ENGR 065: HW #4

c) $R_2 = 100k\Omega$
$R_m = 100k\Omega$
$R_s = 10k\Omega$
$R_1 = 20k\Omega$

$$V_o = (V_s)\left[\frac{(R_2 \| R_m)}{R_s + R_1 + (R_2 \| R_m)}\right]$$

$$V_o = (40)\left[\frac{(100k \| 100k)}{10k + 20k + (1k \| 100k)}\right]$$

$R_2 = 100k\Omega$
$R_s = 10k\Omega$
$R_1 = 20k\Omega$

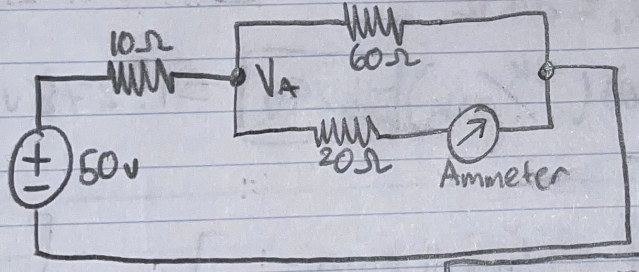
$$V_o = (40)\left(\frac{100k}{10k + 20k + 100k}\right)$$

$$= (40)\left[\frac{\frac{(100k)(100k)}{100k + 100k}}{30k + \left(\frac{(100k)(100k)}{100k + 100k}\right)}\right] \Rightarrow (40)\left(\frac{50k}{30k + 50k}\right)$$

$$= 40\left(\frac{50}{80}\right)$$
$$= 25V$$

$$= (40)\left(\frac{100k}{130k}\right) = 30.769V$$

2.- a)



ideally it has ∅ internal resistance

$$\frac{V_A - 50}{10} + \frac{V_A}{60} + \frac{V_A}{20} = 0$$

$$\frac{6V_A - 300 + V_A + 3V_A}{60} = 0$$

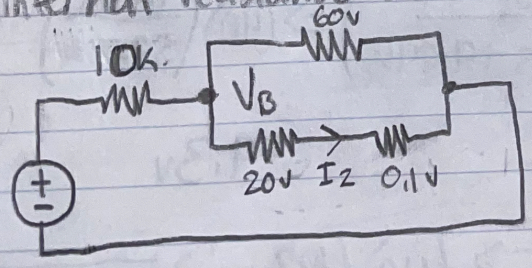
$$10V_A - 300 = 0$$

$$V_A = 300/10 = 30V$$

$$V_A = 30V$$

$$I_1 = V_A/20 = 30/20 = 1.5A = I_1$$

b) using a real ammeter with an internal resistance 0.1Ω



$$\frac{V_B - 50}{10} + \frac{V_B}{60} + \frac{10V_B}{20} = 0$$

$$\frac{402V_B - 20100 + 67V_B + 200V_B}{4020} = 0$$

$$\Rightarrow \frac{669V_B}{669} = \frac{20100}{669} = 30.044$$

$$I_2 = V_B/20.1 \Rightarrow 30.044/20.1 = 1.493A$$