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ELECTRICAL SCIENCE - I (15B11EC111)

Tutorial Sheet - 2

Q.1. Power supplied by the VCCS : $i_d V_d$

$\therefore \quad i_d = 4V_c = 4(-2) = -8\,A$

$V_d = 2$ Volt

$P_{VCCS} = -8 \times (2 \cdot 2) = -17.6$ watt $\quad \therefore$ Power = 17.6w

Q.2. (a) Current in R : $i = \frac{V_s}{R} = \frac{15}{5} = 3A$

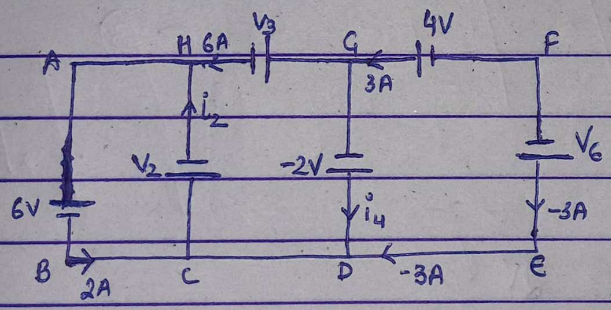
Power absorbed by resistor : $P = i^2R = 9 \times 5 = 45$ watt

(b) Since neither V_s & nor R change and their is no effect in 'i' in R by changing is.

$\therefore \quad i = 3A$

$P = 45w$

Q.3.



By KVL :

In ABCHA : $-6 - V_2 = 0$

$V_2 = -6V$

In CDGHC : $+2 - V_3 + V_2 = 0$

$V_3 = 2 - 6 = -4V$

In DEFGD : $-V_6 + 4 - 2 = 0$

$V_6 = 2V$

By KCL :

In node C : $i_2 = i_4 - 3 + 2$

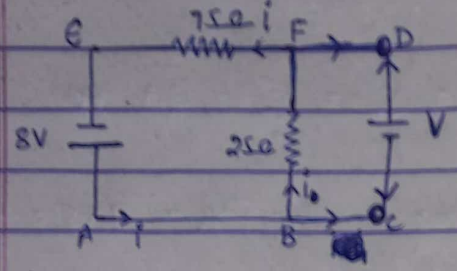
$i_2 = i_4 - 1$ — (1)

In node G : $3 = G + i_4$ — (2)

$i_4 = -3A$

$i_2 = -4A$

Q.4.



In ABFEA : $-25i_0 - 75i + 8 = 0$

$25i + 75i = 8$ — (1) $\therefore i = \frac{8}{100}$ A

In BCDFB : $V + 25i = 0$

$V = -25i$ — (2)

In ABCDFEA : $V - 75i + 8 = 0$

$V - 75i = -8$ — (3)

$25i - 75i = -8$

$i = \frac{-8}{-50} = \frac{4}{25}$ A

$V = 25i = 8V$

Q.5. (a) $R_{net} = 100 + 400 + 300 = 800\Omega$

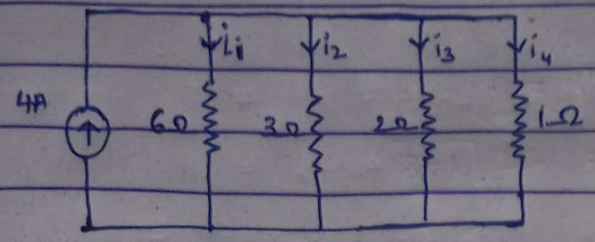
$i_{net} = \frac{V}{R_{net}} = \frac{12}{800} = \frac{3}{200}$ A

$V_2 = i_{net} R_2 = \frac{3}{200} \times 400^{2} = 6V$

(b) $V_2 = -V_b$ (circuit are similar but Voltage are opp.

$\therefore V_b = -6V$

Q.6:



$$\frac{1}{R_{net}} = \frac{1}{1} + \frac{1}{2} + \frac{1}{3} + \frac{1}{6}$$

$$R_{net} = \frac{6}{6+3+2+1} = \frac{1}{2}\Omega$$

Current division : $I_x = \frac{R_{net} \times I_s}{R_x}$

$$i_1 = \frac{\frac{1}{2} \times 4}{6} = \frac{1}{3} A = 0.333 A$$

$$i_2 = \frac{\frac{1}{2} \times 4}{3} = \frac{2}{3} A = 0.666 A$$

$$i_3 = \frac{1/2 \times 4}{2} = 1A$$

$$i_4 = \frac{1/2 \times 4}{1} = 2A$$