

CBCS Scheme

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15NT33

Third Semester B.E. Degree Examination, Dec.2016/Jan.2017 Foundations of Nanoscale Science & Technology

Time: 3 hrs.

Max. Marks: 80

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

Module-1

- 1 a. Define the terms Nanotechnology and Nanomaterials. Give a note on history of nanotechnology. (04 Marks)
- b. Write a note on the following :
- i) Bohr atomic model
 - ii) Phases
 - iii) Classical physics
 - iv) Quantum mechanics. (07 Marks)
- c. Explain surface to volume ration with any two examples. (05 Marks)

OR

- 2 a. Give a note on scientific revolution, about nanoscience. (06 Marks)
- b. Enumerate the challenges of Rechr d Fegman and who solved it? Add note on molecules. (06 Marks)
- c. Mention the importance of Nanomaterials and their devices. (04 Marks)

Module-2

- 3 a. Explain the classifications of Nanostructures with examples each. (05 Marks)
- b. What are semiconductors? Give a note on types of semiconductors. Add a note on top-down and Bottom-up approaches. (05 Marks)
- c. Define Quantum dots and Nanowires. Describe nanosheets with examples. Mention applications. (06 Marks)

OR

- 4 a. Write a short note on :
- i) Nano composites and their importance
 - ii) Ceramics and mention its classifications. (05 Marks)
- b. Explain Quantum size effect in 0D, 1D, 2D and 3D Nanomaterials. Add a note on density of states. (08 Marks)
- c. Explain current flow in semiconductors. (03 Marks)

Module-3

- 5 a. What biomimetics? Explain its applications. (04 Marks)
- b. Discuss Lotus effects and mentions the applications. (06 Marks)
- c. What are bio-materials? Explain their classification. (06 Marks)

OR

- 6 a. Explain biologically inspired structures and tools in detail. (06 Marks)
- b. Write a note on Velcro effect. Mention its application. (05 Marks)
- c. Explain Industrial significance of biomimetic. (05 Marks)

Important Note: 1. On completing your answer, compulsorily draw diagonal cross lines on the remaining blank space.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

Module-4

- 7 a. Write a note on the metal nano-particles and their applications in FET. (08 Marks)
b. Explain Carbon based nano-materials and their applications in FET. (08 Marks)

OR

- 8 a. With examples explain metal oxide nanoparticles and their applications in solar cells. (08 Marks)
b. Discuss magnetic and ceramic nanomaterials with applications. (08 Marks)

Module-5

- 9 a. Give a short note on nanomaterials pollution. (04 Marks)
b. Discuss the effects of nanomaterials in environment. (06 Marks)
c. Explain safety and pollution control techniques of nanomaterials (06 Marks)

OR

- 10 a. Give a note on nanomaterials in environment. (05 Marks)
b. Explain toxicology of air borne Nanomaterials. (04 Marks)
c. Discuss Handling, Packaging and disposal of Nanomaterials. (07 Marks)

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