R13

B.Tech II Year II Semester (R13) Supplementary Examinations December/January 2015/2016
ELECTRONIC CIRCUITS ANALYSIS & DESIGN
(Common to ECE and EIE)

Time: 3 hours

Max. Marks: 70

PART – A
(Compulsory Question)
*****

1   Answer the following: (10 X 02 = 20 Marks)
  (a)   How are amplifiers classified according to the transistor configuration?
  (b)   What is the difference between Darlington pair and Cascode amplifier?
  (c)   Draw the hybrid π equivalent circuit of BJTs.
  (d)   The input power to a device is 10,000 W at a voltage of 1000 V. The output power is 500 W and the output impedance is 20 Ω. Find the power gain in decibels.
  (e)   Define positive and negative feedback of the amplifier.
  (f)   What are the conditions for oscillations?
  (g)   What is the function of power amplifier?
  (h)   Why heat sink is necessary in case of power transistor?
  (i)   What is a tuned amplifier? Mention its advantages and disadvantages.
  (j)   What is Q factor?

PART – B
(Answer all five units, 5 X 10 = 50 Marks)

 UNIT – I

2 (a)   Draw the circuit of Common Emitter Amplifier and its equivalent circuit. List out its characteristics.
   (b)   For the emitter follower with R_S = 500 Ω and R_L = 5 kΩ, Calculate A_I, A_V, A_{VS} and R_o. Assume h_{fe} = 50, h_{ie} = 1 kΩ, h_{oe} = 25 mA/V.

OR

3   Draw the circuit diagram of two stages RC coupled transistor amplifier. Explain the operation and calculate the mid frequency range and low frequency range.

 UNIT – II

4   Derive the expression for CE short circuit current gain and explain the same for resistive load.

OR

5 (a)   Explain the effect of Coupling and Bypass Capacitor in CE amplifier.
   (b)   A BJT has the following parameters measured at I_c = 1 mA; h_{ie} = 3 kΩ, h_{fe} = 100, f_T = 4 MHz, C_C = 2 pF, and C_e =18 pF. Find $r_{b'e}$, $r_{bb'}$, g_m, f_H for R_L = 1 kΩ.

 UNIT – III

6 (a)   A voltage series negative feedback amplifier has a voltage gain without feedback of A = 500, input resistance R_i = 2 K, output resistance R_o = 15 K and feedback ratio = 0.01. Calculate the voltage gain, input resistance and output resistance of the amplifier with feedback.
   (b)   Explain the concept of feedback with block diagram.

OR

7 (a)   Discuss about amplitude & frequency stability in oscillators.
   (b)   With neat diagram explain about crystal oscillator.

www.jntuonline.com

UNIT – IV

8 (a) Draw the circuit diagram of class-A power amplifier with transformer coupled. Explain operation and calculate the efficiency.

(b) What are the advantages and disadvantages of push pull configuration? Show that in class –B push pull amplifier the maximum conversion efficiency is 78.5%.

OR

9 (a) A transistor in a transformer coupled (class – A) power amplifier has to deliver a maximum of 5 W to a load of 4 Ω. The quiescent point is adjusted for symmetrical swing, and the collector supply voltage is V_{CC} = 20 Volts. Assume V_{min} = 0 volts.
(i) What is the transformer turns ratio?
(ii) What is the peak collector current?

(b) Compare the series fed and transformer coupled class – A power amplifiers. Why is the conversion efficiency doubled in transformer coupled class – A amplifier?

UNIT – V

10 (a) Explain the working of single tuned amplifier. Draw the frequency response

(b) Explain the operation of a double tuned amplifier. Explain the advantages of double tuned circuit over single tuned circuit

OR

11 (a) Explain the effect of cascading single tuned amplifier on band width

(b) Derive the expression for bandwidth in terms of resonant frequency and quality factor in case of double tuned amplifiers.

*****