

國立彰化師範大學 98 學年度碩士班招生考試試題

系所：車輛科技研究所

科目：(丙) 電子學

☆☆請在答案紙上作答☆☆

共 2 頁，第 1 頁

1. (1) For the circuit in Fig. 1, derive an expression for the transfer function.

$$\frac{V_o(s)}{V_i(s)} = \frac{k}{1+(s/\omega_0)}; \quad \text{Find } k \text{ and } \omega_0. \quad (2) \text{ Determine } C_2 \text{ to obtain a 3-dB frequency of 1 kHz with}$$

$R_1=1\text{k}\Omega, R_2=100\text{k}\Omega. (20\%)$

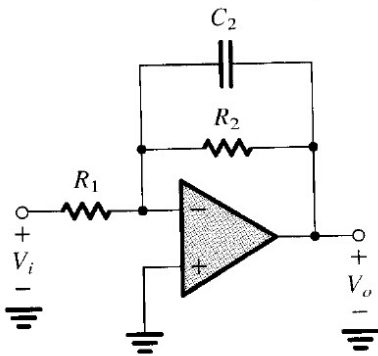


Fig. 1

2. Use the constant voltage drop diode model to find the bridge rectifier of Fig. 2, (a) the average voltage v_o (b) the peak diode current. Where v_s (ac line voltage) is a 12v rms sinusoid, $V_D=0.7\text{v}$, $R=100\Omega. (20\%)$

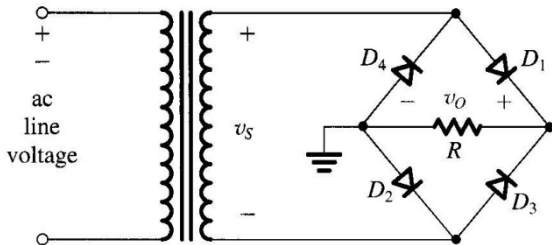


Fig. 2

3. Determine the transistor amplifier dc analysis shown in Fig. 3. Find V_c and I_c of the transistor. Assume $\beta = 100. (20\%)$

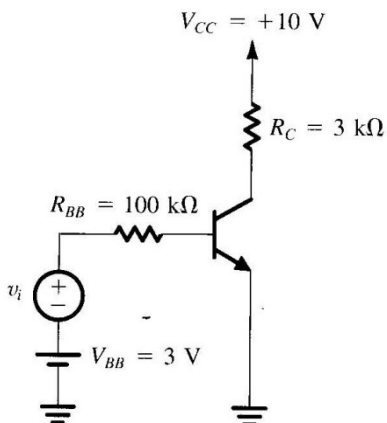


Fig. 3

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4. Fig. 4(a) shows an ideal voltage amplifier having a gain of -100 V/V with an impedance Z connected between its output and input terminals. (a) Find Z_1 and Z_2 of the Miller equivalent circuit as shown in Fig.4(b) when Z is a $1\text{-M}\Omega$ resistance, and (b) use the equivalent circuit to determine V_o/V_{sig} . (20%)

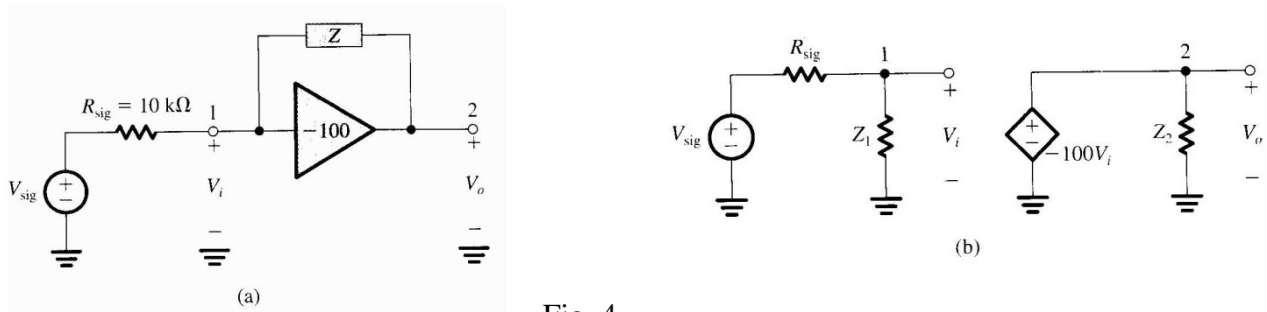


Fig. 4

5. Analyze the circuit of Fig. 5 to determine the voltages at all nodes and the currents through all branches. The transistor is saturated. The minimum value of β is specified to be 30. (20%)

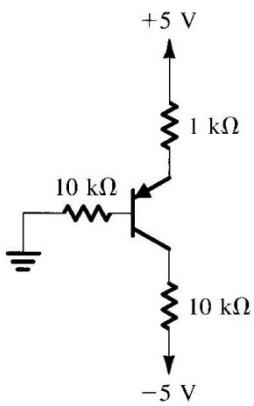


Fig. 5