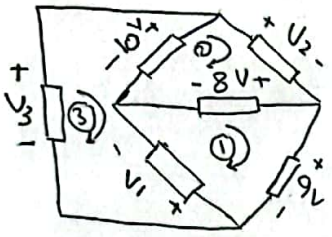
Sheet 1 Solution

1 loops = 7
mesh = 3

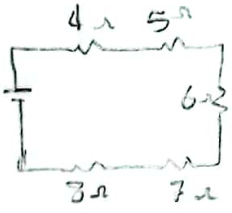
2
by using KVL



at loop ①
$-9 - V_1 + 8 = 0$
$V_1 = -1$ volt
at loop ②
$-8 + 10 - U_2 = 0$
$U_2 = 2$ volt
at loop ③
$U_3 - 10 + V_1 = 0$ (-1)
$U_3 = 11$ volt

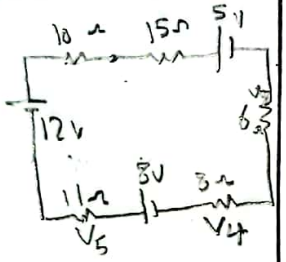
3 $P = VI$
$\therefore I = \frac{P}{V} = \frac{6}{15} = 0.4\ A$
$R = \frac{V}{I} = \frac{15}{0.4} = 37.5\ \Omega$
$R_t = 8 + 37.5 = \frac{120}{0.4} = 300\ \Omega$ ← Total resistance

4 by using voltage divider



$V_{6\Omega} = 90 * \frac{6}{4+5+6+7+8}$
$V_{6\Omega} = 18$ volt

5 by using voltage divider

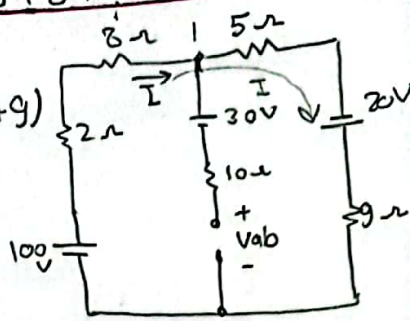


$V_t = 12 - 5 + 8$
$= 15$ volt

$V_4 = 15 * \frac{8}{6+8+11+10+15} = 2.4v$

$V_5 = 15 * \frac{11}{6+8+11+10+15} = 3.3v$

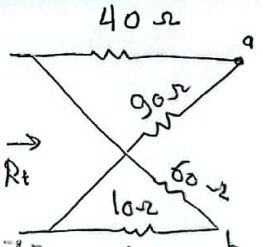
6



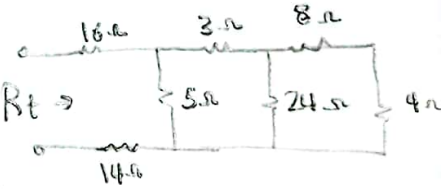
$100 - I(2+8+5+9) + 20 = 0$
$I = \frac{120}{24} = 5A$
$100 - (2+8)*5 = 30 + V_{ab}$
$50 = 30 + V_{ab}$
$V_{ab} = 20$ volt

7 $R_p = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}$
$R_p = \frac{1}{1} + \frac{1}{0.5} + \frac{1}{0.25} + \frac{1}{0.125} = 15$
$R_t = \frac{1}{R_p} = \frac{1}{15}\ \Omega$
$G = \frac{1}{R_t} = 15\ \mho\ (S)$

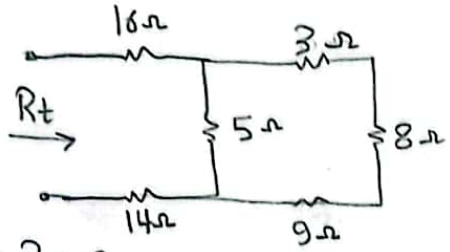
8



$40 + 90 = 130$
$60 + 10 = 70$
$(130 // 70) = \frac{130 * 70}{130 + 70} = 45.5\ \Omega$

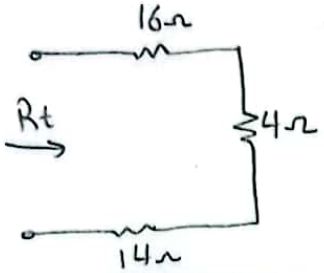


$8 + 4 = 12\ \Omega$
$(12 // 24) = \frac{12 * 24}{12 + 24} = 8\ \Omega$



$9+8+3 = 20\Omega$

$20 // 5 = \frac{20*5}{20+5} = 4\Omega$



$Rt = 16+4+14$

$= 34\Omega$

(9) using current divider To Find I_1, I_2

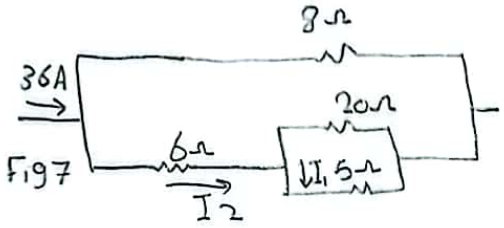
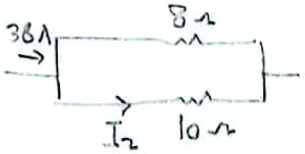


Fig 7

To Find I_2



$I_2 = 36 * \frac{8}{8+10}$

$= 16\ A$

From fig 7

$I_1 = 16 * \frac{20}{20+5} = 12.8\ A$