Total No. of printed pages = 5

CAI-506/EC&D-II/5th Sem/2015/M

ELECTRONIC CIRCUITS AND DEVICES-II

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) For the following emitter bias circuit, determine the expressions for the following. 7

(i) I_B

(ii) I_C

(iii) V_{CE}

Calculate I_B and V_{CE} for the given values : R_B=330kΩ, V_{CC}= +20V R_C = 2kΩ, β = 50 and R_E= 1kΩ.

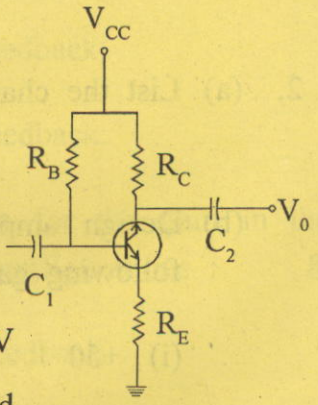

Fig. 1

[Turn over

(b) Perform A.C analysis of the following fixed bias circuit using γ_e' model and determine the expressions for the following parameters. 7

(i) Input impedance

(ii) Output impedance

(iii) Voltage gain.

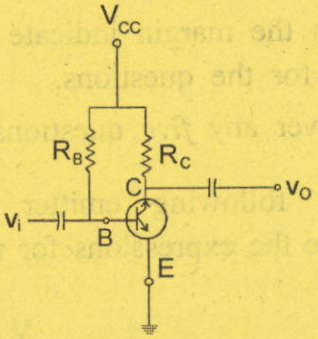

Fig. 2

2. (a) List the characteristics of an ideal opamp. 4

(b) Design amplifiers using opamp with the following gains : 6

(i) +50

(ii) – 10

(c) Explain in brief how opamp can be used as a filter. 4

3. (a) Describe the operation of series and shunt voltage regulator using block diagrams and relevant circuit diagrams. 8

(b) Design a +9V voltage supply using bridge rectifier, capacitive filter and IC regulators. 3

(c) With the help of a circuit diagram, explain the operation of LM317 IC. 3

4. (a) Draw the block diagram for the following feedback configuration : 3

(i) Voltage series feedback.

(ii) Current series feedback.

(b) Derive an expression for the gain in the following feedback configurations : 8

(i) Voltage–series feedback.

(ii) Voltage–shunt feedback.

(c) Calculate the gain and input impedance for a voltage series feedback amplifier having $A=-200$, $R_i = 25\ k\Omega$, $R_o = 2k\Omega$, and $\beta = -0.1$. 3

5. (a) Describe the operation of a single tuned amplifier with capacitive coupling using a relevant circuit diagram. Also, draw the frequency response curve for the amplifier. 7

(b) A tuned amplifier circuit using capacitive coupling is having $R=20\Omega$, $L=30mH$ and $C=0.07\mu F$. Determine 5

(i) Resonant frequency of the circuit.

(ii) Q-factor of the tank circuit.

(iii) Bandwidth of the amplifier.

(c) Discuss the criteria for obtaining continuous oscillations in a circuit. 2

6. (a) Deduce the relations for emitter current I_E and collector to emitter voltage V_{CE} in case of a dual-input balanced-output differential amplifier. 7

(b) Explain the operation of any *one* of the following : 7

(i) Wein bridge oscillator.

(ii) Phase shift oscillator.

7. Write short notes on any *two* : 7×2=14

(a) Switch Mode Power Supply (SMPS).

(b) Double tuned amplifier.

(c) CMRR

(d) Boost Regulator.