

Electrical Science - I (ISB/IEC/III)Tutorial - 6

Q.1.

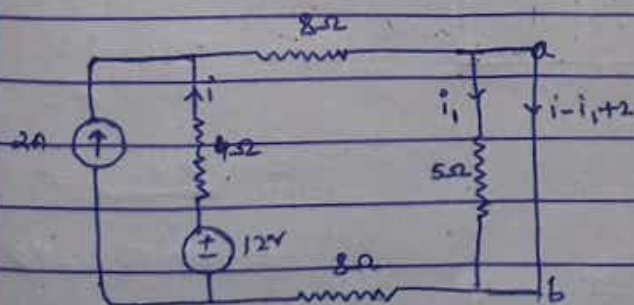
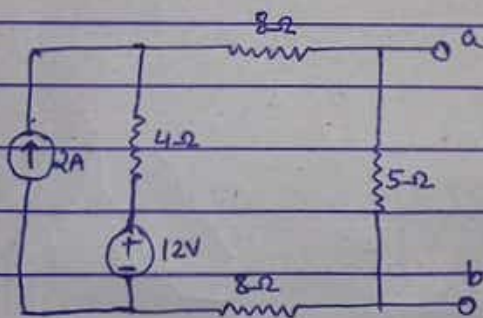


$$R_{\text{net}} = 4 + \frac{8 \times 2}{10} = \frac{28}{5} \Omega$$

$$i = \frac{48 \times 5}{28} = \frac{240}{28} \text{ A}, \quad V_2 = 48 - 4 \times \frac{240}{28} = \frac{384}{28}$$

$$I_N = \frac{384}{28} \times \frac{1}{2} = \frac{192}{28} = \frac{192}{28} = 6.85 \text{ A}$$

Q.2.



$$12 - 4i - 8(i+2) - 5(i-i_1+2) - 8(i+2) = 0$$

$$12 - 2i - 8i_1 - 20 = 0$$

$$\Rightarrow 5i_1 - 30 = 0$$

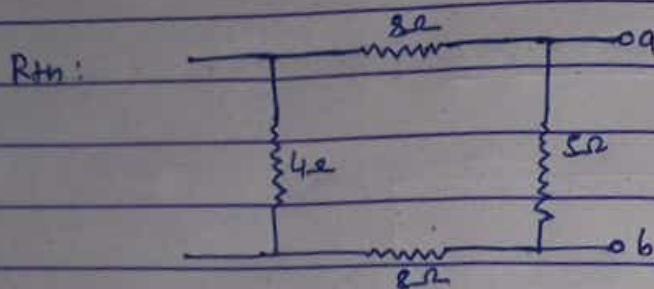
$$i_1 = \frac{6}{5} \text{ A}$$

$$-4i - i_1 = 4 \quad \text{--- (1)}$$

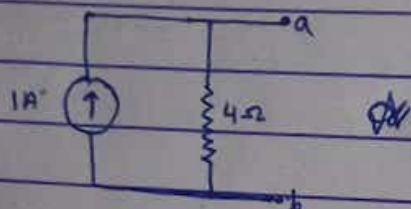
$$5i_1 = 0 \quad \therefore i = -1 \text{ A}$$

$$i_1 = 0$$

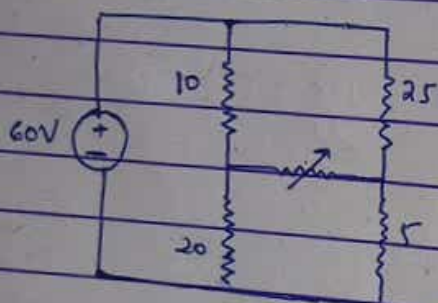
$$I_N = i_{+2} = 2 - 1 = 1A$$



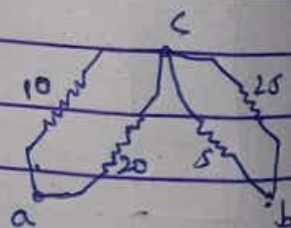
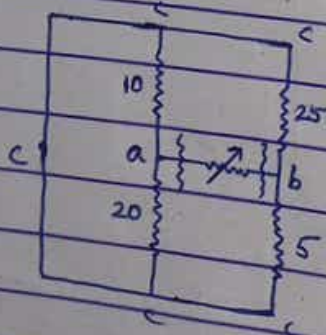
$$R_{th} = \frac{4 \times 2 \times 5}{2 \times 5 + 4 \times 5} = 4\Omega$$



Q.3.



for R_{th}

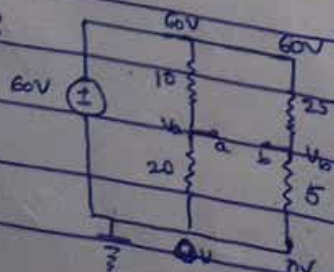


$$R_{th} = \frac{10 \times 20}{10 + 20} + \frac{25 \times 5}{25 + 5}$$

$$= \frac{40 + 25}{6} = \frac{65}{6} \Omega$$

$$= 10.833 \Omega$$

for V_{th} :



$$\frac{V_a - 60}{10} + \frac{V_a}{20} = 0$$

$$2V_a - 120 + V_a = 0$$

$$V_a = 40V$$

$$\frac{V_b - 60}{25} + \frac{V_b}{5} = 0$$

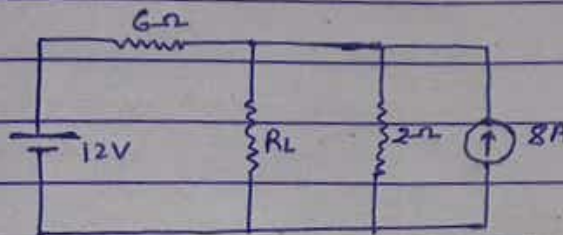
$$V_b - 60 + 5V_b = 0$$

$$V_b = 10V$$

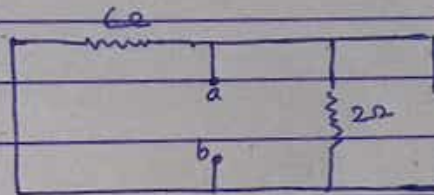
$$V_{th} = V_{ab} = V_a - V_b = 30V$$

$$P_{max} = \frac{V_{th}^2}{4R_{th}} = \frac{30^2 \times 6}{4 \times 65} = 20.76 \text{ watt}$$

Q.4.



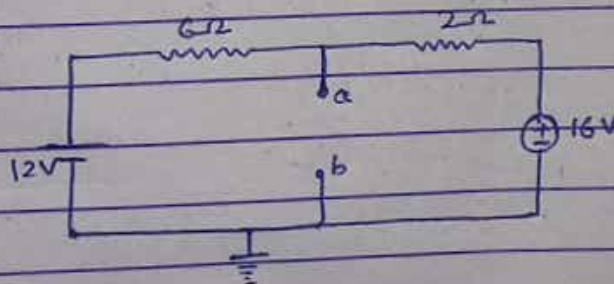
R_{th} :



Max. power is transferred to load :

$$R_L = R_{th} = \frac{36 \times 8}{8^2 + 2} = 1.5 \Omega$$

Q.5.



$$\frac{V_a - 12}{6} + \frac{V_a - 16}{2} = 0 \quad \therefore V_a = 15$$

$$V_{th} = V_a - V_b = 15V$$

$$P_{max} = \frac{(15)^2}{4 \times 3} = \frac{5 \times 15}{2} = 37.5 \text{ watt}$$