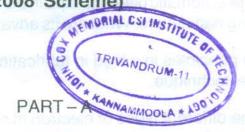


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Eighth Semester B.Tech. Degree Examination, November 2013 08.801 : NANOELECTRONICS (TA) (2008 Scheme)

Time: 3 Hours



Max. Marks: 100

Answer all questions. Each question carries 4 marks.

- 1. Define any three characteristic lengths associated with nanoelectronic devices.
- 2. What are the differences between evaporation and sputtering?
- 3. Explain TEOS technique of SiO2 deposition.
- 4. What are the merits of AFM over STM?
- 5. With doping profile and energy band diagrams explain ni pi super lattice.
- 6. Explain the principle of resonant tunnelling. How is it different from Esaki tunnelling?
- 7. Why are quantum dots considered as artificial atoms?
- 8. With diagram explain how the threshold current and gain of a multiple quantum well laser depends on the number of wells.
- 9. Derive expression for the voltage required for tunnelling through a nanocapacitor.
- Explain with reasons the difference in mobility of electrons in MOSFETS and MODFETS.



PART-B

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

Module - I

- 11. With a simple schematic diagram explain the principle of Molecular Beam Epitaxy for fabricating nanolayers. What are its advantages and disadvantages?
- Explain the principles involved in fabricating different types of nanomaterials using sol-gel technique.
- What are the different types of electron microscopes? With diagrams explain the principle of Scanning Electron Microscope.

Module - II

- Compare the energy distribution and density of states in 3D, 2D, 1D and 0D materials.
- 15. What are the differences in the distribution of energy of electrons in multiple quantum well and superlattice? Explain any one application of each.
- 16. Explain integer quantum Hall effect.

Module - III was to algoring or

- 17. With energy band diagrams explain the principle of operation of a heterojunction BJT.
- Explain the principle of operation and characteristics of a quantum dot based, single electron transistor.
- 19. With structural details explain the principle of operation of a quantum dot laser. What are its advantages and disadvantages?