

Code No: 126DM**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech III Year II Semester Examinations, May - 2016****CHARACTERIZATION OF NANOMATERIALS****(Material Science and Nano Technology)****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) Define Magnification and Resolution. [2]
- b) Explain the importance of Depth of field. [3]
- c) How does the Microscopy differ from Spectroscopy? [2]
- d) Explain the principle of Electron Microscope. [3]
- e) What are the Back Scattered electrons? [2]
- f) Explain Auger electrons. [3]
- g) Write a short note on dimensions of AFM Tip. [2]
- h) Write about the principle of AFM. [3]
- i) Define diffraction phenomena with example. [2]
- j) How diffraction differ from scattering and transmission. [3]

PART - B (50 Marks)

2. Describe the Theory and principle of Electron Microscope. [10]
OR
3. Describe the importance of Electron sources and Electron lenses in Electron Microscope. [10]
- 4.a) Explain the Importance of beam spot size.
b) Explain Specimen-Beam interactions with neat sketch. [5+5]
OR
- 5.a) Describe the construction and working principle of SEM.
b) Mention few applications of SEM. [5+5]
6. Describe the construction, working principle, advantages and disadvantages of TEM with a neat diagram. [10]
OR
- 7.a) Explain the Applications of TEM.
b) How does the HRTEM differs from TEM?
c) Explain the concept of Dark field imaging. [3+4+3]
8. Describe the construction, advantages and disadvantages of AFM with a neat sketch. [10]
OR
- 9.a) Explain the concept of Tip Functionalization.
b) Explain the Force curves and force measurements of AFM. [5+5]

- 10.a) Explain the working principle and construction Raman Spectroscopy.
b) Derive an expression for Braggs law.
c) Describe the working principle of XRD. [4+3+3]

OR

- 11.a) Explain the working principle and construction IR Spectroscopy
b) Explain the applications of Raman Spectroscopy.
c) Describe the applications of XRD. [4+3+3]

---ooOoo---