



Reg. No. : .....

Name : .....

**Eighth Semester B.Tech. Degree Examination, October 2014  
(2008 Scheme)**

**08.801 : NANO ELECTRONICS (TA)**

Time : 3 Hours

Max. Marks : 100

**PART - A**



Answer **all** questions. **Each** question carries **4** marks.

1. Explain the technique of fabricating xevogel.
2. With diagram explain the principle of laser ablation for fabricating nanolayers.
3. What are the merits of molecular beam epitaxy in fabricating nanolayers ?
4. Explain any two methods of fabricating quantum dots.
5. What are the different scattering mechanisms in a nano material ? How do they affect carrier mobility ?
6. Derive expression for quantum mechanical resistance. What is its numerical value ?
7. What are the differences between multiple quantum wells and superlattices ?
8. Explain Aharnov Bohm effect.
9. What is meant by real space transfer in quantum heterostructures ?
10. Explain the principle of a single electron transistor.

**PART – B**

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

**Module – I**

11. With schematic diagram explain the principle of ion implantation. How can the dose and range of implantation be controlled? What are the merits and demerits of ion implantation with respect to fabrication of nanolayers or nanodevices?
12. With schematic diagram explain the principle of atomic force microscope? What are its advantages and disadvantages over STM and SEM?
13. Explain the principle of thermal CVD and plasma enhanced CVD with diagrams compare them.

**Module – II**

14. Derive Landauer formula for the conductance of a nanowire.
15. Compare the distribution of energy and the wave functions in two dimensional square, parabolic and triangular potential wells.
16. Explain the effect of lattice mismatch on the energy band diagram of a strained layer. How do the mismatch between the layers affect the degeneracy of holes?

**Module – III**

17. Explain the principle of operation of hot electron transistor and resonant tunnelling transistor, with structure and energy band diagrams.
18. With structural details explain the principle of operation of a Vertical Cavity Surface Emitting Laser.
19. Explain the principle of operation of a carbon nanotube transistor (CNT transistor) with its structure equivalent circuit.