

**Eighth Semester B.E. Degree Examination, July/August 2022**  
**Nanotechnology**

Time: 3 hrs.

Max. Marks:100

Note: Answer any FIVE full questions, selecting atleast TWO questions from each part.

**PART – A**

- 1 a. What do you mean by Nano – Technology? Explain the nature and scope of Nanotechnology. (10 Marks)
- b. How can Nanotechnology be used for sustainable development? (10 Marks)
- 2 a. Explain the working principle of Scanning Electron Microscope. (10 Marks)
- b. With the neat sketch, explain AFM. (10 Marks)
- 3 a. What are Fullerenes? With a schematic diagram, explain synthesis and purification of Fullerenes. (10 Marks)
- b. What are the different types of carbon nano – tubes? Explain their physical and mechanical properties. (10 Marks)
- 4 a. What are Self Assembled Monolayers? Why gold is preferred substrate? Explain the preparation of nano on gold. (10 Marks)
- b. Define Atomic or Molecular clusters. List various cluster sources. Explain cluster formation from any one cluster source. (10 Marks)

**PART – B**

- 5 a. What are Quantum dots? List the ideal properties of nano crystals and its application. (10 Marks)
- b. Explain Brast method of preparing Monolayer protected clusters. (10 Marks)
- 6 a. What are Core shell Nano particles? Elaborate on its application. (10 Marks)
- b. Explain the concept of super lattices. (10 Marks)
- 7 Explain the following :
  - a. Define Nano sensors schematically. Explain Self Assembly.
  - b. Interaction between biomolecules and nano particle surface.
  - c. Target drug delivery using Nano particles. (20 Marks)
- 8 a. With the neat sketch, explain surface fore apparatus in Nano tribology and Nano tribometer. (10 Marks)
- b. Write a short note on :
  - i) Molecular ratchet
  - ii) Nano lubrication. (10 Marks)

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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.

