淡江大學 95 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　13-1

准帶項目請打「V」	
✓	簡單型計算機

本試題共 2 頁

1. Assume that the operational amplifier in the circuit of Fig. 1 is ideal. Derive the voltage gain V_o/V_i of this noninverting amplifier. (20%)

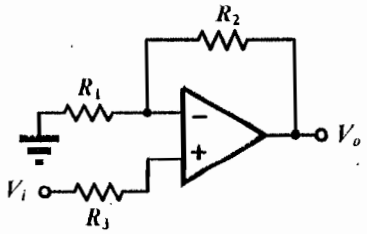

Fig. 1

2. Assume that the diodes D_1 and D_2 in the circuit of Fig. 2 are ideal, find the values of the labeled voltage V and current I. (20%)

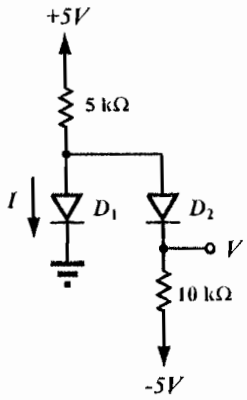

Fig. 2

3. For the circuit in Fig. 3, V_{tn} = 1V, $\mu_n C_{ox}$=20μA/V^2, L=10μm, and W=30μm. Neglect the channel length modulation and body effect, find the labeled voltage V_2 and current I_1. (20%)

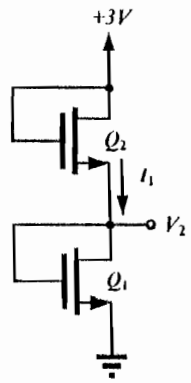

Fig. 3

本試題雙面印製

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4. For the circuit in Fig. 4, the BJT has a common-emitter current gain $\beta = 100$, V_{BE}=0.7V, and R_B=100kΩ. Find the dc currents I_B, I_C, and I_E, and dc voltage V_B, V_C, and V_E. (20%)

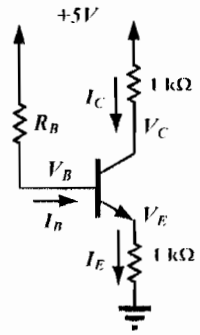

Fig. 4

5. For the NMOS amplifier in Fig. 4, replace the transistor with its equivalent small-signal model, ignore the channel length modulation and body effect. Derive expressions for the voltage gains v_s/v_i and v_d/v_i. [utilize g_m to represent the transconductance of transistor] (20%)

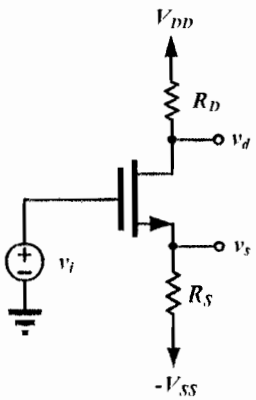

Fig. 5