Total No. of printed pages = 3

19/2nd Sem/PFET 2122

2022

NANOMATERIAL SYNTHESIS AND CHARACTERIZATION TECHNIQUES

Full Marks – 100

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer any *five* questions.

1. (a) Define Nanoscience, Nanotechnology and Nanoparticles. 5

   (b) What are the applications of Nanotechnology in food industry ? 5

   (c) Differentiate between Bottom-up and Top-down approach of Synthesis of Nanomaterials. 5

   (d) Explain 0D, 1D, 2D and 3D Nanomaterials. 5

[Turn over

2. Write notes on any *four* of the following : 5×4=20

(a) Carbon Fullerenes

(b) Carbon Nanotubes

(c) Graphene

(d) Gold Nanoparticles

(e) Food Nanotechnology.

3. (a) Write is green synthesis ? Describe the various biological ingredients for the synthesis of nanomaterials. 10

(b) How do you synthesize silver nanoparticles using plant extract ? 10

4. (a) "Template-assisted synthesis of nanoparticles is a very efficient tool to grow highly ordered nano-wires / nanorods". Explain. 10

(b) Describe the steps to follow with schematics for hydrothermal synthesis of nanoparticles. 10

5. (a) What is the difference between UV-Vis and FT-IR spectroscopy ? How can you make samples for FT-IR for solid and liquid samples ? 10

(b) Explain the working principles of X-ray diffraction. 10

6. (a) Explain how to characterize a material with Scanning Electron Microscope (SEM) with neat sketch. 10

(b) Explain the importance of size and shape dependence of material properties at the nanoscale. 10

7. (a) Define Electro Deposition method and explain its principle. Write the advantages and disadvantages of CVD. 10

(b) Discuss the principles and applications of Sol Gel method. 10