

CBCS SCHEME

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17NT43

Fourth Semester B.E. Degree Examination, June/July 2019 Synthesis and Processing Techniques

Time: 3 hrs.

Max. Marks: 100

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

Module-1

- 1 a. Write a brief note on ball milling synthesis of nano-particles. (12 Marks)
b. Explain radio frequency plasma method of synthesis of nano-material. Mention its advantages and applications. (08 Marks)

OR

- 2 a. Discuss in detail about inert gas condensation method for synthesis of nano-material. (10 Marks)
b. Discuss about atomic layer deposition with its advantages and limitations. (10 Marks)

Module-2

- 3 a. Write note on
i) Chemical precipitation
ii) Co-precipitation method
iii) Arrested precipitation method. (10 Marks)
b. Explain hydrothermal synthesis and solution combustion synthesis of nanoparticles. (10 Marks)

OR

- 4 a. Explain sol-gel method of synthesis of nano-materials. (10 Marks)
b. Write a note on:
i) Electro-chemical synthesis
ii) Sonochemical synthesis. (10 Marks)

Module-3

- 5 a. Explain in detail the growth mechanism and kinetics and rate determining steps in VLS method. (10 Marks)
b. Write short notes on SLS growth and stress induced recrystallization in brief. (10 Marks)

OR

- 6 a. Explain in detail about VLS growth of nanowires and control of the size of nanowires. (10 Marks)
b. Write a short notes on fundamental aspect of VLS and SLS processes. (10 Marks)

Module-4

- 7 a. Draw Electron beam lithography set up and explain working process in detail. (10 Marks)
b. Explain soft lithography replication of patterns done in different ways. (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

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OR

- 8 a. Write short note on :
- Deep UV lithography
 - X-ray based lithography
 - Dip pen lithography
 - Soft – lithography.
- (16 Marks)
- b. Explain the writing mechanism involved in a ion beam lithography with diagram. (04 Marks)

Module-5

- 9 a. Explain the fabrication techniques of organic nano crystals and their optical properties and materialization. (10 Marks)
- b. Mention some of the cosmetics available in the market based on nanoparticles and explain method of developing new cosmetic based on nanoparticles. (10 Marks)

OR

- 10 a. Elaborate the process involved in developing functional skin care cosmetics. (06 Marks)
- b. Explain surface modification of inorganic nanoparticles by organic functional groups. (08 Marks)
- c. Explain instantaneous nanofoaming method for fabrication of closed – porosity silica particle. (06 Marks)
