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18NT733

Seventh Semester B.E. Degree Examination, Feb./Mar. 2022 Nanodevices and Applications

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Explain about microsensors, nanosensors and biosensors. (10 Marks)
b. Write a note on sensors and their classification. (10 Marks)

OR

- 2 a. Discuss about optical sensors and different types of industrial optical sensors. Mention their applications. (15 Marks)
b. Explain about radiation sensors and their types. (05 Marks)

Module-2

- 3 a. Describe about one dimensional gas sensor and their classification based on the arrangement of nanostructures. (12 Marks)
b. Write a note on:
i) Approaches of gas adsorption on a surface
ii) Nano structured thin film gas sensor
iii) Types of nano structured metal oxide thin film gas sensors. (08 Marks)

OR

- 4 a. Explain the Density Of States (DOS) in 0D, 1D, 2D and 3D nanomaterials. (15 Marks)
b. Explain nano mechanical sensors. (05 Marks)

Module-3

- 5 a. Explain the deposition process of fabrication of NEMS. (10 Marks)
b. Discuss about sacrificial etching process. (10 Marks)

OR

- 6 a. Describe the etching process of fabrication of NEMS. (15 Marks)
b. Write a note on polymeric nano fibres and their preparation by electrospinning. (05 Marks)

Module-4

- 7 a. Write a note on the challenges and applications of electronic devices based on DNA. (10 Marks)
b. Describe the applications of bio sensor-based instruments to the bio-process industry. (10 Marks)

OR

- 8 a. Discuss about the importance of biosensors for environmental pollution detection. (15 Marks)
b. Discuss about photo-induced charge transfer in DNA. (05 Marks)

Module-5

- 9 a. Explain the factors that decide the appropriateness of electrode materials in super capacitor and emerging 2D super capacitor electrodes. (08 Marks)
b. Explain about the materials used as cathode in asymmetric super capacitors. (12 Marks)

OR

- 10 a. Explain electrical double layer capacitors. (10 Marks)
b. Write a note on the fibre type asymmetric super capacitor devices. (10 Marks)
