Unit IV

7. (a) Write notes on the following : **10**

(i) Chemical and bio-chemical sensors.

(ii) Energy conservation devices.

(b) What is Quantum Computing ? Discuss its basic properties and applications. **10**

8. What do you mean by polymers electro-active materials blends ? How they are fabricated and write their two properties and two applications ? **20**

DD-284

M. Sc. EXAMINATION, Dec. 2017

(Fourth Semester)

(Re-appear Only)

PHYSICS

PHY-608-B

Nano Science and 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) Discuss novel combination of properties of material at nano scale. **8**

(b) Write notes on the following : **12**

(i) 2D electron gas

(ii) Nano particle as superatams.

2. (a) Define the density of state in bands and example the effect of crystal size or dimensions on density of states. **12**

(b) Write a note on Hetero-structure and super-lattices. **8**

Unit II

3. (a) Define top down approaches used to fabricate nano particles. Write the various step, required to deposite nano film using molecular beam expitaxy. **10**

(b) Write notes on the following : **10**

(i) Nucleation and growth

(ii) Self assembly of monolayers.

4. (a) Define bottom up technique and write the various steps, required to deposite nano film using plasma assist chemical vapour deposition. **12**

(b) Write a note on Focused ion beam technique. **8**

Unit III

5. (a) Classify various types of techniques used to characterize a nanomaterials. **10**

(b) What do you mean by Auger Electron spectroscopy and explain the variation in Auger spectrum of nano-materials ? **10**

6. (a) Differentiate between contact and non-contact method of surface characterization. **8**

(b) Draw the schematic diagram of Scanning Tunneling Microscope (STM) and explain its principle, working and image modes. **12**