

GBCS SCHEME



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17EC551

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

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- a. Define Nanotechnology. Mention with an example different types of Nanostructures. (04 Marks)
b. State Moore's law. Mention its limitations. (04 Marks)
c. Explain the concept of isolated atom. (12 Marks)

OR

- a. Explain the concept of electronic conduction and prove that density of states is α^u to \sqrt{E} . (12 Marks)
b. Explain Top-down and Bottom up process involved in the generation of nanomaterials. (08 Marks)

Module-2

- a. What is characterization on nanomaterial. Explain x-ray scattering when they interact with matter. (06 Marks)
b. Mention different types of scanning probe technique. Explain any one method. (08 Marks)
c. Define Bragg's law. Explain X-ray Diffractometer. (06 Marks)

OR

- a. With necessary energy band diagram explain Doping. (06 Marks)
b. What are excitons and explain the variation of absorption coefficient with photon energy. (05 Marks)
c. Derive an equation for total energy of Quantum confinement in one-dimension. (09 Marks)

Module-3

- a. Explain different types of requirements of ideal semiconductor? (08 Marks)
b. With necessary diagram discuss different types of self-assembly technique. (12 Marks)

OR

- a. With necessary diagram discuss the concept of Quantum hall effect. (10 Marks)
b. In detail discuss the concept of Resonant Tunneling. (10 Marks)

Module-4

- a. With necessary diagram explain the nature of carbon bonding. (06 Marks)
b. Explain the concept of Alkali-Doped C_{60} and Super conductivity in C_{60} . (06 Marks)
c. What are carbon nanotubes and explain laser evaporation method to develop carbon nanotubes. (08 Marks)

OR

- a. Explain different types of carbon nano structure. (06 Marks)
b. In detail explain electrical properties of carbon nanotubes. (08 Marks)
c. Mention the application of Carbon Nanotubes. Explain any two. (06 Marks)

Module-5

- 9 a. What are nanosensors? Explain nanoscale organization using template method. (05 Marks)
b. Write a note on Nano Biosensors. (05 Marks)
c. Discuss the concept of Electronic Nose developed using Nano sensors and Basic sensor device. (10 Marks)

OR

- 10 a. With a necessary diagram explain injection laser. (10 Marks)
b. Write a note on Optical Memories and Quantum Cascade Lasers. (10 Marks)

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