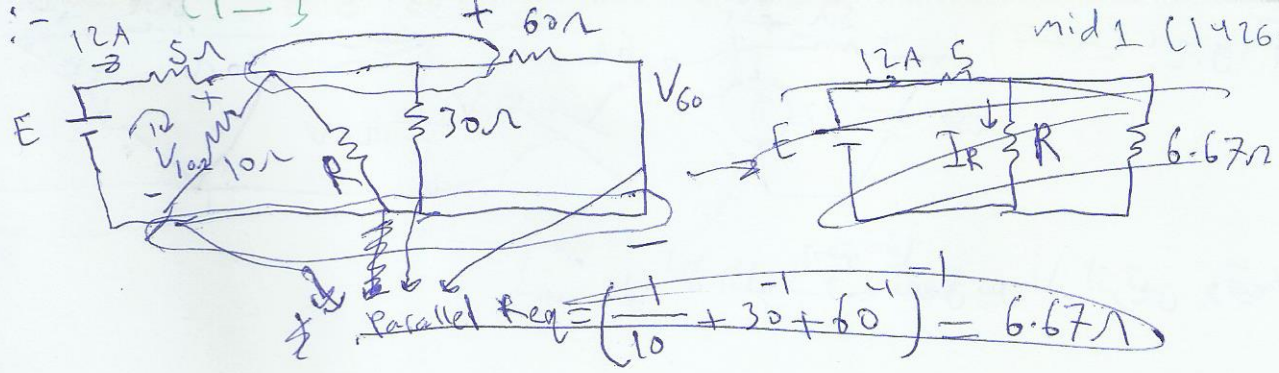


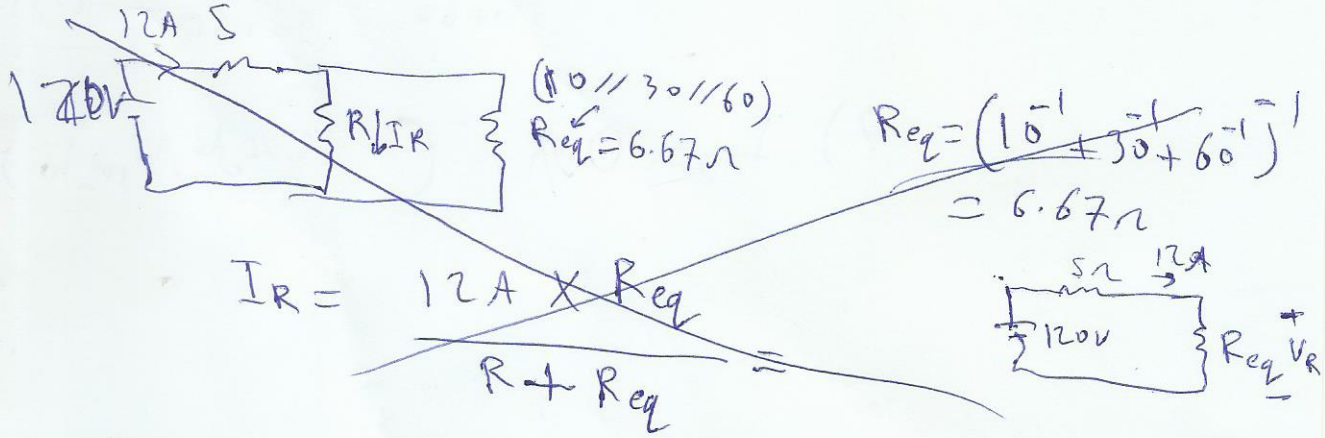
Parallel $R_{eq} = \left(\frac{1}{10} + 30^{-1} + 60^{-1}\right)^{-1} = 6.67\Omega$

$$P_{60\Omega} = \frac{V_{60}^2}{R_{60\Omega}} \rightarrow V_{60} = \sqrt{P_{60}\,60} = \sqrt{60(60)} = 60V$$

$$V_{60\Omega} = V_{30\Omega} = V_R = V_{10\Omega} = 60V$$

Kirchof loop: $E = I(5) + V_{10\Omega} = 12 \times 5 + 60 = 120V$

1) $E = 120V$



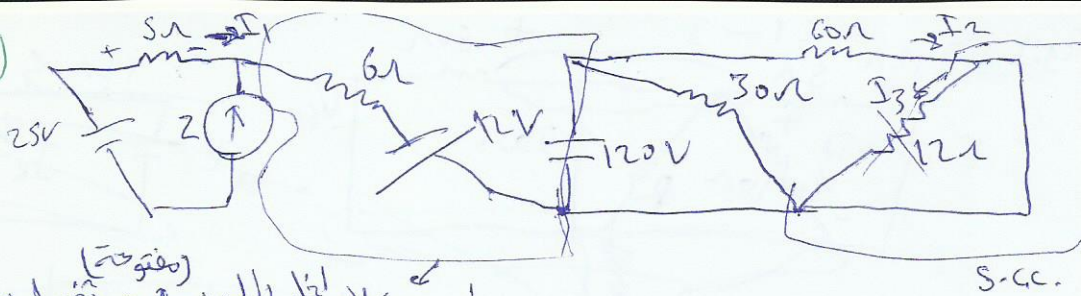
$$I_R = \frac{12A \times R_{eq}}{R + R_{eq}} =$$

$$R_{eq} = (10^{-1} + 30^{-1} + 60^{-1} + R^{-1})^{-1} = \frac{V_R}{I} = \frac{60}{12} = 5\Omega$$

2) $R = 20\Omega$: [illegible]

3) $P_{10\Omega} = \frac{V_{10\Omega}^2}{R} = \frac{60^2}{10} = 360\,W$

Fig.2: (4-7)



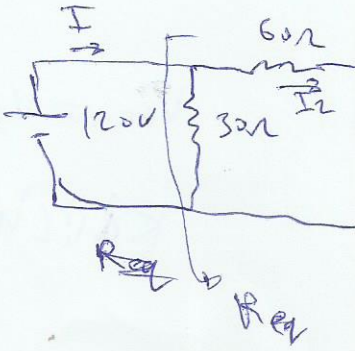
ليست (مفتوحة) تفصل بين الدائرتين وقيمة التيار فيها 0

4) $P_{12V} = 0\ W$

5) $I_1 = -2A \rightarrow$ (current supply عكس اتجاه)

6) ~~$I_2 =$~~

$$R_{eq} = \frac{60 \times 30}{60+30} = \frac{60 \times 30}{90} = 20\Omega$$

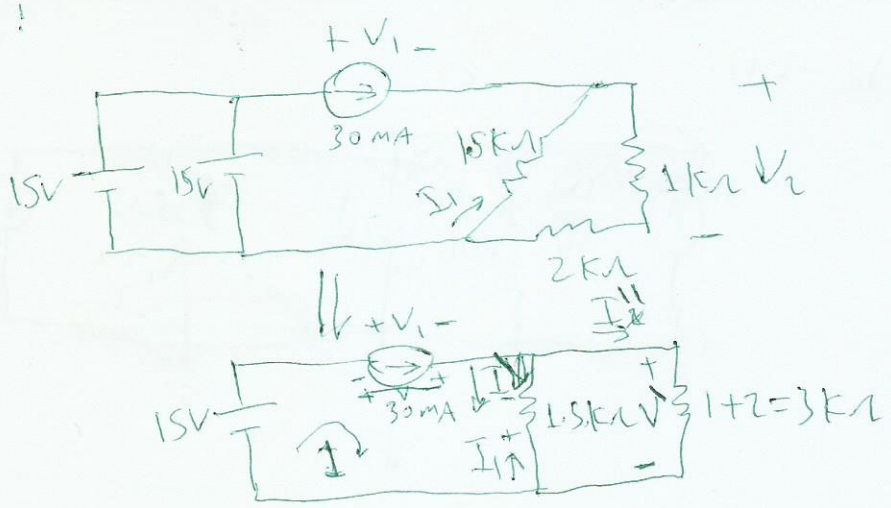


$$I = \frac{V}{R_{eq}} = \frac{120}{2} = 60A$$

6) $$I_2 = \frac{30I}{30+60} = \frac{30 \times 60}{30+60} = 2A$$

7) $I_3 = 0A$ (ما يمر تيار على 12Ω)

Fig. 3: (8 – 11):



8) $I_1 = -I' = \dfrac{-30mA \times 3k}{1.5k + 3k} = -0.02A = -20\,mA$

V. Kirchuf loop: $15 - V_1 + 1.5k I_1 = 0$

$15 = V_1 - 1.5k I_1$

$15 = V_1 - 30m \times 1.5k$

9) $\rightarrow V_1 = 15 + 1.5k(-20m) = -15\,V$

10) $I'' = 30m - 20m = 10\,mA$

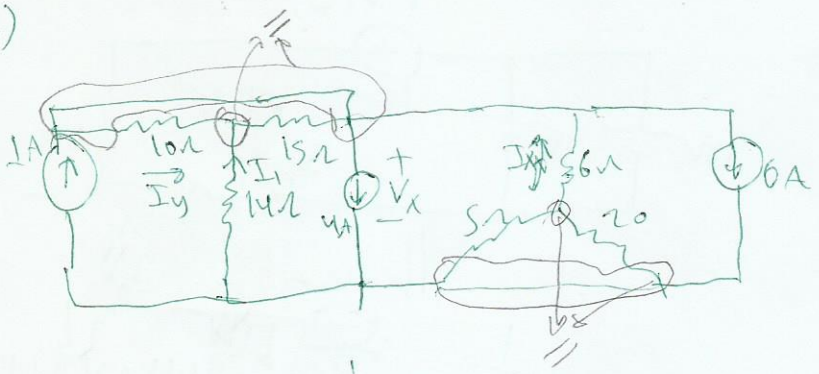
$V_2 = 1k\, I'' = 1k \times 10mA = 10\,V$

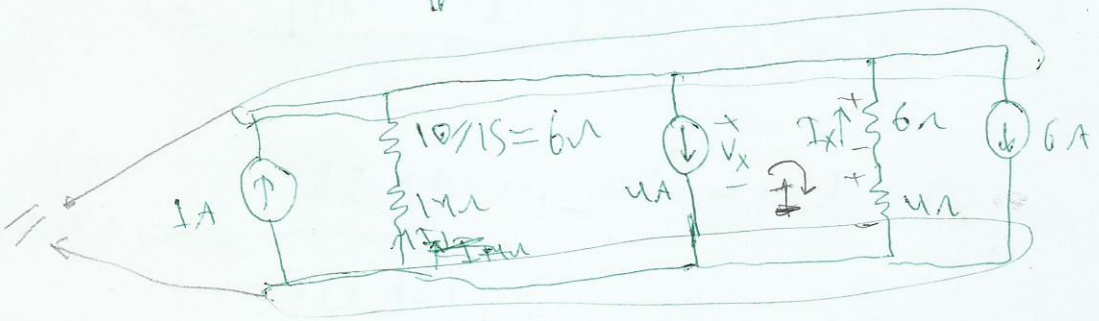
11) $V_{30mA} = -V_1$

$P_{30mA} = I V_{30mA} = 30m \times 15 = 450\,mW$

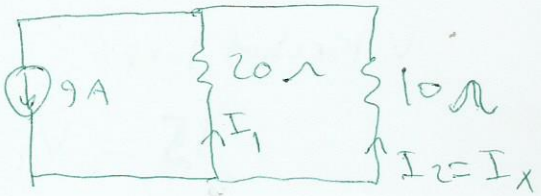
$= 0.45\,W$

fig.4) (12 - 14)





1A − 4A − 6A = −9A



$I_1 = \frac{9 \times 10}{10+20} = 3A$, $I_x = 9 - 3 = 6A$

↑ :

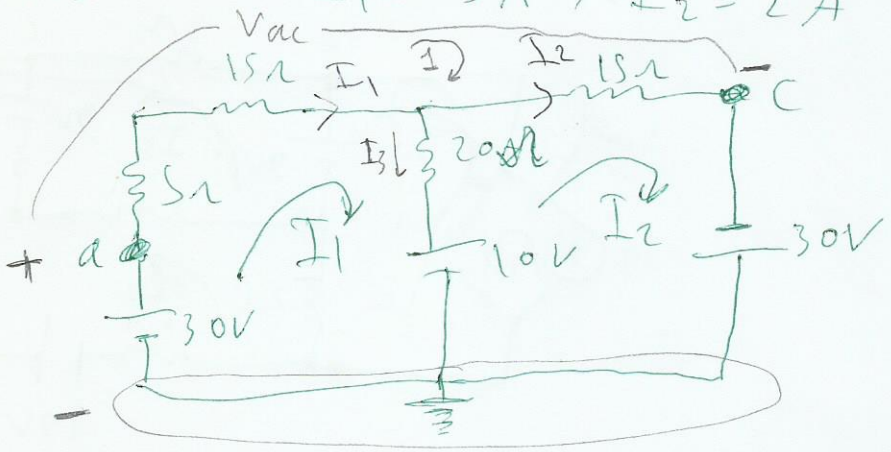
$$V_x - (6\Omega I_x + 4 I_x) = 0$$

12) $V_x = 10 I_x = 60\ V$

13) $I_x = 6A$

14) $I_d = I_1 \times \frac{15\Omega}{15\Omega + 10\Omega} = 3 \times \frac{15}{25} = 1.8A$

Fig 5 : (15-17) $I_1 = 1.5\,A$, $I_2 = 2\,A$



15. $V_a = V_{a\text{-ground}} = 30\,V$

16. $V_{ac} = ?$

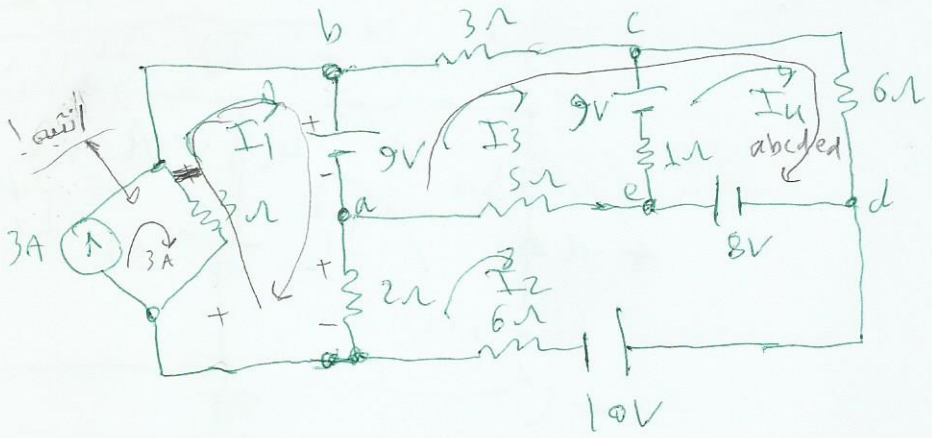
by using V. Kir. loop 1:

$$V_{ac} = (5\Omega + 15\Omega)I_1 + 15I_2$$
$$= 20 \times 1.5 + 15 \times 2$$
$$= 60\,V$$

17. $P_{20\Omega}$:

$$P = I^2R$$
$$P_{20\Omega} = I_3^2 \times 20 \qquad : I_3 = I_1 -$$
$$= (-0.5)^2 \times 20 = 5\,W \qquad = -0$$

Fig 6 : (18-20):



18.

$$(3\Omega + 2\Omega)I_1 - 2I_2 + 9V - (3A \times 3\Omega) = 0$$

$$\rightarrow 5I_1 - 2I_2 = -9 + 9 = 0$$

$$\Rightarrow 5I_1 - 2I_2 = 0$$

19.

$$-2I_1 + (2+5+6)I_2 - 5I_3 + 8 =$$

$$\rightarrow -2I_1 + 13I_2 - 5I_3 = -18$$

20.

$$-9V + 3I_3 + 6I_4 + 5(I_3 - I_2) =$$

$$= -5I_2 + 8I_3 + 6I_4 = 17$$