



Reg. No. : .....

Name : .....

**Eighth Semester B.Tech. Degree Examination, April 2015**

**(2008 Scheme)**

**08.801 : NANOELECTRONICS (TA)**

Time : 3 Hours

Max. Marks : 100

**PART – A**

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



1. What are the different types of specimen interactions in SEM ?
2. Write notes on Chemical Vapor deposition.
3. Briefly explain the process of ion plating.
4. A dosage of  $10^{13} \text{ cm}^{-2}$  is achieved while irradiating a sample of area  $100 \text{ cm}^2$  in an ion implantation equipment for a period of 160 seconds. Calculate the ion current (Assume single charged ions are involved in the process).
5. Prove density of state function,  $\rho_{1D}(E) = \left( L(2m/\hbar^2)^{1/2} E^{-1/2} \right) / 2\pi$ .
6. Obtain the wave function for a Quantum dot (State your assumptions clearly).
7. Compare the gain spectrum of quantum well and quantum dot lasers.
8. What do you mean by Coulomb gap voltage ?
9. Briefly explain CNT transistor.
10. Briefly explain the working of RTT.

**PART – B**

Answer **any 2** questions from **each** Module. **Each** question carries **10** marks.

**Module – 1**

11. Explain the operation of TEM with relevant diagram.
12. Write notes on :
  - a) Sputtering
  - b) Sol gel technique.



13. a) Explain why annealing is required after ion implantation.
- b) Explain the process of laser ablation. Highlight the advantages.

### Module – 2

14. Obtain density of states function for a 2D semiconductor nano structure. Compare the value with 1D semiconductor.
15. Determine the electron wave function for a finite potential square well (State all your assumptions clearly).
16. List and explain the major electron scattering mechanisms in parallel transport.

### Module – 3

17. Describe the operation of heterojunction bipolar transistors.
18. With relevant diagrams explain the working of Single electron transistor.
19. a) With relevant figures explain the operation of VCSEL.
- b) Write notes on HEMT.