Assignment 1

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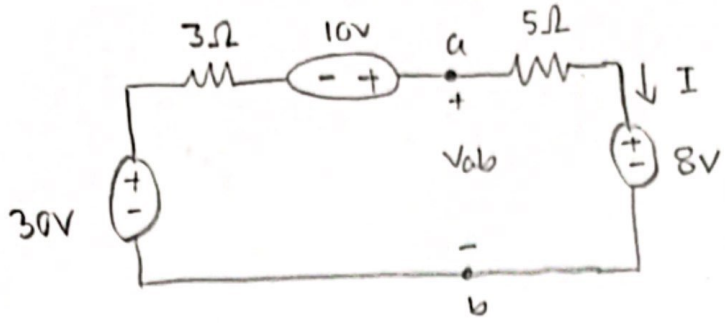
Sec - 13

CSE 250

Qus - 1



KVL,

$$-30 + 3I - 10 + 5I + 8 = 0$$

$$\Rightarrow -32 + 8I = 0$$

$$\therefore I = 4\ A$$

(Ans)

Voltage difference at Vab,

$$-30 + 3I - 10 + V_{ab} = 0$$

$$\Rightarrow -40 + 3(4) + V_{ab} = 0$$

$$\therefore V_{ab} = 28V$$

(Ans)

$P_{30V} = -VI$

$= -(30)(4)$

$= -120W$

$\therefore P_{30V}$ is Power delivering.

$P_{8V} = -VI$

$= -(8)(4)$

$= -32W$

$\therefore P_{8V}$ is Power delivering

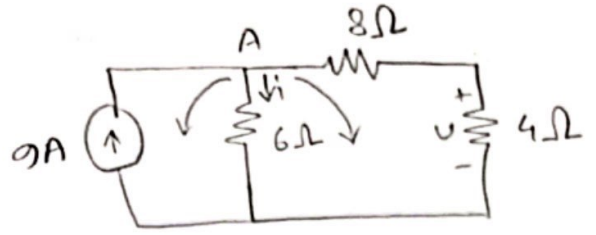
$P_{10V} = +VI$

$= 10 \times 4$

$= 40W$

$\therefore P_{10V}$ is Power absorbing.

Qus - 2



KCL,

$$-9 + \frac{V_a}{6} + \frac{V_a}{8+4} = 0$$

$$\Rightarrow \frac{2V_a + V_a}{12} = 9$$

$$\Rightarrow 3V_a = 108$$

$$\therefore V_a = 36\ V$$

Current, $i = \frac{V_a}{6\Omega} \Rightarrow \frac{36V}{6\Omega}$

$$\Rightarrow 6A$$

For Power of 8Ω,

$$I = \frac{V_a}{(8+4)\Omega} = \frac{36V}{12\Omega}$$

$$\Rightarrow 3A$$

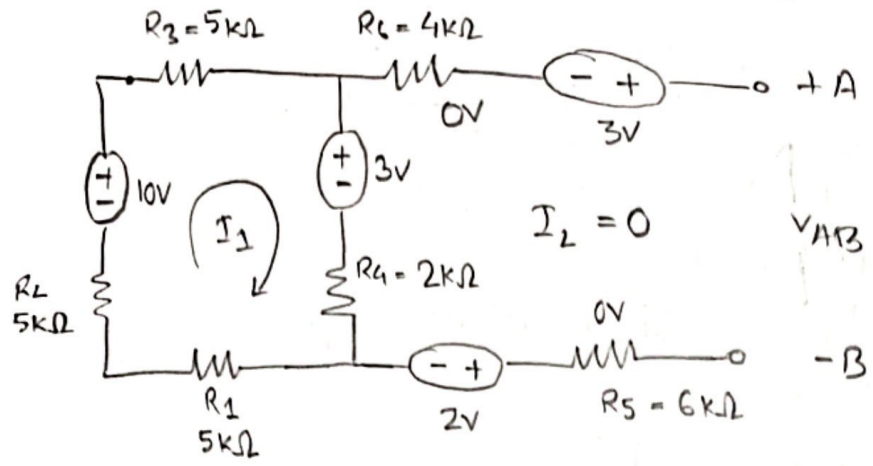
$$P_{8\Omega} = I^2R$$

$$= (3)^2 \times 8$$

$$= 72W$$

(Ans)

Qus - 3



KVL in 1st loop.

$$5I_1 + 5I_1 - 10 + 5I_1 + 3 + 2I_1 = 0$$

$$\Rightarrow 17I_1 = 7$$

$$\therefore I_1 = 7/17 \text{ mA}$$

∴ As 2nd loop is opened, there will be no current flow. (Ans)

KVL at 2nd loop.

$$0 + 2 + 2(I_2 - I_1) - 3 + 0 - 3 + V_{AB} = 0$$

$$\Rightarrow -4 + 2(0 - 7/17) + V_{AB} = 0$$

$$\Rightarrow -4 - \frac{14}{17} + V_{AB} = 0$$

$$\therefore V_{AB} = 82/17 \text{ V}$$

(Ans)

$P_{3V} = -\Delta V I$

$= -3 \times (0 - \frac{7}{17})$

$= \frac{21}{17}$

$= 1.23 \text{ mW}$

$\therefore P_{3V}$ is Power absorbing.

$P_{10V} = -\Delta V I$

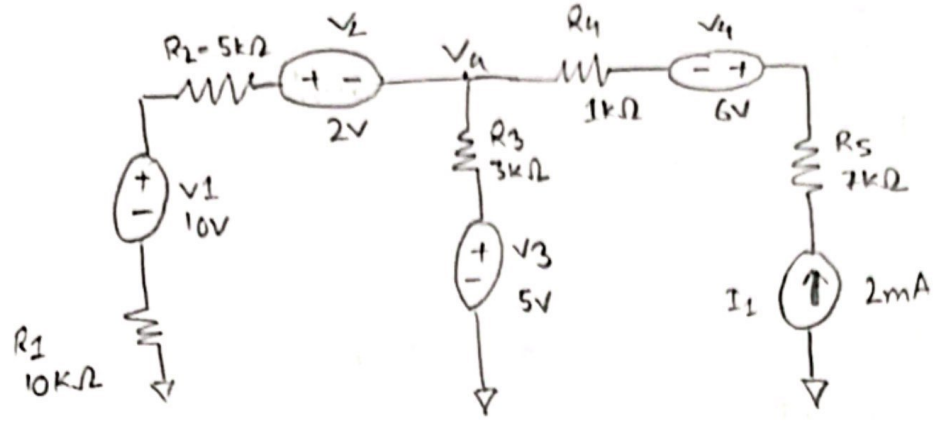
$= -10 \times (\frac{7}{17})$

$= -4.11 \text{ mW}.$

$\therefore P_{10V}$ is Power delivering.

(Ans)

Qus - 4



Applying KCL to V_A,

$$\frac{V_A - (-2) - 10}{5+10} + \frac{V_A - 5}{3} + (-2) = 0$$

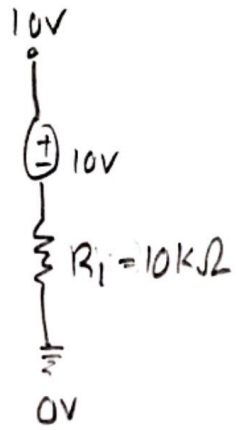
$$\Rightarrow \frac{V_A - 8}{15} + \frac{V_A - 5}{3} = 2$$

$$\Rightarrow \frac{V_A - 8 + 5V_A - 25}{15} = 2$$

$$\Rightarrow 6V_A = 63$$

$$\therefore V_A = 63/6$$

$$= 10.5\ V \quad \text{(Ans)}$$



$$I = \frac{10V}{10k\Omega}$$

$$= 1mA$$

$$P_{10k\Omega} = I^2R$$

$$= (1 \times 10^{-3})^2 \times (10 \times 10^3)$$

$$= 0.01\ mW$$

(Ans)

For V_3,

$$I = \frac{5V}{3k\Omega}$$

$$= 1.67\ mA$$

$$P_{V3} = \Delta V I$$

$$= 5 \times (1.67)$$

$$= 8.35\ mW$$

(Ans)

For V_4,

$$\therefore I = -2mA$$

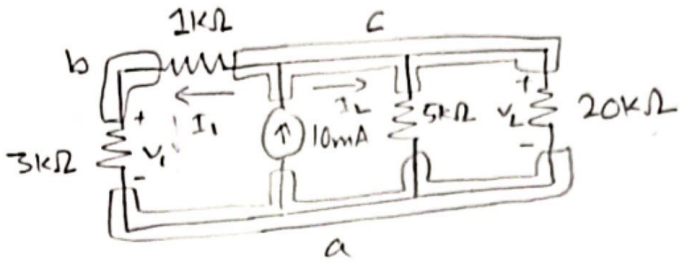
$$P_{V4} = -\Delta V I$$

$$= (-6)(-2)$$

$$= 12\ mW$$

(Ans.)

Qus - 5



we take node C,

$$\frac{V_c - 0}{1} + \frac{V_c - 0}{5} + \frac{V_c - 0}{20} - 10 = 0$$

$$\Rightarrow \frac{20V_c + 4V_c + V_c}{20} = 10$$

$$\Rightarrow 25 V_c = 200$$

$$\therefore V_c = 8V$$

(Ans)

V_1

V_2,

$$V_2 = \frac{V_c}{20k\Omega}$$

$$= \frac{8V}{200k\Omega}$$

$$\therefore V_2 = 0.04V.$$