

M.SC.(Phy.) Semester - 4 (CBCS) Examination
April/May-2022 (NEW COURSE)
Materials Characterization (Elective)

Time: 2:30 Hours**Marks: 70****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate marks.

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- Q.1. Answers the following any **SEVEN** [14]
- (i). What is TGA? Describe Dynamic TGA, Isothermal TGA and Quasistatic TGA.
 - (ii). How X-ray are produced?
 - (iii). Give names of Ferroelectric material crystals.
 - (iv). Why the angle between diffracted and undiffracted beam is 2θ rather than the Bragg's angle θ ?
 - (v). Differentiate STM and SFM.
 - (vi). What is lock-in amplifier? Where it is used?
 - (vii). Write a statement of Beer's Law.
 - (viii). Define charge transfer process in UV sensitive compounds.
 - (ix). Write a two essential criteria for a compound to absorb IR radiation.
 - (x). Why TEM has high spatial resolution?
- Q.2. Answer any **TWO** [14]
- (1). Explain DTA & DSC in context of principle, types and applications.
 - (2). Discuss UV-viz technique in detail.
 - (3). Explain molecular vibrations in FTIR.
- Q.3. Answer the following [14]
1. Discuss STM in detail
 2. Describe: A powder pattern is a crystal's fingerprint.
- OR**
- Q.3. Answer the following [14]
1. Explain various types of polarizations in dielectric material and discuss the dielectric response at different frequency. What is dielectric loss?
 2. Write a short note on SQUID and its applications.
- Q.4. Answer any **TWO** [14]
- (1). What is TGA? Write a note on instrument of TGA.
 - (2). Describe Van der Pauw method of resistivity measurement.
 - (3). Write a detail note on TEM. Also, differentiate SEM and TEM.
- Q.5. Answer any **TWO** [14]
- (1). SFM in detail
 - (2). VSM and its applications.
 - (3). Write a short note on Ferro electricity. Also, Discuss P-E loop.
 - (4). Discuss x-ray emission spectrum of copper in detail.
