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Reg. No. :

Name : .....

Eighth Semester B.Tech. Degree Examination, May 2022

(2008 Scheme)

08.801 : NANOELECTRONICS (TA)

Time : 3 Hours Max. Marks : 100

SECTION – A

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

1. Explain the principle of Molecular Beam Epitaxy (MBE).

2. Discuss the principle of Atomic Force Microscopy (AFM)?

3. Explain the fabrication of nano particle

   (a) grinding

   (b) Laser ablation

4. Define the term de Brogile wavelength and diffusion length.

5. Distinguish between Quantum well (2D), quantum wires (1D) and quantum dot(0D)?

6. Draw the block diagram of two strained SiGe heterostructures and list two applications.

7. Explain Impurity scattering.

P.T.O.

8. Draw the schematic representation of the conduction band of a resonant tunnel diode with

   (a) no voltage applied

   (b) increasing applied voltage.

   Also draw its current-voltage characteristics.

9. Draw the structure of single electron transmitter and draw its current-voltage characteristics.

10. State the important characteristics of vertical cavity surface emitting LASERS.

(10 × 4 = 40 Marks)

SECTION – B

Answer any **two** questions from each module. All questions carry **10** marks.

Module – I

11. Describe the physical vapour deposition by Ion implantation and DC voltage sputtering.

12. Explain about solgels and precipitation of Quantum dots.

13. Discuss scanning Tunnelling microscopy and X-ray diffraction.

Module – II

14. Discuss the trends in Nanoelectronics and optoelectronics.

15. Explain the basic properties of two-dimensional semiconductor nanostructures.

16. Describe the MOSFET structure and NiPi superlattices.

Module – III

17. Explain the features of MODFETs and quantum well photodetectors.

18. Discuss an edge emitting laser based on self assembled quantum dots and hot electron transistor.

19. Describe in detail the resonant tunnelling transistor and double heterostructure laser.

(6 × 10 = 60 Marks)