

Roll No.

78612

M. Sc. Physics 4th Semester (New)

Examination – May, 2014

PHYSICS OF NANO-MATERIALS (New)

Paper :XVI

Time : Three hours]

[Maximum Marks : 80

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) Distinguish between conductors insulators and semiconductors on the basis of band theory.
(b) Give idea of quantum well structure in brief.

- (c) Why physical properties changes in case of nanostructure when particle size reduces to nano scale ?
- (d) Name 'top down' and 'Bottom up' techniques for the synthesis of nanomaterials. Give co-precipitation method in brief.

UNIT - I

2. Discuss free electron theory (qualitative idea) and its features.
3. (a) Discuss variation of density of states with energy.
- (b) Discuss how band gap varies with the size of crystal.

UNIT - II

4. (a) Discuss quantum dot.
- (b) Explain Quantum wire.

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5. Discuss Electron Confinement in infinitely deep square well mathematically.

UNIT - III

6. (a) Discuss shift in photoluminescence peaks in case of nanomaterials.
- (b) How will you find size of nanomaterials ?

7. (a) Discuss variation of Raman spectra in case of nanomaterials.

- (b) Discuss increase in width of XRD Peaks of nanoparticles.

UNIT - IV

8. Discuss the synthesis of nanomaterials by :

- (a) Ball Milling
- (b) Ion beam deposition technique.

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