

Code No: 117FU

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, November/December - 2017

NANO TECHNOLOGY
(Common to Chem, ME)

Time: 3 Hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART- A

(25 Marks)

- 1.a) Write importance of nanotechnology. [2]
- b) Explain the quantum confinement effect in nano materials. [3]
- c) What is the importance of stacking faults defects in nano materials? [2]
- d) How the nano crystalline materials differ from crystalline materials. [3]
- e) What are the advantages of Top-down approach? [2]
- f) Explain the working principle involved in Ball mill. [3]
- g) Describe the terms Tunneling and Scattering. [2]
- h) Explain the importance of SAXS to study nano materials. [3]
- i) How the significance of nano materials in space application. [2]
- j) What are MEMS? [3]

PART-B

(50 Marks)

- 2.a) Materials in nano scale may exhibit remarkable properties, Justify your answer. [5]
 - b) Discuss the concept of size dependent properties with a suitable example. [5]
- OR**
- 3.a) Write four important ways in which nanoscale materials may differ from micro scale materials? [5]
 - b) Write a note on Challenges and Future Prospects of Nanotechnology. [5]
- 4.a) How does the Mechanical Properties differ in Nano and Micro. [5]
 - b) Describe the Grain growth characteristics of nanomaterials. [5]
- OR**
- 5.a) How does the Electrical Properties differ in Nano and Micro. [5]
 - b) Explain the concept of Giant Magnetic Resonance. [5]
- 6.a) Write a notes on synthesis materials ? Define nano particle, nano composite and nano materials. [5]
 - b) Discuss the inert gas condensation experimental procedure for the synthesis of nano structures. [5]
- OR**
- 7.a) How the Aerogel and Xerogel are formed from solgel synthesis. [5]
 - b) Explain the advantages and disadvantages of sol gel method. [5]

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8.a) With the help of a suitable diagram, explain Contact, Non contact and Tapping modes of Atomic force microscopy (AFM).

Ro b) Write short notes on Nano indentation techniques. [5+5] Ro R

9.a) Applications of Energy Dispersive X-ray analysis (EDAX)

b) Why STM is used to study only the conducting surfaces? Justify your answer. [5+5]

10. Explain applications of Nano materials in:

a) Food and Agricultural Industry

b) Cosmetic and Consumer Goods

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11. Explain applications of Nano materials in Automotive Industry.

[10]

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