M.Sc. Physics Semester - 4
Preparation Techniques and Characterization of Nanomaterials
[Phys-N401] Paper Code: 4756

Total Marks:70 APRIL -2015 Time: 2½ hrs

Instructions:
- All questions are compulsory
- Figures in right margin indicate marks

1. (a) What do you understand by high energy ball milling ? Explain in detail the parameters affecting milling process. Write advantages and disadvantages of obtaining nano-sized particles of a substance compared to wet-chemical bottom-up approach ? **[10]**
   (b) Explain the principle of Laser ablation. Write short note on: Pulse Laser Deposition technique for preparation of thin films. **[04]**

OR

1. (a) Explain reaction mechanism involved in chemical vapour deposition (CVD) techniques with block diagram. Write advantages and disadvantages of it **[10]**
   (b) Write advantages of gas phase process to develop nano-particles **[04]**

2. (a) Explain two different approaches of nanofrabrication with example. **[03]**
   (b) What is liquid phase synthesis: Explain any one technique in detail **[07]**
   (c) What is micro-emulsion: write its applications **[04]**

OR

2. (a) Explain co-precipitation method of synthesis for nano-particles in detail with example. **[07]**
   (b) Discus sol-gel technique for preparation of nano-particles. **[07]**

3. (a) Write a note on Biosynthesis of Nanoparticles **[07]**
   (b) Write a note on magnetosome chains **[07]**

OR

3. (a) Write a note on Vibrating sample magnetometer **[07]**
   (b) What is SQUID? Explain components of it in short. **[07]**

4 (a) Explain working principle and construction of TEM with block diagram, how it is different from SEM. **[10]**
   (b) Explain working principle of Energy dispersive X-ray spectroscopy **[04]**

OR

4. (a) Write Bragg's law of X-ray diffraction. Explain working principle and construction of powder X-Ray diffractometer with neat diagrams. **[10]**
   (b) What are the drawbacks of XRD method of characterisation of NPs? **[04]**

5. Discuss in detail construction of differential scanning calarometry (DSC) **[14]**

OR

5. What is TGA? Explain working principle of TGA **[14]**