



## M.Sc. IV Semester Degree Examination, October - 2023

### BIOTECHNOLOGY

#### Nanobiotechnology

#### (NEP)

Time : 3 Hours

Maximum Marks : 70

**Notes :** (i) Answer **any five** of the following questions with question no. **1 (Q. 1)** is **compulsory**, each question carries **equal** marks.

(ii) Draw neat diagrams wherever necessary.

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|----|-----|--|----|
| 1. | (a) | Explain about classification of nanomaterials with suitable examples.  | 10 |
|    | (b) | Discuss on physico-chemical features of nanoparticles.   | 4  |
| 2. | (a) | Brief about bottom-up and top-down approaches of synthesis.  | 4  |
|    | (b) | Explain high energy ball milling and melt mixing methods of synthesis.   | 10 |
| 3. | (a) | Explain Scanning Probe Microscopy.   | 7  |
|    | (b) | Explain working principle of Nuclear Magnetic Resonance Spectroscopy.  | 7  |
| 4. | (a) | Brief about various types of biological nanomaterials.   | 4  |
|    | (b) | Discuss in briefly about Protein-based nanostructures and their applications.  | 10 |
| 5. | (a) | Explain about future of nanotechnology in biomedicine.   | 4  |
|    | (b) | Explain working principle, types and applications of biosensors.   | 10 |
| 6. | (a) | Discuss the sputtering and ion plating methods of synthesis.   | 10 |
|    | (b) | Brief on application of FTIR spectroscopy for analysis of nanomaterials.   | 4  |
| 7. | (a) | Discuss in briefly about Biocompatible nanomaterials and their biological applications.                                    | 7  |
|    | (b) | Explain Protein sensors and their applications.  | 7  |
| 8. |     | Discuss in detail about biological methods of synthesis and their advantages compare to the physical and chemical methods. | 14 |

