Exam.Code:0975
Sub. Code: 7104

2123

M. Tech. (Micro-Electronics)

First Semester

MIC-101: Semiconductor Device Physics

Time allowed: 3 Hours Max. Marks: 50

***NOTE**: Attempt <u>five</u> questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Attempt the following:-

a) What is need for biasing in the transistor?

b) Differentiate between JFET and BJT.

c) In which region JFET act as a resistor and why?

d) Compare between signal assignment and variable assignment statements.

e) What is the distribution function?

f) What is the effect of temperature on intrinsic carrier concentration? (5x2)

UNIT - I

II. Discuss the importance of reverse bias PN junction diode. Derive the relation for junction capacitance. (10)

III. Why pure crystal is required as a substrate in semiconductor devices? List various methods used in the growth of semiconductor material. Explain any one in detail. (10)

IV. Define Fermi level. How is the Fermi distribution function used to calculate the electron and hole concentration in semiconductor? (10)

UNIT - II

V. What are the advantages of MOSFETs over JFETS? Explain the small dimension effects with respect to threshold voltage and width. (10)

VI. What are the various noises in BJT? Describe the operation of BJT in Ebber Molls model. (10)

VII. Write short notes on following:-

a) Hetero-junction Bipolar Transistor

b) Non ideal MOS effects (10)

x-x-x