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Question Paper Code: U3405

B.E./B.Tech. DEGREE EXAMINATION, NOV 2023

Third Semester

Electronics and Communication Engineering

21UEC305-ELECTRONIC CIRCUITS

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Improper biasing of a transistor circuit leads to a _____ CO1-U
(a) Excessive heat production at collector terminal.
(b) Distortion in output signal
(c) Faulty location of load line
(d) Heavily loading of emitter terminal
2. The capacitive effects of transistor junction manifest themselves in CO1-U
(a) Low frequency (b) high frequency (c) middle frequency (d) all the above
3. In class A amplifier, $V_{CE(MAX)}=15V, V_{CE(MIN)}=1V$. Find the CO2-App
overall efficiency for (a) series fed load, (b) transformer coupled load.
(a) 23%, 47.68% (b) 33.78%, 59% (c) 23.33%, 43.75% (d) 17.98%, 39.70%
4. To obtain very high input and output impedance in a feedback CO1-U
amplifier, the type of feedback utilized
(a) voltage series (b) current series (c) voltage shunt (d) current shunt
5. Which of the following oscillators is (are) tuned oscillators? CO1-U
(a) colpitts (b) Hartley (c) crystal (d) all the above

PART – B (5 x 3 = 15 Marks)

6. Define various h –parameters . CO1-U
7. For an amplifier, 3dB gain is 200 and higher cut off frequency is 20 KHz. Find CO2-App
the gain of the amplifier at frequency 100 KHz.

8. Compare Push Pull and Complementary Symmetry Class B amplifiers. CO1-U
9. The overall gain of a multistage amplifier is 140. When negative voltage feedback is applied, the gain is reduced to 17.5. Find the fraction of the output that is feedback to the input. CO2 App
10. Give the overall classification of oscillators? CO1-U

PART – C (5 x 16= 80 Marks)

11. (a) Derive the necessary expressions and analyze Voltage gain(A_v), Current Gain(A_i), Input Impedance(Z_i), output admittance(Y_o) from small signal model of BJT using h-parameters for CE configurations of BJT. CO2-App (16)
- Or
- (b) Analyze the effect of self-biasing in BJT CE configuration and CB configuration with neat diagrams and equations. CO2-App (16)
12. (a) Analyze the high frequency response of BJT amplifier with h - parameter model in detail with necessary equations. CO3-Ana (16)
- Or
- (b) Analyze an amplifier for the following specifications: Mid band gain (A_v) should be 20 & base voltage should be $2V$. Given: $h_{ie}=1100 \Omega$, $h_{re}=10 \times 10^{-4}$, $h_{fe}=100$, and $h_{oe}=4 \times 10^{-4} \text{ mho}$. CO3-Ana (16)
13. (a) Design and explain the power amplifier circuit using power transistor for narrow band RF application in AM/FM receiver. CO1-U (16)
- Or
- (b) Explain the operation of class A transformer coupled power amplifier circuit using power transistor and calculate its maximum efficiency. CO1-U (16)
14. (a) Design a feedback amplifier to use as voltage buffer for impedance matching in front end of amplifiers. Derive necessary expressions for input and output resistance. CO4-Ana (16)
- Or
- (b) When negative voltage feedback is applied to an amplifier of gain 100, the overall gain falls to 50.
 (i) Calculate the fraction of the output voltage feedback.
 (ii) If this fraction is maintained, calculate the value of the amplifier gain required if the overall stage gain is to be 75. CO4-Ana (16)

15. (a) Design a LC oscillator for the frequency of 10 KHz in which tank circuit has two inductive reactance's and one capacitive reactance and derive the expression for frequency of oscillation and condition for oscillation. CO5-App (16)

Or

- (b) A colpitts oscillator oscillates at 1.13 MHz.if the inductor in the feedback network has a value of 20pH and one of the capacitors value is 0.1 μ F, calculate the value of the other capacitor. CO5-App (16)

