明新科技大學 104 學年度研究所考試入學招生 試題卷

系所類別	科目	節次	准考證號碼 (考生請填入)	考試 日期
電機工程系碩士班（電機組）	電子學	第一節		104/4/26

※答案須寫在答案卷內，否則不予計分。

1. In Fig. 1, assume that the diode with constant forward voltage drop V_D=0.8V. The circuit parameters are V_{DD}=5V and R=1kΩ. The dissipated powers of diode and resistor are P_D and P_R respectively. Calculate P_D and P_R. (10%)

2. Assume that each of the diodes in Fig. 2, in the forward bias condition, can be modeled as a constant voltage drop V_D=0.7V. Design R to make I_D= 0.5A. (10%)

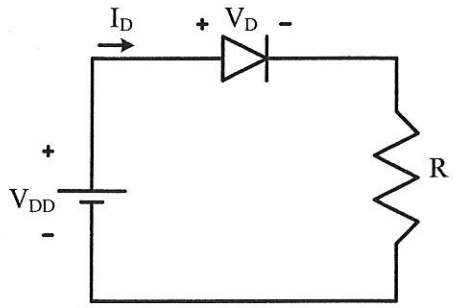

Fig. 1

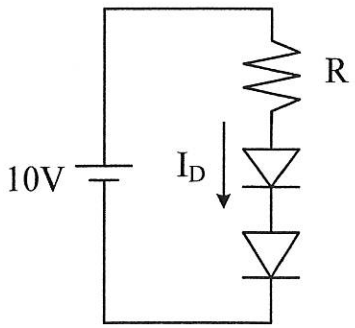

Fig. 2

3. According to the non-inverting op-amp circuit in Fig. 3, answer the following questions.
   (a) What is the voltage gain of Av=(Vo/Vi) ? (5%)
   (b) When Vi=0.3sin(2000πt), find Vo. (5%)

4. Fig. 4 is a simple op-amp circuit with its output saturation voltages=±15V and differential voltage gain Av=100000(V/V). The other parameters of the op-amp are assumed to be ideal.
   (a) When Vi=0.1mV, find Vo. (5%)
   (b) When Vi=0.1V, find Vo. (5%)

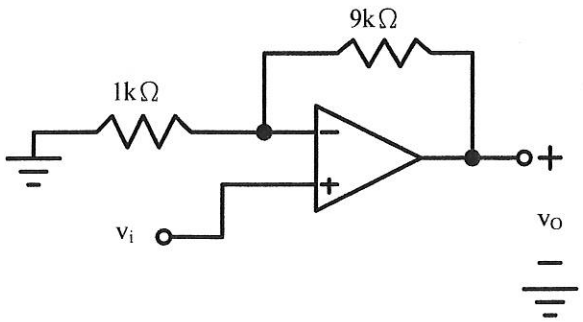

Fig. 3

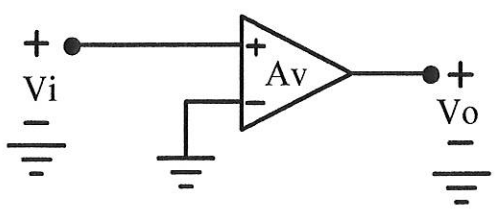

Fig. 4

系所類別	科目	節次	准考證號碼 (考生請填入)	考試 日期
電機工程系碩士班（電機組）	電子學	第一節		104/4/26

5. Fig. 5 is an inverting integrating circuit with its op-amp is ideal. Derive its voltage gain transfer function of $A_V(S)=V_O(S)/V_i(S)$. (10%)

6 Fig. 6 is an RC single time constant circuit. If R=10kΩ and C=10uF, find the transfer function $T(S)=V_O(S)/V_I(S)$. (10%)

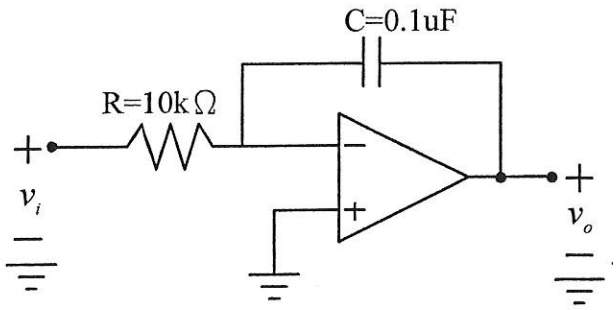

Fig. 5

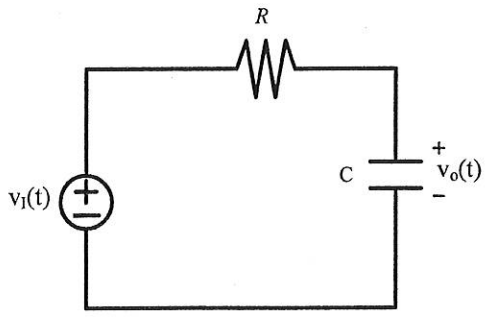

Fig. 6

7. In Fig. 7, assume that the operational amplifier is ideal. Find the voltage gain $A_v=v_o/v_I$. (10%)

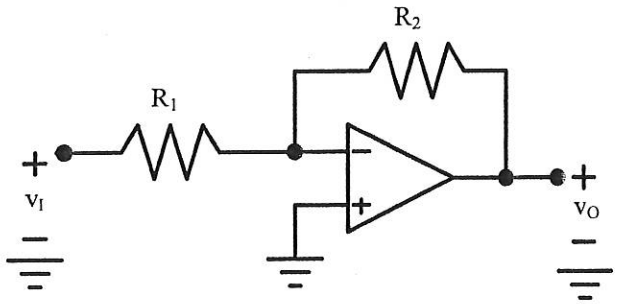

Fig. 7

系所類別	科目	節次	准考證號碼 (考生請填入)	考試 日期
電機工程系碩士班（電機組）	電子學	第一節		104/4/26

8. In Fig. 8, the NMOSFET has V_t=1V and $(\mu_n C_{ox})(W/L)$=1mA/V^2. Find V_D and I_D. (10%)

9. In Fig. 9, the Common Source Amplifier is connected to a signal source v_{sig} with R_{sig}=100kΩ and a load resistance R_L=15kΩ. Assume that the NMOSFET is properly biased in the saturation region and has the following parameters g_m=1mA/V. Find the overall voltage gain $A_v=v_o/v_{sig}$. (10%)

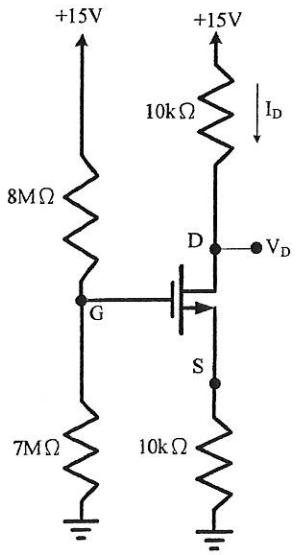

Fig. 8

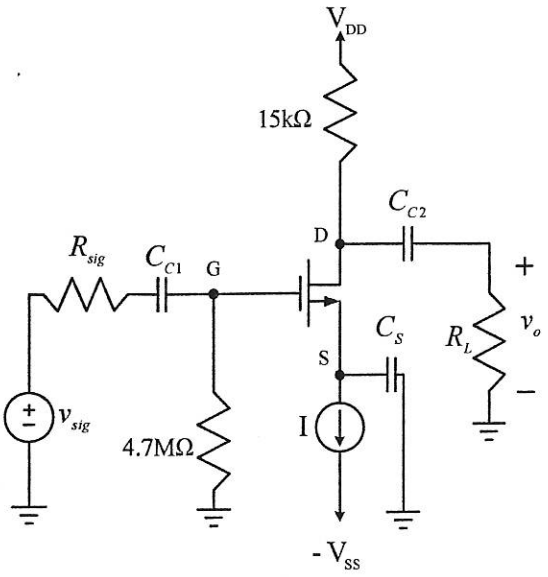

Fig. 9

10. In Fig. 10, assume the NPN transistor has β=100 and BE forward bias voltage V_{BE}=0.7V. Find I_B, I_C, I_E, and V_{CE}.(10%)

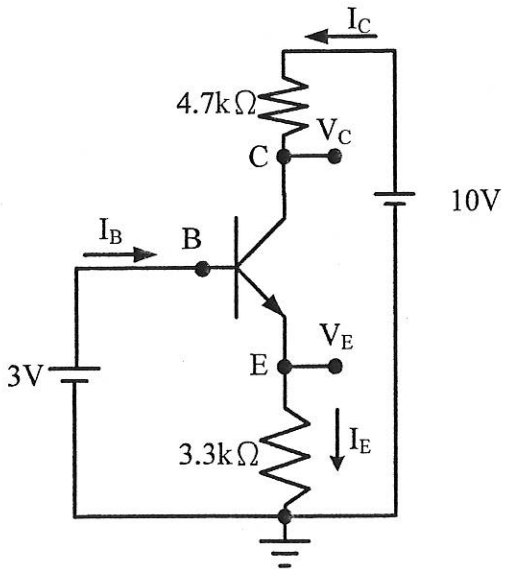

Fig. 10