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[A-30/A-31]

SEAT No. _____

Number of printed pages: 02

SARDAR PATEL UNIVERSITY

M. Sc. Integrated Biotechnology (Semester-X) Examination

Friday, 13/04/2018; Time-10:00 AM to 01:00 PM

SUBJECT CODE: PS10CIGIB3/C-β3

SUBJECT TITLE: NANOTECHNOLOGY AND ITS APPLICATION

Maximum Marks: 70

- Note: (1) All questions are compulsory.
 (2) Figure to right indicates total marks of question.

Q.1 Multiple choice questions (08)

1. Which of the following nanostructure possess the electrons confined to one direction and can move in two directions?

a) Quantum dots	b) Quantum halls
c) Quantum wells	d) Quantum wire
2. Lattice vibration waves are known as

a) Phonons	b) Photons
c) Holes	d) None
3. Who coined the word 'nanotechnology'?

a) Eric Drexler	b) Richard Feynmann
c) Sumio Tijima	d) Richard Smalley
4. Charge determination for nanoparticles is done by

a) Rose Bengal(dye) binding	b) Transmission electron microscopy
c) Atomic force microscopy	d) Zeta potentiometer
5. Within nano-particle based sensors ... can be utilized as an on/off switch

a) Secretary Protein	b) Cytosolic proteins
c) Ion channel based proteins	d) Any receptor proteins
6. What is the diameter of ATPase?

a) 10 nm	b) 14 nm
c) 12 nm	d) 16 nm
7. Fast and efficient, require mild reaction conditions and create water-soluble and biocompatible linkages is:

a) Ping reaction	b) Click reaction
d) Quick reaction	d) None
8. Which type of molecules form aggregate through a self-assembly process that is driven by the hydrophobic effect?

a) Electrophilic	b) Nucleophilic
c) Ambiphilic	d) None of the mentioned

Q.2 Answer in brief: Attempt any seven (14)

1. Write different forms and properties of nanoparticles.
2. What do you mean by quantum dots and quantum wire?

[P.T.O.]

3. Give basic principle of Ball milling.
4. Briefly discuss the basic principle of SEM based nanolithography.
5. Write nanostructures which can be synthesized by utilizing lipids.
6. Briefly discuss applications of Nano-biotechnology in biomedical field.
7. How the DNA can be used to build hinges?
8. What do you mean by self assembly and self organization? Discuss in brief.
9. Discuss role of size in nanomaterials with example.

- Q.3 (a) Describe quantum wells and its application in detail. (06)
(b) What do you mean by Nano-biotechnology? Give Top down and bottom up approach for synthesis of nanomaterials. (06)

[OR]

- (b) Write short note on Machine-Phase Nano-biotechnology. (06)

- Q.4 (a) Enlist physical methods of fabrication of nanomaterials and describe any one in detail. (06)
(b) Explain E beam lithography in detail. (06)

[OR]

- (b) Describe Chemical precipitation and co-precipitation methods of synthesis of nanomaterials. (06)

- Q.5 (a) Describe the various methods of bio-functionalization of nanomaterials. (06)
(b) Describe the various techniques involved in drug delivery system. (06)

[OR]

- (b) Describe synthesis of monolayer by lipid as nanoparticles and give its significance. (06)

- Q.6 (a) Describe the toxicities of nanomaterial. (06)
(b) Write a note on protein folding. (06)

[OR]

- (b) Describe biometric approach and DNA coating method for the nanofabrication. (06)