CBCS SCHEME

USN | | | | | | | | | | |

15EC551

Fifth Semester B.E. Degree Examination, Aug./Sept. 2020
Nanoelectronics

Time: 3 hrs. Max. Marks: 80

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

Module-1

1 a. Define nanotechnology, discuss the classification of nano structured materials and systems depending on the number of dimensions. **(08 Marks)**
b. Distinguish the TOP–down and bottom up processes methods for fabrication of nanostructures. **(08 Marks)**

OR

2 a. Classify conductor, insulator and semiconductors based on its electronic properties. **(08 Marks)**
b. Give an over view of the bonding between atoms using the concept of molecular bonding. **(08 Marks)**

Module-2

3 a. Discuss briefly the general classification of characterization methods for both imaging and analysis employed for the investigation of nano structures. **(08 Marks)**
b. With schematic diagram discuss the working principal of scanning electron microscopy. **(08 Marks)**

OR

4 a. Evaluate the quantum confinement in semiconductor nanostructures. **(08 Marks)**
b. Write a brief note on electronic density of states. **(08 Marks)**

Module-3

5 a. Explain the main requirements for an ideal semiconductor nanostrucures. **(08 Marks)**
b. Explain the steps involved in growth of quantum wires on a vicinal surface. **(08 Marks)**

OR

6 a. Explain the phenomenon in quantum confined stark effect. **(08 Marks)**
b. Give an account on quantum hall effect and resonant tunneling. **(08 Marks)**

Module-4

7 a. Explain the different experimental methods to synthesize carbon nanotubes. **(08 Marks)**
b. Discuss the applications of carbon nano tubes. **(08 Marks)**

OR

8 a. Evaluate the properties of carbon nanotubes. **(08 Marks)**
b. Discuss the carbon clusters and C_{60}. **(08 Marks)**

Module-5

9 a. Discuss the working principle of sensors with schematic and electro chemical sensors. **(08 Marks)**
b. Describe nanosensors based on physical properties and nano cantilever sensor. **(08 Marks)**

OR

10 a. Discuss the working principles of nanobiosensors. **(08 Marks)**
b. Write a note on injection laser and its working principles. **(08 Marks)**

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