

# 國立彰化師範大學 104 學年度碩士班招生考試試題

系所： 機電工程學系(選考戊)、  
車輛科技研究所(選考戊)、  
電子工程學系(甲組選考乙、乙組選考丙)、  
電信工程研究所(選考乙)

科目： 電子學  
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☆☆請在答案紙上作答☆☆

1. The circuits are connected as shown in Fig.1 with ideal diodes. Find  $V$  and  $I$ . (20%)

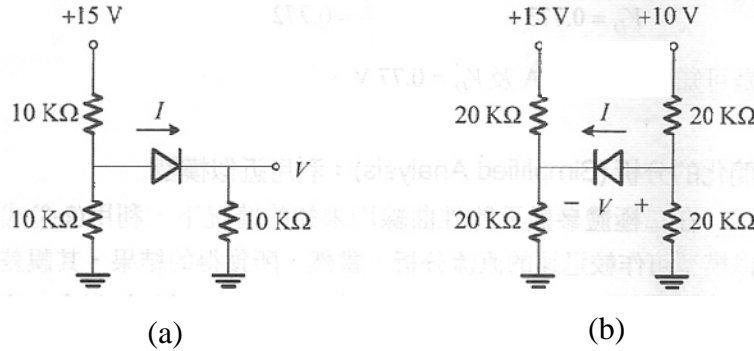


Fig.1

2. For the circuit shown in Fig.2, the transistor has  $\beta=100$  and  $V_A=\infty$ . (a) What is the amplifier configuration? (CE, CB, CC). (b) Determine the voltage gain  $v_o/v_i$ , the input resistance  $R_i$  and the output resistance  $R_o$ . (20%)

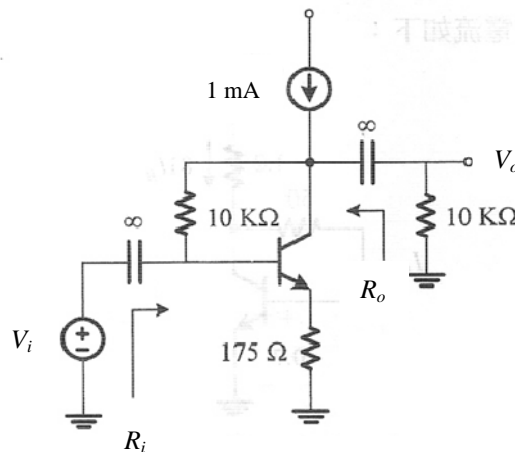


Fig.2

3. For the op amplifier circuit of Fig.3, assuming an ideal op amp, find the output voltage  $v_o$ . (10%)

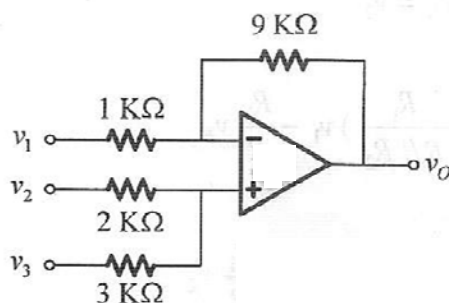


Fig.3

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4. Consider the NMOS transistor in the discrete CS amplifier circuit of Fig.4 under the following conditions:  $R_{sig} = 50 \text{ k}\Omega$ ,  $R_1 = 33 \text{ M}\Omega$ ,  $R_2 = 5 \text{ M}\Omega$ ,  $R_D = 3.9 \text{ k}\Omega$ ,  $R_S = 1.5 \text{ k}\Omega$ ,  $R_L = 5.6 \text{ k}\Omega$ ,  $C_{C1} = 0.02 \text{ }\mu\text{F}$ ,  $C_{C2} = 0.1 \text{ }\mu\text{F}$ ,  $C_S = 20 \text{ }\mu\text{F}$ , and  $g_m = 1 \text{ mA/V}$ . Find the mid band gain  $A_m = v_o / v_{sig}$ ,  $f_{p1}$ ,  $f_{p2}$ ,  $f_{p3}$  and,  $f_L$ . (30%)

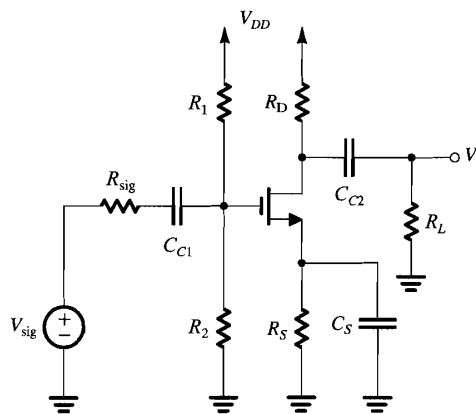


Fig.4

5. Find the voltage gain and input resistance of the amplifier in Fig.5 assuming that  $\beta = 100$ . (20%)

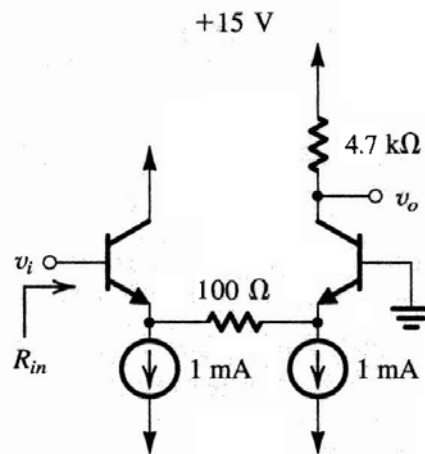


Fig.5