M.Sc.(Physics) (CBCS Pattern) Semester-III

PSCPHYT11-2 -Paper-XI Core Elective E1.2 : Nanoscience and Nanotechnology-I

P. Pages : 2 **GUG/W/24/11299**

Time : Three Hours * 4 3 6 6 * Max. Marks : 80

Either:

1. a) State and explain the features of free electron theory. **8**

b) Explain the idea of band structure of nanotechnology. **8**

OR

e) Explain in brief the shifting of peak in photoluminescence. **8**

f) Describe the factors affecting the size and structure of particle. **8**

Either:

2. a) Explain Bottom-up Ball Milling synthesis. **8**

b) Discuss the use of laser pyrolysis in the synthesis of nanomaterials. **8**

OR

e) Discuss the main path of sol-gel process. Explain how acid catalyst helps to enhance the rate the hydrolysis of sol-gel process. **8**

f) Explain the principle of low-pressure CVD technique. **8**

Either:

3. a) Describe the theory of UV-Visible Spectroscopy with the help of diagram. **8**

b) Explain the Raman spectroscopy and state its application. **8**

OR

e) State and explain the difference between SEM and TEM. **8**

f) Explain the parts of SEM instrument. **8**

Either:

4. a) Describe types of CNT with the help of neat diagram, how CNT are fabricated. **8**

b) Describe in brief aerogel. State its applications. **8**

OR

e) Explain in brief the electrical and magnetic properties of nanostructures. **8**

f) Describe self assemble nanomaterials. **8**

5. Solve the following questions.

a) Discuss quantum well and quantum dots. **4**

b) Explain in brief ionized cluster beam deposition. **4**

c) Describe vibration sample magnetometer. **4**

d) State and explain the properties of porous silicon nanostructure. **4**

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