



**B.TECH DEGREE EXAMINATIONS: NOV/DEC 2023**

(Regulation 2018)

Seventh Semester

**BIOTECHNOLOGY**

U18BTE0007: Nanobiotechnology

**COURSE OUTCOMES**

- CO1:** Understand the synthesis processing of various nanomaterials.  
**CO2:** Apply and interpret the various characterization techniques for nanomaterials.  
**CO3:** Apply and evaluate the various nanomaterials applications in different field.  
**CO4:** Understand and apply the natural bionanomolecules for various biological applications.  
**CO5:** Understand and apply the nanobiochips, nanobiosensor and micro array for biological Applications.  
**CO6:** Evaluate the nanomaterials in cancer diagnosis and treatment.

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 2 = 20 Marks)**

**(Answer not more than 40 words)**

- |   |     |                   |
|---|-----|-------------------|
| 1. Classify the nanomaterials based on size and shape.                      | CO1 | [K <sub>2</sub> ] |
| 2. "Nanorobots (Bacteriobots) can diagnose and treat the cancer" Justify.   | CO1 | [K <sub>3</sub> ] |
| 3. Provide any four advantages of AFM.                                      | CO2 | [K <sub>2</sub> ] |
| 4. What are the applications of XRD?  | CO2 | [K <sub>2</sub> ] |
| 5. Distinguish between the single-walled and multi-walled carbon nanotubes. | CO3 | [K <sub>2</sub> ] |
| 6. What is a biological nanopore?   | CO3 | [K <sub>2</sub> ] |
| 7. List the uses of nanofibres.   | CO4 | [K <sub>2</sub> ] |
| 8. Define a magnetosome.  | CO4 | [K <sub>1</sub> ] |
| 9. Summarize the advantages of polymeric micelle.                           | CO5 | [K <sub>2</sub> ] |
| 10. How nanoshells are used for cancer therapy?                             | CO6 | [K <sub>3</sub> ] |

**Answer any FIVE Questions:-**

**PART B (5 x 16 = 80 Marks)**

**(Answer not more than 400 words)**

- |   |    |     |                   |
|---|----|-----|-------------------|
| 11. a) Discuss any one bottom-up approach method to synthesize/fabricate the nanomaterials with a neat sketch.                      | 10 | CO1 | [K <sub>2</sub> ] |
| b) "Nano devices are potential to improve the cancer detection and diagnosis processes". Justify the statement with anyone example. | 6  | CO1 | [K <sub>3</sub> ] |

12.	Explain the principle and the instrumentation of SEM with a neat diagram.	16	CO2	[K <sub>2</sub> ]
13.	“It is a nondestructive technique to identify the crystalline phases and orientation.” Identify the technique, and explain its the working principle and instrumentation with a neat illustration.	16	CO2	[K <sub>3</sub> ]
14.	a) Write a detailed note on any two methods to synthesis the nanostructure materials of fullerenes and their potent applications.	10	CO3	[K <sub>2</sub> ]
	b) Explain the principle of nanopore sequencing with a neat sketch.	6	CO3	[K <sub>2</sub> ]
15.	“Proteins are suitable for material development and building nanoscale devices.” Substantiate the statement with suitable examples.	16	CO4	[K <sub>2</sub> ]
16.	a) Discuss the importance bio-imaging process with any one suitable method.	8	CO5	[K <sub>2</sub> ]
	b) Elaborate the nanomaterials used of in cancer diagnosis and treatment with few suitable examples.	8	CO6	[K <sub>3</sub> ]

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