

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE- SEMESTER-VII (NEW) EXAMINATION – WINTER 2020****Subject Code:2172109****Date:30/01/2021****Subject Name:Materials Characterization****Time:10:30 AM TO 12:30 PM****Total Marks: 56****Instructions:**

1. Attempt any FOUR questions out of EIGHT questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) State the importance of materials characterization. **03**  
(b) Write the difference between Positive Replica and Negative Replica. **04**  
(c) Write short note on Differential Thermal Analysis.. **07**
- Q.2** (a) What is the purpose of molecular sieve in sorption pump? **03**  
(b) What do you understand by vertical resolution? **04**  
(c) Explain in detail the principle, working, advantages and applications of SEM **07**
- Q.3** (a) Explain the phenomenon of cryotrapping. **03**  
(b) Write short note on Colour Metallography **04**  
(c) What do you understand by optical Abberation? Explain the off axis aberrations with its remedies in detail. **07**
- Q.4** (a) Draw the schematic diagram illustrating the principle of Metallurgical microscope. **03**  
(b) List the application of Transmission Electron Microscopy. **04**  
(c) Write short note on field ion microscopy. **07**
- Q.5** (a) Write short note on formvar replica. **03**  
(b) Explain the technique that can be used for the observation of liquation of constituents. **04**  
(c) Explain Electron Probe Micro Analysis (EPMA) in detail. **07**
- Q.6** (a) State the electrolyte and conditions for electrolytic polishing to prepare replica. **03**  
(b) Write short note on Image Analyzer. **04**  
(c) What is X-ray diffraction? Derive Bragg's law. **07**
- Q.7** (a) Explain the terminology 1) Numerical Aperture 2) Resolving power **03**  
(b) Which technique is used to find out the elemental analysis of geological material? Explain its principle in brief. **04**  
(c) Explain the application of XPS (ESCA) for material characterization **07**
- Q.8** (a) Draw a schematic diagram of arrangement of TMA. **03**  
(b) State the working principle of Turbo molecular pump.. **04**  
(c) Differentiate between EDS and WDS. **07**

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