

MODEL QUESTION PAPER

MFET1

I Semester M.TECH Examination, August 2011 SEMICONDUCTOR DEVICES & MODELING

Time: 3 Hours

Max. Marks: 75

GROUP A : Answer any three questions.

- Q.1 Explain BARITT diode.
- Q.2 Discuss about impact ionization . What is breakdown of P-N diode.
- Q.3 Give the ultimate expression for emitter and collector current in BJT including all current components.
- Q.4 What are Hall Effect and Magneto resistance? What is their significance in the study of semiconductors?
- Q.5 Explain band diagram for a P-N heterojunction under zero bias condition.

GROUP B : Answer any three questions.

- Q.6 Explain BJT as a Switch.
- Q.7 Sketch qualitative distribution of electric field, electric potential and carrier concentration in thermal equilibrium for a P-n structure.
- Q.8 Explain the Principle of operation of Hot Electron Injection Transistors. Give its advantage.
- Q.9 Assume that the refraction indexes of two media are 3.3 and 1. Find the reflection co-efficient with and without the antireflection coating with the refraction index 1.83.
- Q.10 Draw the MIS structure & explain its capacitance-voltage characteristics

GROUP C : All Questions are Compulsory.

Q.11 Fill in the blanks

- (i) Doped Semiconductors are called as _____ Semiconductors.
- (ii) In the IC 74H00, H stands for _____.
- (iii) HFET, HEMT MODFET etc are the example of _____ FET.
- (iv) Full form of PBT is _____.
- (v) The Schotky barrier gate contact is used to modulate the channel conductivity in _____ devices.

Q.12 Multiple choice question.

- (i) The depletion width of diode _____ with forward bias & _____ with reverse bias.
 - (a) Increases, Decrease
 - (b) Increases, Constant
 - (c) Constant, Increases
 - (d) Decrease, Increases
- (ii) The devices mainly used for switching purpose are _____.
 - (a) Diode & FET
 - (b) FET & BJT
 - (c) Diode, BJT & FET
 - (d) None of these
- (iii) MISFET is an alternate name of _____.
 - (a) MESFET
 - (b) MOSFET
 - (c) MFET
 - (d) MODFET
- (iv) The input resistance of a JFET is the order of _____.
 - (a) 100 M Ω
 - (b) 1 M Ω
 - (c) 1000 M Ω
 - (d) 10 M Ω
- (v) Following is not the hetero structure FET _____.
 - (a) HEMT
 - (b) MODFET
 - (c) JFET
 - (d) HIGFET

Q.13 True or false

- (i) The Hall factor for electrons in GaAs depends on temperature.
- (ii) The energy band diagrams of p-type and n-type semiconductors are similar.
- (iii) In hetero-junction device contact is formed between same types of semiconductor materials.
- (iv) Energy of a photon is inversely proportional to the frequency of light.
- (v) The Monte Carlo method it is compulsory to solve the Boltzmann transport equation.
