

ch 10 and ch 11 Homework Solution

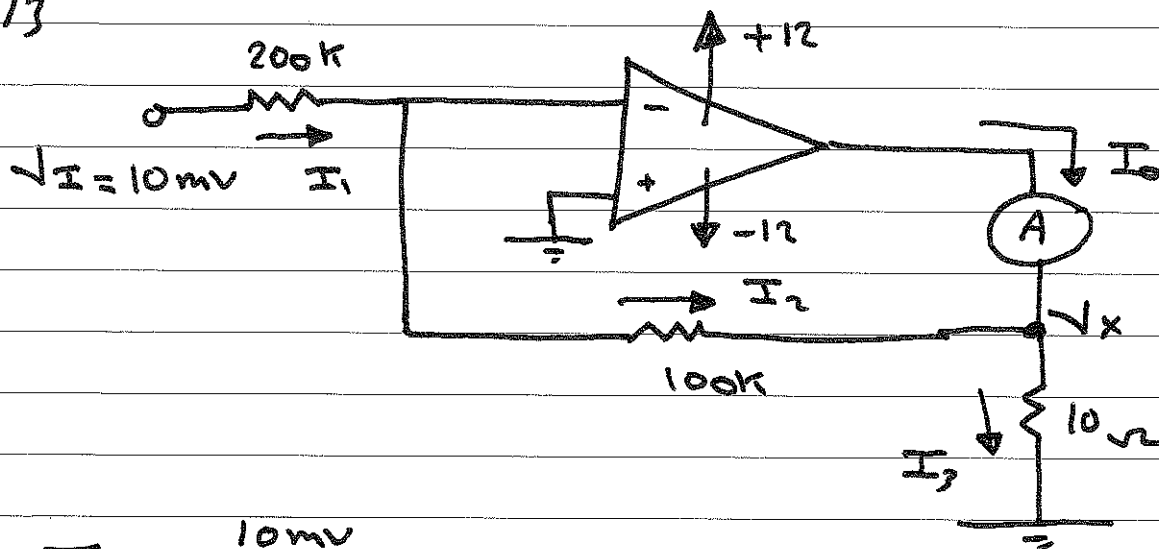
$$10.13 \quad V_2 = - \frac{200k}{20k} (0.2V) = - 2V$$

$$V_3 = \left(1 + \frac{200k}{10k}\right) (0.2V) = 4.2V$$

$$10.14 \quad V_o = - \left[\frac{100k}{10k} (0.1V) + \frac{100k}{20k} \left(1 + \frac{400k}{20k}\right) (0.1V) \right]$$

$$V_o = -1 - 10.5 = -11.5V$$

11.13



$$I_1 = \frac{10mV}{200k}$$

$$I_2 = I_1$$

$$V_X = -100k I_2 = -5mV$$

$$I_3 = \frac{V_X}{10\Omega} = -0.5mA$$

$$I_o = I_3 - I_2 \approx -0.5mA$$

11.14

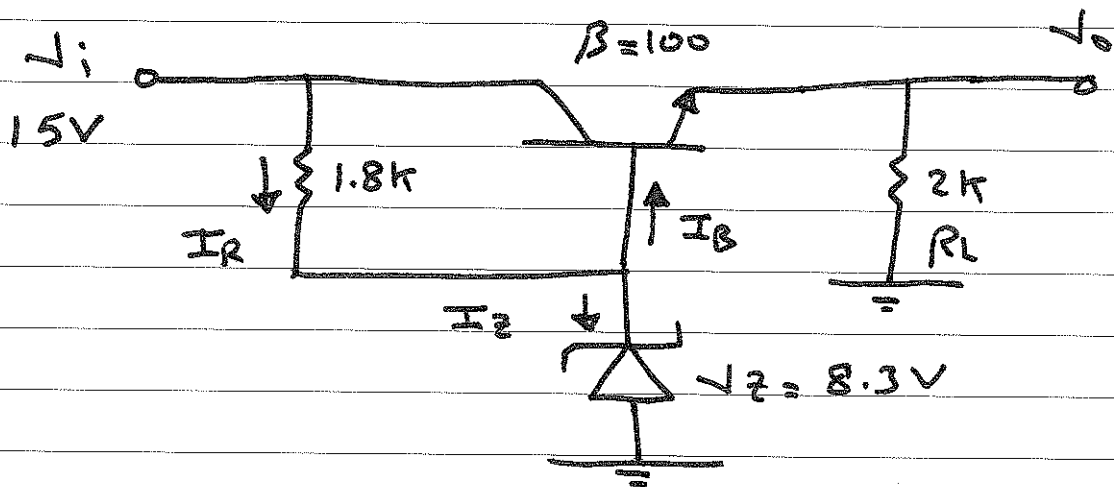
$$V_0 = \left(1 + \frac{2}{a}\right) (V_2 - V_1)$$

$$a = \frac{1}{5} = 0.2 ; V_2 = 1V ; V_1 = 3V$$

$$\therefore V_0 = 11 (V_2 - V_1)$$

$$V_0 = -22V$$

15.19



$$V_o = V_{EB} + V_Z = 8.3 - 0.7 = 7.6V$$

$$I_L = \frac{V_o}{R_L} = \frac{7.6}{2k} = 3.8mA$$

$$I_B = \frac{I_L}{\beta + 1} \approx 38\mu A$$

$$I_R = \frac{V_i - V_Z}{1.8k} = 3.7mA$$

$$I_Z = I_R - I_B = 3.66mA$$

15.21

$$V_o = V_Z \left(1 + \frac{12k}{8.2k} \right)$$

$$V_o = 24.6V$$

15.27

$$V_o = V_{reg} \left(1 + \frac{R_2}{R_1} \right) + I_{adj} R_2$$

$$= 1.25 \left(1 + \frac{1.5k}{0.22k} \right) + (100\mu A)(1.5k)$$

$$V_o = 9.9V$$