Total No. of Questions :8] *[Total No. of Printed Pages :2*

MEVD-204

M.E./M.Tech., II Semester

Examination, July 2015

Microelectronics

 Time : Three Hours

Maximum Marks : 70

Note : i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) Explain the concept of electron motion in free space.
   b) What is effective mass of electron, drive its mathematical expression?

2. a) Discuss the concept of holes.
   b) Describe the time-independent schrodinger's wave equation.

3. a) What do you understand by phonon scattering and impurity scattering?
   b) What is diffusion and transition capacitances?

4. a) Explain the concept of charge densities in a semiconductor.
   b) Discuss the process of generation and recombination of charges.

5. a) Explain the energy band diagrams for metals, semiconductors, insulators.
   b) Explain the energy band diagram of a pn junction in thermal equilibrium.

6. a) What do you mean by drift and diffusion currents? Write the expressions for current density.
   b) Discuss Ebers-Moll model in detail.

7. a) What are high current and high frequency effects?
   b) Explain small signal model of BJT with CC configuration.

8. Write short notes on any four.
   a) Linearly graded junction.
   b) Heterojunction materials.
   c) Tunneling effects.
   d) Short diode.
   e) Four assumptions to drive Ideal V-I relationship of a pn junction.
   f) Hall effect.

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