Reg. No. : ....
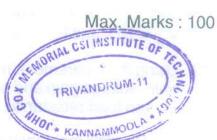
Name : ....

Third Semester B.Tech. Degree Examination, January 2015
(2008 Scheme)
08.305 : SOLID STATE DEVICES AND CIRCUITS (E)

Time : 3 Hours　　　　　　　　　　　　　　　　　　　　　Max. Marks : 100

PART – A

Answer all questions. Each question carries 4 marks.

1. Explain the term transistor biasing. What are the factors determining the choice of Q point ?

2. Draw the h parameter equivalent circuit of transistor in CE configuration.

3. A JFET has $I_{DSS} = 8$ mA, pinch off voltage = –6V, calculate the drain current for $V_{GS} = -3V$.

4. What do you understand by Class A, Class B, Class AB and Class C power amplifiers ?

5. What are the advantages of negative feedback in amplifiers ?

6. State and explain Barkhausen criterion for sustained oscillations.

7. Explain cross over distortion in amplifiers.

8. Draw the circuit of an emitter coupled differential amplifier.

9. Define CMRR and slew rate of an opamp.

10. An opamp non inverting amplifier has an input resistor of 10 kΩ and a feedback resistor of 50 kΩ. If the input voltage is 0.3 V, find the output voltage.

PART – B

Answer **any two** full questions from **each** Module. **Each** question carries **10** marks.

Module – I

11. Design a voltage divider bias circuit for an NPN silicon transistor having $\beta = 100$ and $V_{BE} = 0.6$ V. The desired Q point is $V_{CE} = 5$ V and $I_C = 1$ mA and $S \le 8$. Assume $V_{CC} = 10$ V and $R_E = 1$ kΩ. Show the circuit diagram with all the component values.

12. Using the h parameter model obtain the expressions for input impedance, current gain, voltage gain and output impedance of a CE amplifier if source resistance is R_S and load resistance is R_L.

13. Explain different biasing circuits for JFET amplifiers.

14. Draw and explain the construction, principle of working and characteristics of p-channel enhancement MOSFET.

Module – II

15. Draw the circuit of transformer coupled class A power amplifier. Explain its working. Obtain the expression for its maximum efficiency.

16. Draw and explain RC phase shift oscillator. Derive the equation for frequency of oscillation and conditions for oscillations.

17. With a neat circuit diagram explain the working of complementary symmetry push pull amplifier.

18. Explain the effect of negative feedback on amplifier gain, bandwidth, non linear distortion and noise.

Module – III

19. Explain the functional block diagram of an opamp. Also state the characteristics of an ideal opamp.

20. Explain how frequency compensation is done in opamp.

21. Draw and explain square wave generator using opamp.

22. Explain the operation of the following circuits using opamp.
    1) Differentiator
    2) Zero crossing detector
    3) Comparator.