國立臺北科技大學九十七學年度碩士班招生考試

系所組別：1111 機電整合研究所甲組

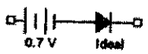
第二節　電子學（選考）試題

填 准 考 證 號 碼

注意事項：

1. 本試題共 5 題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

1. (a) Explain the Ohm's Law and Kirchhoff's Voltage Law (5%)

(b) Determine the total current through the circuit in Fig. 1 (If ideal diode can be equivalently express as 

) (5%)

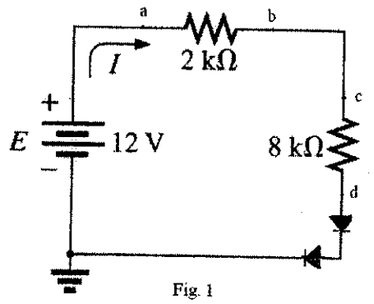


Fig. 1

(c) Determine the Vab and Vcd (voltage drop between points a and b) as shown in Fig. 1 (5%)

2. A series R-C circuit as shown in Fig. 2, the values of E,R, and C are 40V , 8KΩ and 4 μF respectively. Answer the following questions

(a) Determine the time constant τ (3%)

(b) Find the mathematical equation for the transient behavior of Vc, i_c and V_R (10%)

(c) Plot the waveform of Vc versus time.(6%)

(d) What is the value of Vc at t= 20ms? (3%)

(e)On the practical basis, how much time pass before we can assume that the charging phase has passed. (3%)

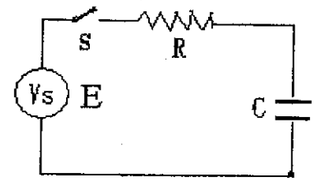


Fig. 2

3. An On-Off control circuit (Schmitt trigger) is shown in Figure 3.

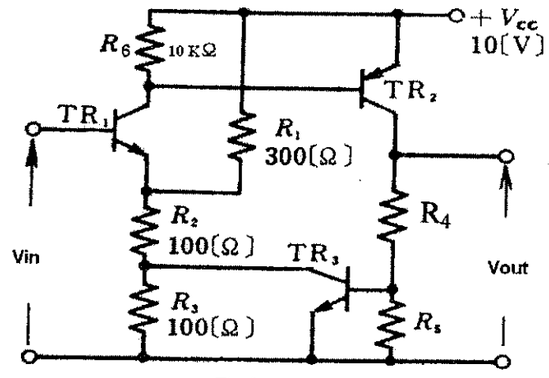


Fig. 3

(a) If input voltage is Vin= 3 V, determine the voltage V_{R1}, V_{R2}, V_{R3}, V_{R4}, V_{R5} (10%)

(b) If input voltage is Vin= 6 V, determine the voltage V_{R1}, V_{R2}, V_{R3}, V_{R6}, V_{out} (10%)

(V_{R1}: voltage drop of resistance R_1)

4. Assume that the C nod point is ground point (Vc= 0) as shown in figure 4 ,

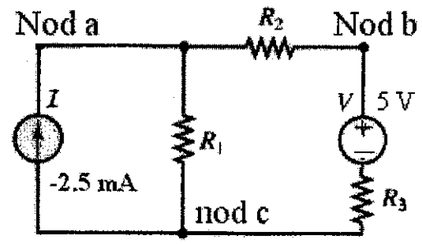


Fig. 4

(a) Find the mathematical nod equation for points a and b (10%)

(b) Determine the voltage of Vac, Vbc, V_{R1} , V_{R2}, and V_{R3} (10%)

(I=−2.5mA, V=5 V , R_1=1KΩ, R_2=2KΩ, R_3=3KΩ)

5. For the transistor configuration in Fig. 5 in which V_{BE} have been provide as V_{BE}=0.7 V, answer the following questions: (20%)

(a) Determine the voltage V_E and the current I_E (5%)

注意：背面尚有試題

(b) Calculate V_{R1} (5%)

(c) Determine V_{BC} using the fact that the approximation $I_C \approx I_E$ is often applied on transistor network (5%)

(d) Calculate the V_{CE} and $V_{C\text{-ground}}$ (5%)

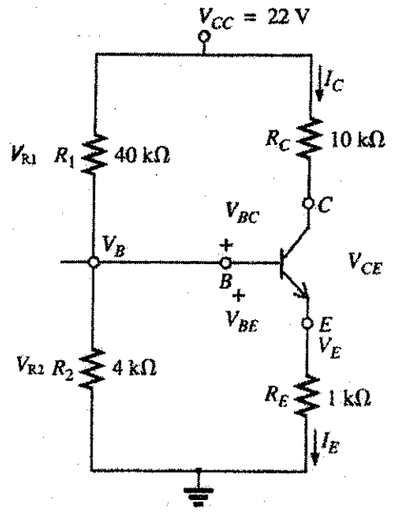


Fig. 5

me4-2