(Pages : 2) **1993**

Reg. No. : ....

Name : ....

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

Time : 3 Hours Max. Marks : 100

PART – A

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

1. Write notes on precipitation of quantum dots.
2. Briefly explain the laser ablation method for nano material deposition.
3. Explain the principle of operation of an STM.
4. Show that the density of states in a one dimensional semiconductor material is directly proportional to $\frac{1}{\sqrt{E}}$.
5. With the help of energy band diagram, explain the two types of multiple quantum wells.
6. Consider an electron having kinetic energy 5 eV and rest mass 0.511 MeV. Calculate its de Broglie wavelength.
7. List the benefits of carbon nanotube FETs.
8. Explain quantum confined stark effect with reference to quantum well optical modulator.
9. Draw the schematic representation of the conduction band of a resonant tunnel diode for
   a) no voltage applied
   b) increasing applied voltage
   Explain its IV characteristics.
10. Explain the Aharonov-Bohm quantum interference effects.

P.T.O.

PART – B

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

MODULE – I

11. Explain the sol-gel process for fabrication of nano particles.
12. Explain the principle of operation of an AFM.
13. Draw and label a CVD reactor and explain the steps involved in CVD processes.

MODULE – II

14. Explain the concept of quantization of conductance and coulomb blockade with reference to quantum transport in nano structures.
15. Explain the Shubnikov-de Hass effect of magnetic fields on the electronic and transport properties of the 2D system.
16. Determine the electron wavefunction for a finite potential square well. State all the assumptions clearly.

MODULE – III

17. Explain coulomb blockade effect and the working of a single electron transistor.
18. The heterojunction bipolar transistor is an improvement of the BJT. Justify.
19. With the aid of energy diagram, explain the working of a resonant tunneling transistor.
