明志科技大學 100 學年度研究所碩士班一般考試暨在職專班招生命題用紙

所別：機電所　組別：機電控制組　科目：電子學

注意：□准一般計算器，考試時間 100 分鐘。試題共 2 頁。

簡答題 50 分

一、簡略介紹以下幾種二極體並繪電路符號。(20%)

(a)光電二極體(Photo Diode)

(b)蕭特基二極體(Schottky Diode)

(c)變容二極體(Varactor Diode)

(d)發光二極體(Light-Emitting Diode)

二、繪圖說明二極體之逆向回復時間(Reverse Recovery)?其效應為何? (10%)

三、兩個對接之二極體是否可作為一個電晶體使用？為什麼? (10%)

四、簡略介紹雙極接面電晶體(BJT)與金屬氧化物半導體場效電晶體(MOSFET)並繪電路符號。(10%)

計算題 50 分

五、In Fig. 1, D_1 and D_2 are ideal diodes, please find the values of I_{D1}, I_{D2}, and V_o. (10%)

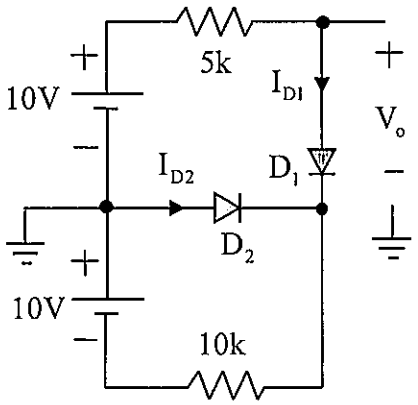

Fig. 1

～背面尚有試題～

六. Shown in Fig.2 is a shunt regulator with a 1-watt Zener diode, where V_Z is 15V at I_{ZT}, I_{ZK} is 0.25mA, I_{ZT} is 17mA, and Z_{ZT} is 14Ω. Please determine the required value of R_s and the allowed minimum value of R_L. (20%)

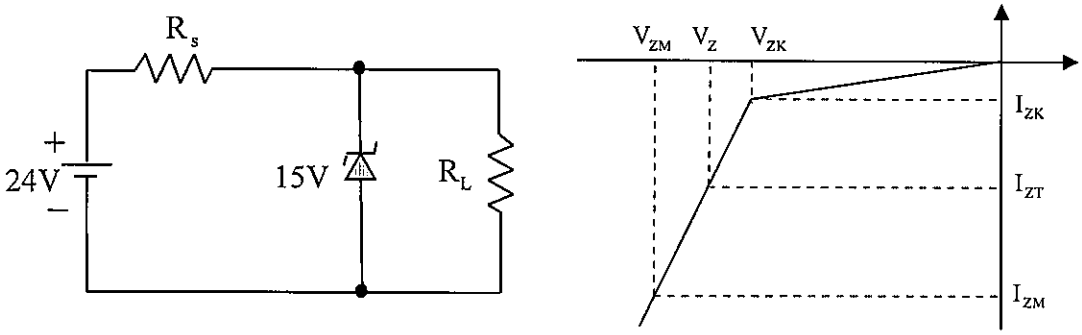

Fig. 2

七. Plot the ac small signal equivalent circuit and calculate the voltage gain of the circuit shown in Fig. 3。(20%)

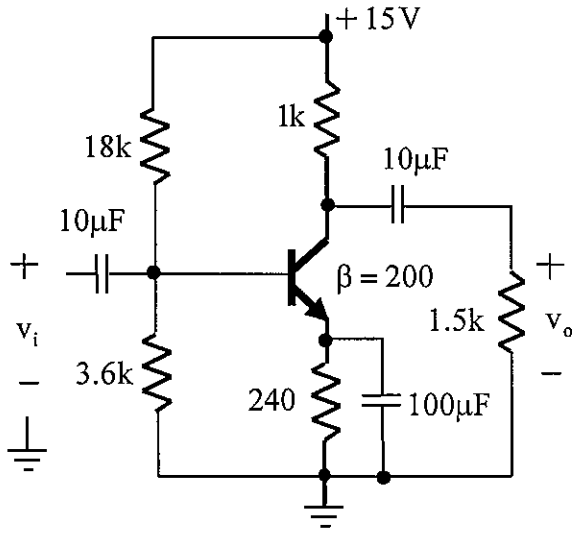

Fig.3