

8. (a) What do you mean by semiconductor nano materials ? How they are fabricated and write their two properties and two applications. **14**
- (b) Write a note on Energy conservation devices. **6**

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Roll No.

DD-284

M. Sc. EXAMINATION, May 2017

(Fourth Semester)

(Main & Re-appear)

PHYSICS

PHY-608-B

Nano Science & Technology

Time : 3 Hours]

[Maximum Marks : 100

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

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a) Explain the concept of quantum well, quantum wires and quantum dots in solids. **10**
(b) Consider a particle in one dimensional box and find the wave function and energy associated with it. **10**
2. (a) Define the density of state in bands and explain the effect of crystal size or dimensions on density of states. **10**
(b) Write a note on intermolecular interactions. **10**

Unit II

3. (a) Define bottom up technique and discuss various bottom up approaches used to deposit thin films. **10**
(b) Write a note on atomic layer deposition. **10**
4. What do you mean by hybride techniques ? Explain the synthesis of nano particle by using focused Ion Beam technique in details. **20**

M-DD-284

2

Unit III

5. (a) Classify various types of techniques used to characterize a non-materials. **8**
(b) What do you mean by Ellipso-metery ? Explain its principle, working and how it is used to characterize a non-material ? **12**
6. (a) Name the various microscopy techniques used to produce images of samples of nano-materials and explain surface plasma resonance technique. **12**
(b) Draw the schematic diagram of Atomic force microscope (AFM) and explain it principle, working and image modes. **8**

Unit IV

7. (a) Write a note on Chemical and bio-chemical sensors. **7**
(b) What are Carbon nano-tubes (CNT's) ? How they are synthesized and characteriazed ? Discuss their unique propeties and any four applications. **13**

(2-22) M-DD-284

3

P.T.O.