Seat No.: _____ *Enrolment No._____*

GUJARAT TECHNOLOGICAL UNIVERSITY

BE SEM-VIII Examination May 2012

Subject code: 182105

Subject Name: Modern Techniques for Material Characterization

Date: 08/05/2012 **Time: 10.30 am – 01.00 pm**

Total Marks: 70

Instructions:

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

Q.1	**(a)**	What is Thermal Analysis? With a labeled sketch of DTA equipment explain its working.	**07**
	(b)	With a general diagram of Scanning Electron Microscope (SEM) explain the function of various components.	**07**
Q.2	**(a)**	What is characterization? State its importance in materials science.	**07**
	(b)	What is X-ray diffraction? Discuss Debye-Scherrer method for study of crystal structure.	**07**
		OR	
	(b)	Write a short note on Hot Stage microscopy.	**07**
Q.3	**(a)**	Define: Exothermic, Endothermic, Heat of fusion, Glass transition temperature.	**07**
	(b)	Explain Heat Flux and Power Compensation DSC techniques.	**07**
		OR	
Q.3	**(a)**	Differentiate between DTA and DSC.	**07**
	(b)	What is Transmission Electron Microscopy? With a ray diagram explain working of TEM.	**07**
Q.4	**(a)**	Write a short note on: Specimen preparation in Electron Microscopy.	**07**
	(b)	What is Spectroscopy? Discuss UV-Visible Spectrophotometer.	**07**
		OR	
Q.4	**(a)**	With a schematic diagram explain X-ray fluorescence analyzer.	**07**
	(b)	Write a short note on Atomic Absorption Spectrophotometry (AAS).	**07**
Q.5	**(a)**	What is FTIR? Explain advantages, limitations and applications of FTIR.	**07**
	(b)	Write a short note on Differential Interference Contrast (DIC) illumination in microscopy.	**07**
		OR	
Q.5	**(a)**	Write a short note on NMR technique.	**07**
	(b)	State Bragg's law.	**07**
		Data given: For FCC (hkl) = (111), a = 5.63 A^0, $\Theta = 5.2^0$. For n = 1, find λ.	

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