

# 淡江大學 102 學年度進修學士班轉學生招生考試試題

系別：電機工程學系三年級

科目：電子學

考試日期：7月22日(星期一) 第3節

本試題共 5 大題， 1 頁

1. Figure 1 shows two diodes with reverse saturation currents of  $I_{S1}$  and  $I_{S2}$  placed in series. (20%)

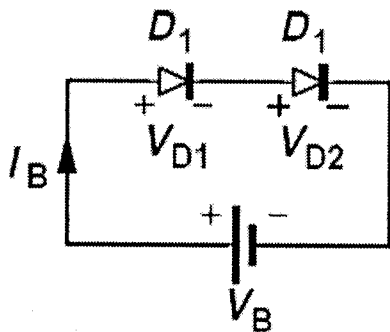


Fig. 1

2. Figure 2 shows two diodes with reverse saturation currents of  $I_{S1}$  and  $I_{S2}$  placed in parallel. If the total current is  $I_{tot}$ , determine the current carried by each diode. (20%)

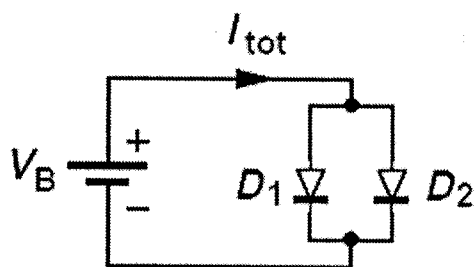


Fig. 2

3. If  $K = 20 \text{ mA/V}$ , what value of load resistance ( $R_L$ ) in Fig. 3 is necessary to achieve a voltage gain of 20? (20%)

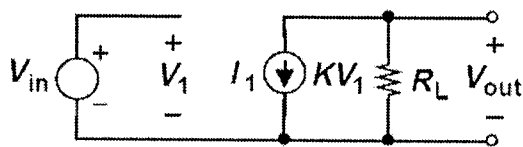


Fig.3

4. Write down the formulas of  $I_C$ ,  $I_B$ ,  $I_E$ ,  $g_m$ ,  $r_\pi$  and  $r_o$  of the BJT. (20%)

5. As depicted in Fig. 4, (a) Compute the  $R_{in}$ ,  $R_{out}$  and voltage gain ( $A_v$ ) of Common-Emitter stage for  $V_A = \infty$ . (b) Compute the  $R_{in}$ ,  $R_{out}$  and voltage gain ( $A_v$ ) of Common-Emitter stage for  $V_A \neq \infty$ . (20%)

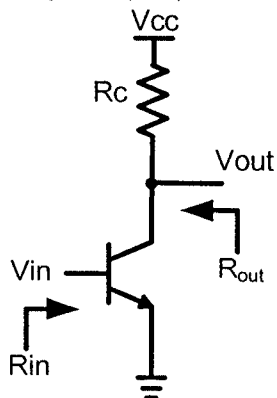


Fig. 4