Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

FOURTH SEMESTER B.TECH DEGREE EXAMINATION (S), SEPT 2022
ELECTRONICS AND COMMUNICATION ENGINEERING
(2020 SCHEME)

Course Code : **20ECT202**

Course Name: **Analog Circuits**

Max. Marks : **100** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. Design a clipping circuit to clip a sine wave at ±3V.
2. Explain DC load line and Q point for CE transistor configuration.
3. State and prove Miller's theorem.
4. Draw the hybrid pi model of BJT amplifier.
5. Explain how FET can be used as a switch.
6. Draw the circuit diagram of a Cascode amplifier.
7. What is Barkhausen's criterion for oscillations?
8. Differentiate between positive and negative feedback.
9. Explain the classification of power amplifiers.
10. What is cross over distortion? How it can be eliminated?

PART B

(Answer one full question from each module, each question carries 14 marks)

MODULE I

11. a) Determine the operating point for a silicon transistor with β=100 in voltage divider biasing arrangement with Vcc=20 V, Rc=1 kΩ, R_1=10 kΩ, R_2=10 kΩ, R_E=5k Ω. (8)

    b) Derive the condition that must be satisfied by a RC circuit to behave as a differentiator. (6)

OR

12. a) Explain the working of a positive clamper circuit. (5)

    b) Design a voltage divider biasing circuit having I_C= 1mA, V_{CE}= 5V, stability factor =5, Given V_{CC}=20V, V_{RE} =3V, β=100, V_{BE} =0.6V. (9)

MODULE II

13. a) (i)Using the hybrid -pi model of a common emitter amplifier derive the expression for current gain, voltage gain, input impedance and output impedance. (8)

b) Draw the high frequency hybrid pi model of a common emitter transistor configuration and derive the expression for short circuit current gain. (6)

OR

14. a) Draw the frequency response of a RC Coupled amplifier & Explain the factors that affect the fall of gain at low frequency and high frequency response. (9)

b) Explain the high frequency equivalent circuits of BJT. (5)

MODULE III

15. a) Explain any two-biasing scheme of MOSFET. (8)

b) Explain a common source amplifier with current source load. (6)

OR

16. a) Derive the expression for voltage gain, input impedance and output impedance of a common source amplifier. (8)

b) Explain how wide bandwidth is obtained in Cascode amplifier. (6)

MODULE IV

17. a) Discuss the effect of voltage-series feedback on input and output resistance of an amplifier. (8)

b) Explain the working principle of crystal oscillator. (6)

OR

18. a) Explain the working of Wien bridge oscillator with neat diagram. Derive the expression for sustained oscillations. (8)

b) Explain the effect of negative feedback on gain, input impedance and output impedance of an amplifier. (6)

MODULE V

19. a) Explain the working of a class B power amplifier. Derive the expression for the maximum efficiency of a class B power amplifier. (9)

b) Explain the working of shunt regulator circuit. (5)

OR

20. a) Design a discrete series voltage regulator with short circuit protection for regulated output voltage 10V and maximum current 100mA. (9)

b) Explain the working of a transformer coupled class A power amplifier. (5)

****