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Third Semester B.E. Degree Examination, Feb./Mar. 2022 Synthesis and Processing of Nano-materials

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. Discuss the method of obtaining nano-fibres from electro-spinning with their advantages. (06 Marks)
- b. Illustrate the process of high energy Ball mill technique for synthesizing Nano-materials with neat sketch. List out their advantages. (10 Marks)
- c. Analyze the Arc Discharge method for obtaining various forms of carbon with a neat sketch. (04 Marks)

OR

- 2 a. Analyze the CVD process in detail. Explain the basic reactions involved with an example. (10 Marks)
- b. Discuss the electro-chemical synthesis of nano-structures. (05 Marks)
- c. Enunciate the sputtering technique for the fabrication of thin films. (05 Marks)

Module-2

- 3 a. Explain Sol-Gel synthesis for producing nano-materials with the help of a neat sketch. (10 Marks)
- b. Discuss the synthesis of nano-materials by chemical reduction method with appropriate reactions. (05 Marks)
- c. Enumerate the hydrothermal process for the synthesis of Nano-materials. (05 Marks)

OR

- 4 a. Discuss in brief the Solvo-thermal method for the synthesis of Nanomaterials. (07 Marks)
- b. Describe the method of obtaining nano-particles from sonochemical method. (07 Marks)
- c. Write short notes on : (06 Marks)
 - i) Micro emulsions
 - ii) Inverse miscelles.

Module-3

- 5 a. With a neat sketch, discuss the process of inert gas condensation for nanoparticle synthesis. (08 Marks)
- b. Write short notes on : (12 Marks)
 - i) Vapor Liquid Solid (VLS)
 - ii) Solution – Liquid –Solid (SLS) method for synthesis of nanomaterials (Nanowires).

OR

- 6 a. Discuss in detail the process of obtaining nanostructures on substrates by flame spray Pyrolysis with their Pro's and Con's. (10 Marks)
- b. Focus on the advantages of using chemical vapor condensation for nanoparticle synthesis. (06 Marks)
- c. Discuss the process parameters and optimization techniques involved in control of size of then nano-wires by VLS method. (04 Marks)

Module-4

- 7 a. Discuss the role of plant in nano-particle synthesis. (07 Marks)
b. Analyze the method of nano-particle synthesis using micro-organisms. (06 Marks)
c. What are magnetotactic bacteria? How are they synthesized? (07 Marks)

OR

- 8 a. Enumerate the process of synthesis of nano-particles using proteins. (08 Marks)
b. Focus on the use of bacteria and fungi for nano-particle synthesis. (06 Marks)
c. Discuss how nano-structured materials can be obtained by using viruses. (06 Marks)

Module-5

- 9 a. Enumerate the process of surface modification of inorganic nanoparticles. (08 Marks)
b. Discuss the method of nanofoaming for the fabrication of Porous Silica particle. (08 Marks)
c. Focus on the optical properties of organic nanocrystals. (04 Marks)

OR

- 10 a. Develop the method of obtaining organic noncrystals. (08 Marks)
b. Discuss the advantages and disadvantages of neat cosmetic based on nanoparticles. (06 Marks)
c. Enunciate the applications of Porous aluminosilicates. Why PLGA nanospheres are selected for skin care cosmetics. (06 Marks)

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