

Seventh Semester B.E./B.Tech. Degree Examination, Dec.2024/Jan.2025
Nanobiotechnology

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Discuss the history and definition of nanotechnology. Compare and contrast nanobiotechnology and bio nanotechnology. (10 Marks)
- b. Describe the Bottom-Up and Top-Down approaches in nanotechnology, and explain their advantages and disadvantages. (10 Marks)

OR

- 2 a. Explain the different methods of nanoparticle synthesis: physical, chemical and biological methods, include their principles and applications. (10 Marks)
- b. Discuss the key parameters affecting nanoparticle growth, shape, size and structure. How do these parameters influence the material properties and applications? (10 Marks)

Module-2

- 3 a. Explain the structure, properties and applications of fullerenes, including Buckyballs and carbon nanotubes. (10 Marks)
- b. Describe the principle, instrumentation and applications of UV spectroscopy and FTIR spectroscopy. (10 Marks)

OR

- 4 a. Discuss the principle, instrumentation and applications of Raman Spectroscopy, Surface Plasmon Resonance (SPR) and Atomic Force Microscopy (AFM). (10 Marks)
- b. Describe the synthesis, structure and applications of Nanoparticles, Nanocomposites, Dendrimers and Quantum Dots. (10 Marks)

Module-3

- 5 a. Discuss the rationale and applications of nanotechnology in molecular diagnostics include examples of nanoparticles used in diagnostics. (10 Marks)
- b. Explain bio-functionalization methods used in nanotechnology, and discuss the role of Bio-Nano hybrids in diagnostic applications. (10 Marks)

OR

- 6 a. Discuss the significance and working principles of nanopore technology and nano arrays in diagnostic applications. (10 Marks)
- b. Describe pathogen detection using magnetic nanoparticle-based techniques and discuss the role of miniaturized devices in nanobiotechnology. (10 Marks)

Module-4

- 7 a. Discuss the principles, advantages and challenges of using nanocapsules in drug delivery systems. Provide examples of their applications in oncology and neurology. (10 Marks)
- b. Evaluate the use of DNA-based nanostructures in medicine. Explain their functions, advantages and potential limitations. (10 Marks)

OR

- 8 a. Analyze the application of biomolecular nanomotors in the field of drug delivery. What are the key types of nanomotors and their role in the delivery process? (10 Marks)
- b. Discuss on current and future applications of nanotechnology in ocular, oncology, neurology and cardiology improve treatment outcomes in these fields. (10 Marks)

Module-5

- 9 a. Discuss the Ethical, Legal and Social Implications (ELSI) of Nano medicine and implication in the development and regulation of Nano-based therapies. (10 Marks)
- b. Evaluate the health risks associated nanoparticles in medicine. Explain the safety concerns and challenges. (10 Marks)

OR

- 10 a. Compare and contrast the in-vitro and in-vivo experimental methods used to assess the toxic effects of nanoparticles. (10 Marks)
- b. Evaluate the regulatory aspects of nano pharmaceuticals in India their challenges and risks associated in commercialization and market acceptance. (10 Marks)

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