

## FACULTY OF INFORMATICS

B.E. 2/4 (IT) First Semester (Suppl.) Examination, June/July 2011

## MICRO ELECTRONICS

Time : Three Hours]

[Maximum Marks : 75

**Note :—** Answer **ALL** questions from Part—A. Answer any **FIVE** questions from Part—B.

**PART—A (Marks : 25)**

1. Define Reverse Saturation Current.
2. Explain the term thermal runaway.
3. Draw the circuit for high impedance transistor.
4. Explain the difference between FET and BJT.
5. Define comparator with neat sketch.
6. If  $\alpha$  value is 0.99, calculate  $\beta$ .
7. Mention most important advantages of negative feedback in an amplifier.
8. Define : (a) Pinch-off voltage, (b) Drain resistance, (c) Trans-conductance.
9. State the Barkhausen Criterion for oscillations.
10. Why power amplifiers are called large signal amplifiers ?

**PART—B (Marks : 5×10=50)**

11. (a) Derive equations for the total hole current and total electron current in a Semiconductor. Give the significance of each term.  
(b) In an N-type semiconductor, its Fermi level lies 0.3 eV below the conduction band, at 300 °K. If the temperature is increased to 330 °K, find the new position of Fermi level.
12. (a) What is Early Effect ? Explain how does it affect the CB static characteristics of BJT.  
(b) Explain the operation of transistor as an amplifier.  
(c) Calculate the collector current for  $\beta = 50$  and  $I_B = 10 \mu A$ .
13. (a) Explain the operation of Astable Multivibrator with neat sketch and mention its applications.  
(b) Calculate the discharging time with a duty cycle of 50% and charging time of 0.5 ms.

14. (a) Explain the operation of depletion and enhancement type of N-channel MOSFETs, with neat sketch.
- (b) An N-channel MOSFET has  $I_{DSS} = 8 \text{ mA}$ ,  $V_p = -5 \text{ V}$ . Find the minimum value of  $V_{DS}$  for pinch-off region and the drain current  $I_{DS}$ , for  $V_{GS} = -2 \text{ V}$  in the pinch-off region.
15. Explain the operation of LED with neat sketch and mention its applications.
16. Define voltage series feedback amplifiers. Derive the expressions for :
- (a) Input Resistance
  - (b) Output Resistance
  - (c) Voltage gain.
17. Write short notes on :—
- (a) Zener diode as voltage regulator
  - (b) Op-Amp as an integrator
  - (c) Varactor diode.