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**Question Paper Code: U3405**

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

Third Semester

Electronics and Communication Engineering

21UEC305 – ELECTRONICS CIRCUITS

(Regulation 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The properly biased, JFET will act as a CO1- U  
(a) Current controlled current source                      (b) Voltage controlled voltage source  
(c) Voltage controlled current source                      (d) Current controlled voltage source
2. The voltage gain of an amplifier decreases at 20dB/octave above 100KHz. CO4- App  
If the mid frequency gain is 80dB. What is the value of voltage gain at 2MHz  
(a) 60dB              (b) 52dB                      (c) 54dB                      (d) 64dB
3. For a transistor  $T_J=160^\circ\text{C}$ ,  $T_A=40^\circ\text{C}$  and  $\theta_{J-A}=80^\circ\text{C/W}$ . Calculate the power CO2- App  
that the transistor can safely dissipate in free air.  
(a) 2.3W                      (b) 5.8W                      (c) 4.0W                      (d) 1.5W
4. To obtain very high input and O/P impedance in a feedback amplifier, the CO1- U  
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 of 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 20kHz. Find CO1- U  
the gain of the amplifier at frequency 100kHz.
8. Compare Push Pull and Complementary Symmetry Class B amplifiers. CO1- U

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.

9. Give the overall classification of oscillators? CO1- U
10. Define various h –parameters . CO1- U

PART – C (5 x 16= 80Marks)

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. 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)

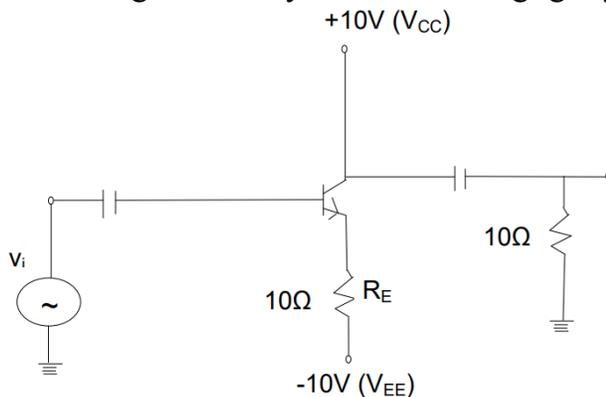
Or

- (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  $h_{oe}=4 \times 10^{-4}$  mho. CO3-Ana (16)

13. (a) Explain the operation of class B power amplifier circuit using power transistor and calculate its maximum efficiency. CO2- App (16)

Or

- (b) Calculate maximum ac output power and efficiency of the amplifier shown in fig.  $V_{BE}$  may be assumed negligibly small. CO2- App (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 10KHz 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 1.13MHz. if the inductor in the feedback network has a value of 20pH and one of the capacitors value is 0.1 $\mu$ F, calculate the value of the other capacitor. CO5-App (16)

