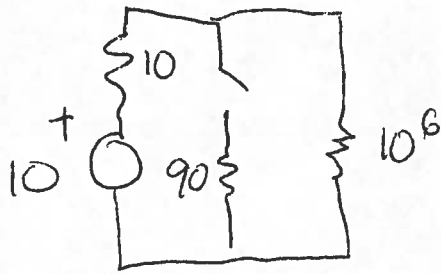


EE 3 Quiz 1 Solution W'13

1. a)



With the switch open, we have 10Ω in series with $10^6\Omega \approx 10^6\Omega$.

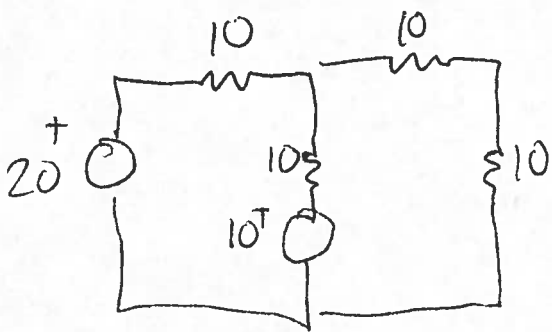
Thus the meter reads 10V.

b) 90Ω parallel to $10^6\Omega \approx 90\Omega$.

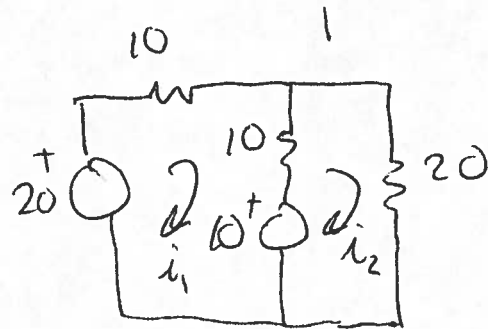
Thus we have a series resistance of 100Ω

$\frac{90}{100} \times 10V = 9V$ is read by the meter.

2.



\equiv



Using mesh eq'ns,

$$10 = 20i_1 - 10i_2 \quad (1)$$

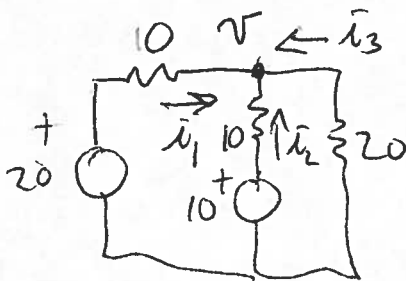
$$10 = -10i_1 + 30i_2 \quad (2)$$

adding 3x eq'n (1) to (2),

$$40 = 50i_1$$

$$i_1 = 4/5$$

or we may use node equations



$$v = 20 - 10\bar{i}_1 = 10 - 10\bar{i}_2 = -20\bar{i}_3$$

$$\therefore -20\bar{i}_3 = 20 - 10\bar{i}_1; \quad \bar{i}_3 = \frac{1}{2}\bar{i}_1 - 1$$

$$10\bar{i}_2 = 10 - 20 + 10\bar{i}_1; \quad \bar{i}_2 = \bar{i}_1 - 1$$

$$\bar{i}_1 + \bar{i}_2 + \bar{i}_3 = 0 \text{ by KCL}$$

$$\bar{i}_1 + \bar{i}_1 - 1 + \frac{1}{2}\bar{i}_1 - 1 = 0; \quad 2.5\bar{i}_1 = 2$$

$$\bar{i}_1 = 4/5$$