

Exam.Code:0912

Sub. Code: 6730

2062

B.E. (Biotechnology) Eighth Semester  
Elective - I

BIO-815(a): Nanobiotechnology

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Section.

x-x-x

1. Attempt the following:- (10x1)
- What are convergent dendrimers?
  - How is EPR effect beneficial in treating cancer?
  - Differentiate between single walled and double walled carbon nanotubes.
  - What are the important features to look for when using a nanomaterial for biomedical applications?
  - Define SERS hotspots.
  - Differentiate between positive and negative photoresist.
  - Mention one application of bucky balls.
  - What are bioinks?
  - Evanescent wave is defined as \_\_\_\_\_.
  - Name one top down and one bottom up approach to synthesize nanoparticles.

### SECTION A

2. a. Describe the synthesis and mechanism of action of nanoshells in detail. Use diagram if required. (5)
- b. "The structural and chemical features of DNA tremendously help to build artificial nanostructures for biotechnological applications". Justify this statement. (5)

P.T.O.



(2)

3. a. How will you create nanoscale featured surface? Explain the process of formation of focal adhesion plaque when the cell interacts with this surface. (5)

b. Explain the growth mechanism in the synthesis of carbon nanotube in detail. Use diagram if required. (5)

4. Write a detailed note on:

a. Synthesis and properties of tissue engineering scaffolds.

b. Surface patterning of nanoparticles to control the adhesion of cells.

(2×5)

### SECTION B

5. a. How is surface enhanced raman spectroscopy based nanosensors used for probing and imaging live cell? Discuss. (5)

b. Explain ion cut technique for SOI wafer fabrication and its application in construction of nanopump. (5)

6. a. "Nanorobots have been proven as a boon for the existing therapeutic approaches". Justify this statement. (5)

b. What are nanopores? Classify them and mention any five applications. (5)

7. a. Elaborate on surface patterning and techniques to control of motility of the actin/myosin motor system. (5)

b. Write a detailed note on MEMS based nanopump. (5)