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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Second Semester, M.Tech. - Mechanical Engineering (MCIM)

Semester End Examination; May/June - 2018

Nano Technology

Time: 3 hrs

Max. Marks: 100

Note: Answer **FIVE** full questions, selecting **ONE** full question from each unit.

UNIT - I

- 1 a. Distinguish between Nano-science and Nano-technology. 4
- b. Define Nano-material and describe the history of Nano-material development. 10
- c. Explain briefly Interdisciplinary nature of Nano-science and Nano-technology. 6
2. Briefly explain below Nano-material property : 20
 - a) Mechanical
 - b) Chemical
 - c) Electrical
 - d) Optical

UNIT - II

- 3 a. Classify Nano-material and explain briefly. 8
- b. Briefly explain the concept of mesopores, misnomers, and misconception of Nano-technology. 12
- 4 a. Write a note on size dependent phenomena of Nano-materials. 4
- b. Briefly discuss Nano-wires, Nano-tubes, Nano-sheet and quantum dots. 16

UNIT - III

- 5 a. Explain with neat sketch Inert Gas Condensation process. 10
- b. With neat sketch explain CVD. 10
- 6 a. With suitable sketch, explain the process of MBE and list their disadvantages. 12
- b. Explain Langmuir-Blodgett techniques for synthesis of Nano-material. 8

UNIT - IV

- 7 a. Explain the x -ray diffraction techniques for material characterization. 10
- b. Explain the working principle of SEM. 10
- 8 a. Describe the working of EDAX and its application. 10
- b. Explain the working principle of AFM. 10

UNIT - V

9. List the application of Nano-technology in the following field : 20
 - a) Automobiles
 - b) Agriculture and food
 - c) Medical
 - d) Defense Engineering
10. Discuss the effect of Nanotechnology on; 20
 - a) Human Health
 - b) Pollution Treatment and Remediation