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Question Paper Code: R3405

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Third Semester

Electronics and Communication Engineering

R21UEC305- ELECTRONIC CIRCUITS

(Regulations R2021)

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 _____. 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 β cutoff frequency is found from _____. CO1-U
(a) CE configuration (b) CB configuration. (c) CC configuration (d) None of these.
3. In class B amplifier $V_{CE}(\text{min}) = 2\text{V}$ and supply voltage $V_{cc} = 15\text{V}$. Find the collector circuits efficiency. CO2- App
(a) 68.0% (b) 45% (c) 23% (d) 50%
4. When voltage feedback (negative) is applied to an amplifier, its input impedance _____. CO1- U
(a) Is decreased (b) Is increased (c) Remains the same (d) None of the above
5. At what phase shift is the magnitudes of βA at its minimum in the Nyquist plot? CO1- U
(a) 90 degree (b) 180 degree (c) 270 degree (d) 0 degree

PART – B (5 x 3= 15 Marks)

6. Define various h –parameters. CO1- U
7. State Millers theorem. CO1- U
8. Recall cross over distortion. How it can be eliminated? CO1- U
9. Mention the effects of negative feedback? CO1- U
10. A wien bridge oscillator is used for operations at 9 kHz. if the value of the resistance R is 100 k Ω , what is the value of C required? CO3- App

PART – C (5 x 16= 80 Marks)

11. (a) Analyze the effect of potential divider biasing in a BJT common-emitter configuration under the condition that the base current is negligible compared to the divider current. Using this condition, derive the expression for the stability factor and explain how each component in the biasing network contributes to thermal stability and β -independence. CO4-Ana (16)
- Or
- (b) Analyze how two different biasing methods — one using a direct base resistor from the supply and the other using a feedback resistor from the output terminal to the base — influence the operation of a Bipolar Junction Transistor (BJT) in a common emitter configuration. Assume that the base current is negligible compared to the resistor current in both cases. With appropriate circuit diagrams, examine how each configuration affects thermal stability, Q-point placement and sensitivity to variations in current gain (β). CO4-Ana (16)
12. (a) Find the frequency of each of the different RC networks that make up the BJT amplifier in low frequency. CO1- U (16)
- Or
- (b) Find the High frequency response of BJT amplifier due to C_1 , C_2 and C_e in detail with necessary quantitative analysis. CO1- U (16)
13. (a) Prove that the class B power amplifier provides the efficiency of 78.5% by calculating its input and output power. Also explain its operation 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) 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. CO2-App (16)
- Or
- (b) With a negative voltage feedback, an amplifier gives an output of 10 V with an input of 0.5 V. When feedback is removed, it requires 0.25 V input for the same output. Calculate CO2-App (16)
- (i) gain without feedback
(ii) feedback fraction mv.

15. (a) Explain LC oscillator and derive the equation for oscillation CO1-U (16)
- Or
- (b) Summarize about RC phase shift oscillator with neat diagram and derive it for frequency of oscillation. CO1-U (16)

