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

PSCPHYT11-2 - Elective Paper-XI : Nanoscience and Nanotechnology-I

P. Pages : 2 **GUG/W/23/11299**

Time : Three Hours * 6 3 1 7 * Max. Marks : 80

Either:

1. a) Discuss free electron theory and explain its features. **8**

b) Explain in short: **8**

i) Quantum confinement

ii) Quantum dot

OR

e) State and explain the factors affecting the size of the nano particles. **8**

f) Explain why in nanoparticles the width of XRD peaks increases. **8**

Either:

2. a) Explain high energy ball milling synthesis technique for nanoparticles. **8**

b) Explain the process: **8**

i) Laser pyrolysis

ii) Laser ablation

OR

e) Describe the complete method for the synthesis of metal nanoparticles using Colloidal route. **8**

f) Discuss in short: **8**

i) Microemulsion method &

ii) Combustion method

Either:

3. a) Draw the systematic diagram for scanning electron microscope and explain each part in detail. **8**

b) Explain the complete procedure for analysis of material by using XRD. **8**

OR

e) Explain in detail the UV-Visible spectrophotometer. **8**

f) Give the difference between TEM and SEM in detail. **8**

Either:

4. a) Describe the different possible structure of carbon materials in detail. **8**

b) Discuss semiconductor nanocluster in detail. **8**

OR

e) Explain structural properties of nanomaterials in detail. **8**

f) Discuss Thermal and Optical properties of nanomaterials. **8**

5. Attempt the following.

a) State 0D, 1D, 2D & 3D quantum states. **4**

b) Write a note on Aerogel. **4**

c) Describe Photolithography in brief. **4**

d) Explain Spintronics. **4**

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