USN | | | | | | | | | |
15EC551

Fifth Semester B.E. Degree Examination, June/July 2018
Nano Electronics

Time: 3 hrs.   Max. Marks: 80

**Note: Answer any FIVE full questions, choosing
ONE full question from each module.**

Module-1

1 a. Give an overview of development milestones in microfabrication in electronic industries.
                                                                    (10 Marks)
   b. Mention the properties that is affected by nanoscale dimension.   **(06 Marks)**

OR

2 a. Name two fabrication methods of nanostructure. Explain any one vapour phase deposition method with neat schematic diagram.   **(10 Marks)**
   b. Explain ordering of nanosystems.   **(06 Marks)**

Module-2

3 a. Illustrate the working principle of atomic force microscopy with neat schematic diagram.
                                                                    (10 Marks)
   b. Mention the different types of microscopy techniques.   **(06 Marks)**

OR

4 a. Explain the quantum confinement in semiconductor nanostructure.   **(10 Marks)**
   b. Explain superlattices in detail.   **(06 Marks)**

Module-3

5 a. Explain the major steps involved in photolithographic technique for the fabrication of nano structure.   **(08 Marks)**
   b. Mention the requirements for an ideal semiconductor nanostructure.   **(08 Marks)**

OR

6 a. Explain interband and intraband absorption in semiconductor nanostructures.   **(08 Marks)**
   b. Explain the Ballistic carrier transport in semiconductor nanostructures.   **(08 Marks)**

Module-4

7 a. What do you understand by carbon clusters? Explain the synthesis of carbon cluster with example.   **(08 Marks)**
   b. Design experiment to synthesis carbon nanotubes using chemical vapour deposition method.
                                                                    (08 Marks)

OR

8 a. Explain the following applications of carbon nanotubes.
      i) Fuel cells   ii) Field emission and shielding.   **(10 Marks)**
   b. Mention the properties of carbon nanotubes and explain any one.   **(06 Marks)**

Module-5

9 a. Explain the working principle of quantum cascade Lasers with a neat sketch.   **(08 Marks)**
   b. Explain coulomb blockade devices with a neat sketch.   **(08 Marks)**

OR

10 a. Explain the basic working principle of sensors. How does nanosize effect the efficiency of a sensor?   **(08 Marks)**
   b. What are the requirements of a nanosensors? Explain nanosensors based on physical properties.   **(08 Marks)**

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