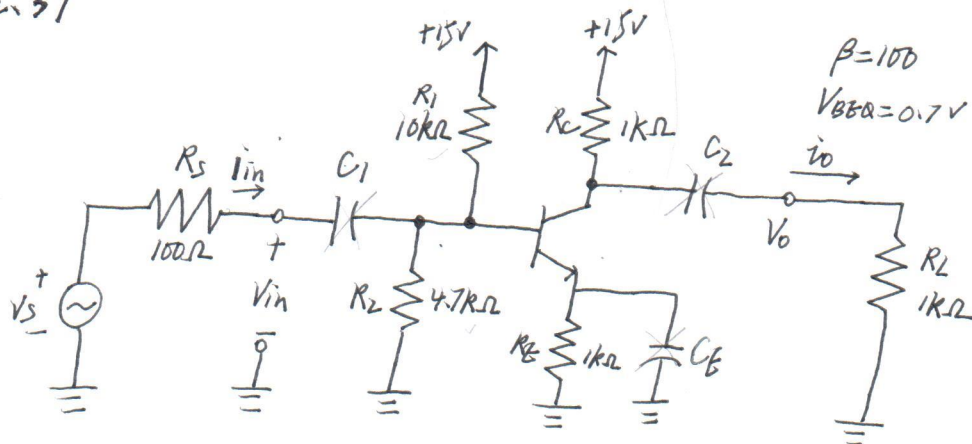
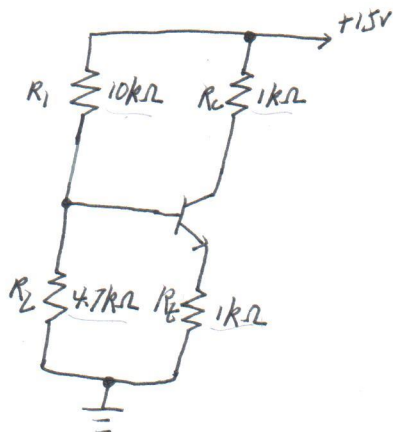


chapter 2

2.37



(a) dc circuit:



$$R_B = \frac{1}{1/R_1 + 1/R_2} = 3.20k\Omega$$

$$V_B = 15V \times \frac{R_2}{R_1 + R_2} = 4.8V$$

$$I_{BQ} = \frac{V_B - V_{BE}}{R_B + (\beta + 1)R_E} = 39.3\mu A \quad (\beta = 100)$$

$$I_{CQ} = \beta I_{BQ} = 100 \times 39.3\mu A = 3.93mA$$

$$r_{\pi} = \beta V_T / I_{CQ} = 662\Omega \quad (V_T \approx 0.026V)$$

(b) $R_L' = \frac{1}{1/R_L + 1/R_C} = 500\Omega$

$$A_v = \frac{V_o}{V_{in}} = -\frac{\beta R_L'}{r_{\pi}} = -76$$

$$A_{v0} = \frac{V_o}{V_{in}} = -\frac{\beta R_L'}{r_{\pi}} = -151$$

$$Z_{it} = r_{\pi}$$

$$Z_{in} = \frac{1}{1/R_B + 1/Z_{it}} = 549\Omega$$

$$A_{i0} = \frac{i_o}{i_{in}} = A_v \frac{Z_{in}}{R_L} = 41.7$$

$$G = A_{i0} A_v = 3169$$

$$Z_o = R_C = 1k\Omega$$

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