

Code: EC3T4

**II B.Tech - I Semester – Regular Examinations - December 2014**

**ANALOG ELECTRONIC CIRCUITS  
(ELECTRONICS & COMMUNICATION ENGINEERING)**

Duration: 3 hours

Marks:  $5 \times 14 = 70$

Answer any FIVE questions. All questions carry equal marks

1. a) Why transistor parameters are called as h-parameters? State the advantages and disadvantages. 7 M
  
- b) Draw the hybrid model for a BJT in Common Emitter configuration and write the corresponding equations. 7 M
  
2. a) An amplifier with open-loop voltage gain  $A_v = 1000 \pm 100$ . It is necessary to have feedback amplifier whose voltage gain varies by not more than  $\pm 0.1\%$ . Find the 7 M
  - i) feedback factor
  - ii) gain with feedback
  
- b) Draw the circuit for BJT based Current series amplifier and justify the type of feedback. Derive the expressions for  $A_v$ ,  $\beta$ ,  $R_i$  and  $R_o$ . 7 M
  
3. a) Draw the small signal model of CE amplifier and derive the expressions for voltage gain and current gain. 7 M

- b) Find  $A_i$ ,  $Z_i$ ,  $A_v$  and  $Z_o$  for the common collector amplifier.  
Data:  $R_s = 1\text{K}\Omega$ ,  $Z_L = 3.3\text{K}\Omega$ ,  $h_{ic} = 1\text{K}\Omega$ ,  $h_{fc} = 51$ ,  $h_{rc} = 1$ ,  
and  $h_{oc} = 25\mu\text{A/V}$ . 7 M
4. a) Give the differences between the FET amplifiers with different configurations and give their applications. 7 M
- b) Sketch common Source Amplifier using JFET and draw its equivalent circuit. Derive the expression for voltage gain. 7 M
5. a) What is the effect of multistage on gain and bandwidth? Explain with the necessary equations. 7 M
- b) Draw the cascode transistor amplifier and derive expressions for voltage gain and current gain. 7 M
6. a) Explain the working of Class AB amplifier with the help of neat diagram. 7 M
- b) Derive the conversion efficiency of class B push pull power amplifier. 7 M
7. a) What is a Tuned amplifier and briefly explain the various types of tuned amplifiers? 7 M

b) Derive the expression for the 3dB bandwidth of double tuned amplifier. 7 M

8. a) A crystal has following parameters  $L=0.33\text{H}$ ,  $C=0.065\text{pF}$ ,  $C_m=1.0\text{pF}$  and  $R=5.5\text{K}\Omega$ . 7 M

i) Find the series resonance frequency?

ii) By what percent does the parallel resonance frequency exceed the series resonant frequency?

iii) Find the Q factor of the crystal.

b) Derive the expression for the frequency of Hartely oscillators. 7 M