Department of Electrical and Electronics Engineering

Reg. No. :

MANIPAL INSTITUTE OF TECHNOLOGY, MANIPAL
(A Constituent Institute of Manipal University, Manipal)

THIRD SEMESTER B.E. DEGREE MAKEUP EXAMINATION
(REVISED CREDIT SYSTEM)

22 July 2009

ANALOG ELECTRONIC CIRCUITS (ELE 209)

Time: 3 hours   **Max. Marks: 50**

Note   :   Answer any **FIVE** full questions.
Missing data, if any, may be suitably assumed.

1A.   Determine I_D, V_0 for the circuit shown in *Figure Q1A*, given V_D=0.7V.   (02)
1B.   Draw the output voltage for the circuit shown in *Figure Q1B.*   (06)
1C.   Write a technical note on construction and applications of photo diode.   (02)

2A.   Plot the waveform of V_O, for the circuit shown in *Figure Q2A.*   (02)
2B.   Design a voltage divider bias circuit to meet the following specifications. V_{CC}=24V, V_{CE}=4.5V, I_C=10mA, β_{dc}=100, $S(I_{CO})\leq5$, R_E=280Ω.   (04)
2C.   Derive the expression of stability factor $S(I_{CO})$ and $S(V_{BE})$ for collector-base feedback bias circuit.   (04)

3A.   Draw the low frequency small signal h-parameter model for the circuit shown in *figure Q3A*. Also identify the configuration employed in the circuits for both transistors.   (02)
3B.   For the circuit shown determine A_v, A_{vs}, R_o and R_i. Given h_{ie}=1.1K, h_{re}=2.5x10^{-4}, h_f=50, h_o=24μA/V.   (04)
3C.   Derive expression for calculating the voltage gain A_v, current gain A_I, input impedance Z_i and output admittance Y_o of an amplifier using hybrid parameters.   (04)

4A.   Discuss the effect of cascading of amplifiers on bandwidth and gain.   (02)
4B.   For the network shown in Figure Q4B, find V_G, I_{DQ}, V_{GSQ}, V_D, V_S and V_{DSQ}. Given I_{DSS}=10mA, V_P=-4V.   (04)
4C.   For the CE amplifier shown in Figure Q4C, determine the bandwidth if h_{ie}=1.2K, h_{fe}=100, r_0=∞.   (04)

5A.   Write a brief note on distortion in power amplifiers   (02)
5B.   For a transformer coupled class-A power amplifier, derive an expression for efficiency and hence obtain maximum efficiency. Also list advantages and disadvantages of the same.   (04)
5C.   A series fed class A amplifier has R_B=2K, R_C=20Ω, β=25 and V_{CC}=25V. Draw the circuit and determine DC input power, efficiency, and power dissipated. Assume the peak value of base current due to AC input voltage is 10Ma.   (04)

6A.   Determine the output power and Zener diode current for the circuit shown in Figure Q6A. Given β=75.   (02)
6B.   Explain the working of a transformer based series voltage regulator.   (04)
6C.   Design a LM317 based variable voltage regulator for 5 to 15V range supplying not more than 100mA load current.   (04)
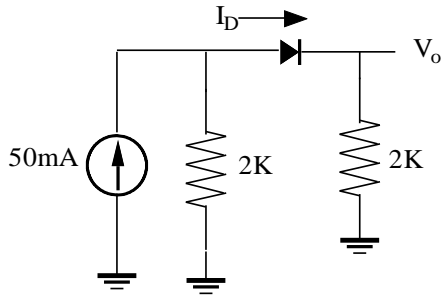
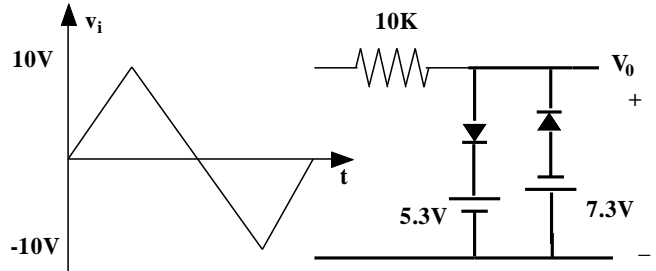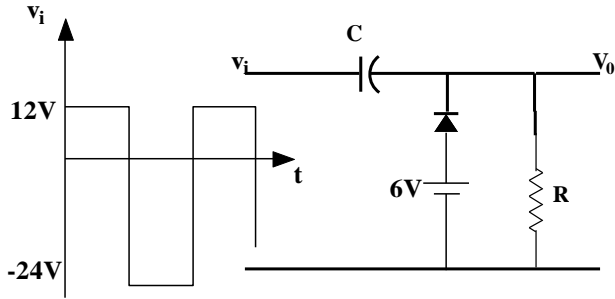**Department of Electrical and Electronics Engineering**
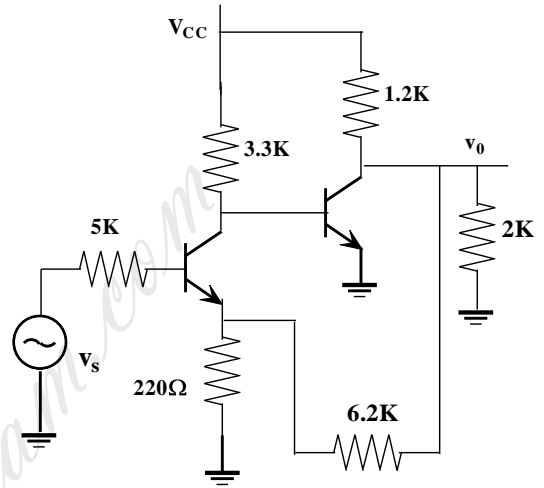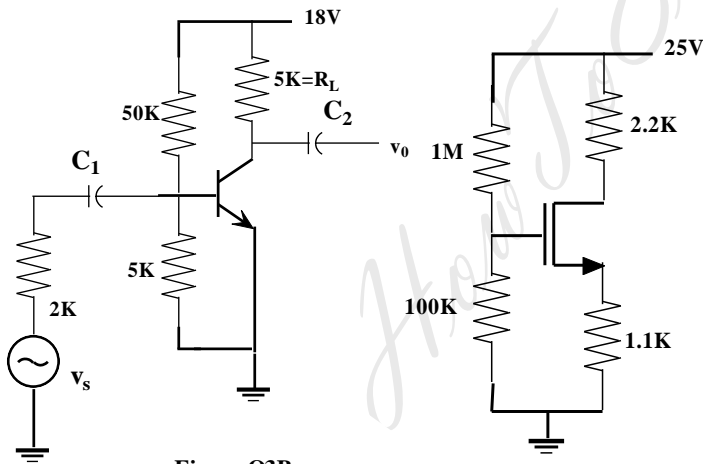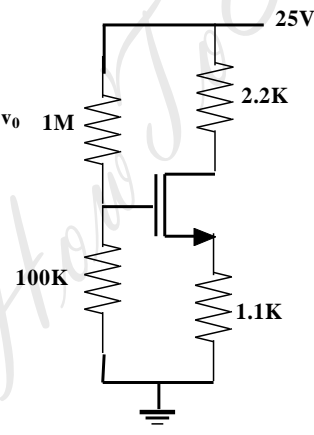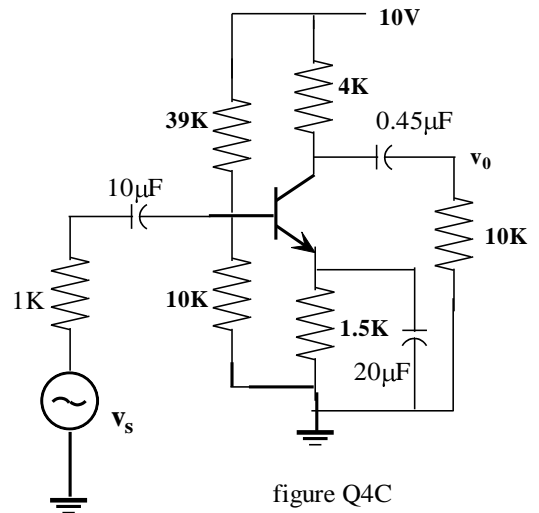

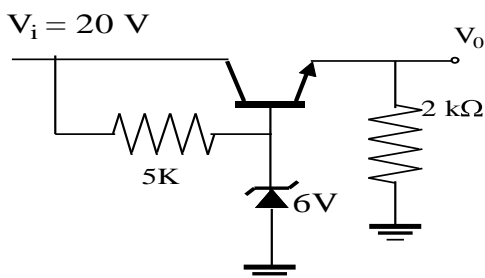figure Q1A

Figure Q1B

figure Q2A

figure Q3A

Figure Q3B

figure Q4B

figure Q4C

figure Q6A