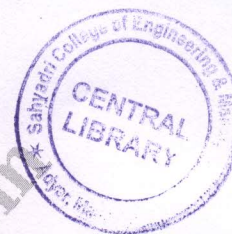


CBCS SCHEME



15EC551

USN

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Fifth Semester B.E. Degree Examination, Dec.2019/Jan.2020 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. What is nanotechnology? Explain the various classification of nanostructures. (08 Marks)
b. State Moore's law. Apply the same to explain the continued miniaturization seen in the field of electronics. (08 Marks)

OR

- 2 a. Explain how the nanometer length scale effects the system structure. (08 Marks)
b. With the schematic of DC glow discharge apparatus and magnetron sputtering explain them. (08 Marks)

Module-2

- 3 a. Discuss the working principle of Scanning Electron Microscopy (SEM). (08 Marks)
b. With the schematic of tip and sample interaction and I - V curve explain Scanning Tunneling Microscopy (STM) technique. (08 Marks)

OR

- 4 a. Based on Bragg's law, summarize the working principle of X-ray diffractometer with a neat sketch. (10 Marks)
b. Write a brief note on electron density of states. (06 Marks)

Module-3

- 5 a. What are the requirements of an ideal semiconductor? Explain. (08 Marks)
b. Give an account on quantum hall effect. (04 Marks)
c. Explain how electrostatically induced dots and wires are formed. (04 Marks)

OR

- 6 a. Give a comparison between interband and intraband absorption in semiconductor nanostructures. (08 Marks)
b. Give an account on optical and electrical characteristion. (08 Marks)

Module-4

- 7 a. Explain the structure of a C60 and brief about its super conductivity. (06 Marks)
b. With the schematic of experimental arrangement explain fabrication of carbon nanotube. (05 Marks)
c. Write a note on electrical and mechanical properties of CNT (Carbon nanotubes). (05 Marks)

OR

- 8 a. Demonstrate the application of SWCNT in fuel cells. (08 Marks)
b. With the schematic of FET made of carbon nanotube explain application of carbon nanotube in computers. Illustrate concept of computer switching device. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-5

- 9 a. What are sensors? With the schematic explain the design of a sensor. (06 Marks)
b. Write a note on electrochemical sensors. (04 Marks)
c. Explain how a smart dust sensor is used, for future use and nano biosensors. (06 Marks)

OR

- 10 a. Write a note on injection laser and its working principle. (08 Marks)
b. Explain the following :
i) Single photon sources
ii) Optical memories. (08 Marks)
