Code: EC4T3

## II B.Tech - II Semester – Regular Examinations – May 2016

## ANALOG ELECTRONIC CIRCUITS
## (ELECTRONICS AND COMMUNICATION ENGINEERING)

Duration: 3 hours                                  Max. Marks: 70

## PART – A

Answer *all* the questions.   All questions carry equal marks

$$11x \; 2 = 22 \; M$$

1.
   a) Which configuration (CE, CB, CC) is preferred to design a power amplifier? Justify your answer.
   b) Suggest an appropriate transistor amplifier for (i) High Voltage gain (ii) High current gain.
   c) What is the phase shift for (i) two stage CE amplifier (ii) two stage CB amplifier.
   d) Define $\beta$, cutoff frequency and $f_T$.
   e) At room temperature BJT in CE configuration is operating at $I_C = 2mA$ and $V_{CE} = 10V$. Calculate its transconductance.
   f) Draw the small signal model of JFET in CS configuration.
   g) Draw the frequency response of RC coupled amplifier and direct coupled amplifier.

h) Is CE amplifier with emitter resistance circuit acts as a feedback amplifier? If yes, which type of feedback amplifier it is.

i) Consider an amplifier with gain 20 and bandwidth 10KHz. If positive feedback is provided with a feedback factor of 0.1 what is the new bandwidth?

j) Suggest an appropriate Oscillator for (i) High frequency applications (ii) Low frequency applications

k) Is power amplifier amplifies the power directly? Justify your answer.

## PART – B
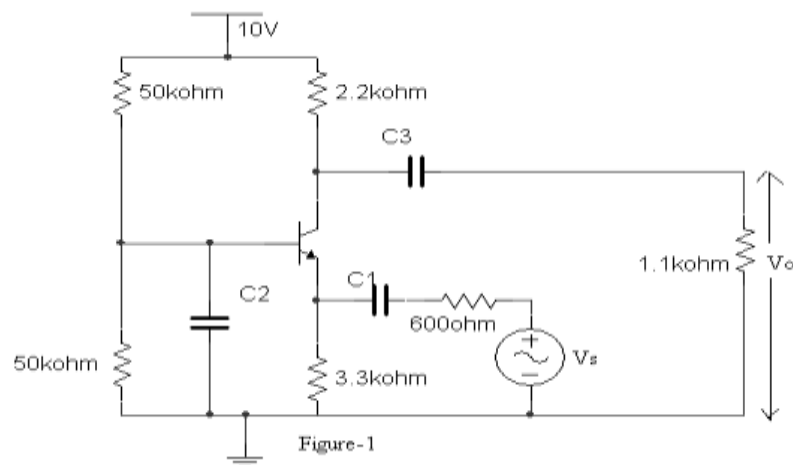
Answer any **THREE** questions.   All questions carry equal marks.

$$3 \times 16 = 48 \text{ M}$$

2.
a. Calculate current gain, overall voltage gain, input and output resistances for the amplifier shown in figure-1. Here for the transistor

$$h_{rb} = 0 \,, h_{ib} = 25\Omega \,, h_{fb} = -0.99 \,, h_{Ob} = 1\,\mu\mho. \quad 10\text{ M}$$



Figure-1

b. Derive an expression for voltage gain of CE amplifier with emitter resistance. 6 M

3.

a. Draw the equivalent circuit of a transistor at high frequencies and derive an expression for feedback conductance, input conductance and base spreading resistance. 8 M

b. Derive an expression for CE short circuit current gain at high frequencies. 8 M

4.

a. Calculate voltage gain and input impedance for the circuit shown in figure-2. Here for FET, transconductance is $6m\mho$ and drain resistance is $5K\Omega$.

8 M



Figure-2
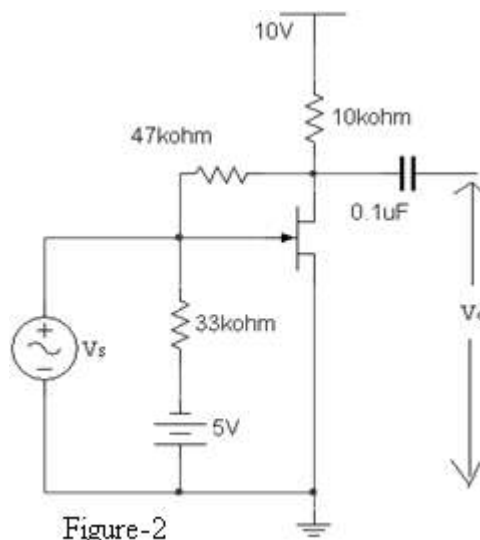
b. Derive an expression for lower and upper cutoff frequencies of multistage amplifier interms of single stage amplifier.                          8 M

5.

a. Derive an expression for input and output resistance of current shunt feedback amplifier.                          8 M

b. A single stage CE amplifier has a Voltage gain of 800 without feedback. When feedback is employed, its gain reduces to 70. Calculate the percentage of the output which is fed back to the input.                          8 M

6.

a. Explain the working of Wien Bridge Oscillator using BJT. Also derive the expression for the frequency of Oscillation.                          8 M

b. Explain the operation of complementary symmetry push pull amplifier.                          8 M