Hall Ticket No | | | | | | | | | | | Question Paper Code: AEC004

INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

B.Tech IV Semester End Examinations (Regular) - May, 2018

Regulation: IARE – R16

Electronic Circuit Analysis

Time: 3 Hours **(ECE)** **Max Marks: 70**

Answer ONE Question from each Unit
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

UNIT – I

1. (a) Design an emitter follower having R_i= 600 k Ω, R_o=10 Ω Assume h_{fe}=150, h_{ie} =1KΩ, h_{oe}=25 μA/V. Find A_I, A_V for the emitter follower using h-parameters. **[7M]**

   (b) Define h-parameters of CE configuration from the input and output characteristics. **[7M]**

2. (a) Derive the expression for voltage gain, input and output impedance of a common emitter configuration with neat circuit diagram? **[7M]**

   (b) Derive the expressions for voltage gain, current gain, input impedance, and output admittance of a common collector amplifier? **[7M]**

UNIT – II

3. (a) Draw the high frequency equivalent of CE mode amplifier **[7M]**

   (b) Derive the expression for gain at upper 3dB frequency f_H and discuss the effect of bypass & coupling capacitance. **[7M]**

4. (a) Derive an expression for short circuit current gain of a transistor with the help of hybrid-π model. **[7M]**

   (b) Explain the variation of hybrid-π parameters with I_C,V_{CE} and temperature. **[7M]**

UNIT – III

5. (a) It is desirable to increase the current gain, suggest the suitable multi transistor configuration to boost A_I and derive the expression for A_I with the help of small signal equivalent circuit. **[7M]**

   (b) Bring out the differences between cascade and cascode type of amplifiers. **[7M]**

6. (a) Draw the circuit diagram of Darlington configuration and derive the expressions for input, output impedance, voltage and current gains? **[7M]**

   (b) Calculate overall cut off frequency of 5 stage cascaded amplifiers having single stage lower cut off frequency of 5k Hz. **[7M]**

UNIT – IV

7. (a) With the help of equivalent circuit, derive the expression for input and output resistance of current shunt feedback amplifier. **[7M]**

   (b) An amplifier with a closed loop gain of 200 is required and this gain should not vary more than 1 when the inherent gain of the amplifier without feedback varies by 20. Find the values of Av and beta. **[7M]**

8. (a) Explain how oscillators are classified and conditions for oscillations. **[7M]**

   (b) Write a short note on **[7M]**

   i. Colpitts and Hartley Oscillator

   ii. RC phase shift Oscillator

UNIT – V

9. (a) Explain the operation of class B push pull amplifier and also derive the expression for maximum conversion efficiency. **[7M]**

   (b) A single stage class A amplifier has V_{CC}=20V, V_{CEQ}=10V, I_{CQ}=600mA and collector load resistor R_L=16Ω. The AC output current varies by ±300mA with the ac input signal. Determine

   i. The power supplied by the DC source to the amplifier circuit. **[7M]**

   ii. DC power consumed by the load resistor

   iii. AC power developed across the load resistor

   iv. DC power delivered to the transistor

   v. DC power wasted in transistor collector

   vi. Overall efficiency

10. (a) Explain the operation of transformer coupled class A amplifier and derive the maximum conversion efficiency. **[7M]**

    (b) Briefly discuss the operation of class 'B' amplifier and uses. **[7M]**