

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III (New) EXAMINATION – WINTER 2015

Subject Code:2133904**Date:18/12/2015****Subject Name: Characterization of Nanomaterials-I****Time: 2:30pm to 5:00pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

		MARKS
Q.1	Short Questions	14
	1 Give Full Form of SEM.	
	2 Write down Bragg`s formula.	
	3 What is sheet resistivity?	
	4 Write down Scherrer formula.	
	5 Magnetic Lenses is made of what?	
	6 What is interference?	
	7 What is Diffraction?	
	8 What do mean by detector.	
	9 What is resolution?	
	10 In which technique resolution is better, SEM or TEM.	
	11 Give Full Form of TEM.	
	12 Which material is used as a filament in electron gun?	
	13 Can we find out particle size using TEM?	
	14 Can we find out particle size using SEM?	
Q.2	(a) Explain Bragg`s law.	03
	(b) Explain how to find out particle size using X-Ray diffraction Pattern.	04
	(c) Write down applications of X-Ray diffraction technique.	07
	OR	
	(c) Write a short note on X-Ray diffraction for material characterization.	07
Q.3	(a) Describe electron gun with schematic diagram.	03
	(b) Draw schematic diagram of Transmission Electron Microscope.	04
	(c) Write down applications of SEM microscopy.	07
	OR	
Q.3	(a) Draw the schematic diagram of magnetic lenses.	03
	(b) Write down advantage and disadvantage of Four Probe resistivity measurements.	04
	(c) Write a short note on Capacitance Measurements.	07
Q.4	(a) Draw schematic diagram of SEM microscopy for nanomaterial characterization.	03
	(b) Give difference between SEM and TEM microscopy.	04
	(c) Write down application of TEM Characterization.	07
	OR	
Q.4	(a) Draw schematic diagram of optical microscopy with necessary notations.	03
	(b) Give difference between optical and electron microscopy.	04
	(c) Describe compound optical microscope with schematic diagram.	07

- Q.5** (a) Describe two probe measurement methods for resistivity measurements. **03**
- (b) Explain resistivity and conductivity and give the name of different techniques to measure it. **04**
- (c) Describe Ellipsometry technique with its applications. **07**

OR

- Q.5** (a) Describe Junction testing. **03**
- (b) Write advantages and disadvantages of four probe measurement methods. **04**
- (c) Describe Profilometry technique with its applications. **07**
