

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 $R_S = 500 \Omega$ and $R_L = 5 \text{ k}\Omega$, Calculate A_i , A_v , A_{VS} and R_o . Assume $h_{fe} = 50$, $h_{ie} = 1 \text{ k}\Omega$, $h_{oe} = 25 \text{ mA/V}$.

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 $I_C = 1 \text{ mA}$; $h_{ie} = 3 \text{ k}\Omega$, $h_{fe} = 100$, $f_T = 4 \text{ MHz}$, $C_C = 2 \text{ pF}$, and $C_e = 18 \text{ pF}$. Find $r_{b'e}$, $r_{bb'}$, g_m , f_H for $R_L = 1 \text{ k}\Omega$.

UNIT – III

- 6 (a) A voltage series negative feedback amplifier has a voltage gain without feedback of $A = 500$, input resistance $R_i = 2 \text{ K}$, output resistance $R_o = 15 \text{ K}$ 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.

Contd. in page 2

Code: 13A04402

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 $4\ \Omega$. 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.

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