Exam.Code:1029
Sub. Code: 7545

2023

M. Tech. (Material Science and Technology)

First Semester

MT-105: Material Characterization

Time allowed: 3 Hours Max. Marks: 50

***NOTE**: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.*

x-x-x

I. Briefly describe the following:-

a) Describe the ionization gauge.

b) Define the term of heat of transition with example.

c) Discuss the basic principle of interferometer.

d) Describe the various electron and photon sources used in optical spectroscopy. (4x2½)

UNIT - I

II. Describe in detail the cryopump and ionization pump used in vacuum technology. (10)

III. a) Write the influence of particle size on XRD peaks.

b) Describe the Bragg's law and its applications in material analysis. (2x5)

IV. a) Discuss the molecular beam epitaxy and its advantages for formation of thin films.

b) Write the principle and construction of thermo-gravimetric analyzer. (2x5)

UNIT - II

V. a) Describe in detail the principle, construction, and applications of FTIR spectroscopy.

b) Describe in detail the Raman spectrometer and the difference between the material information obtained from Raman spectra and FTIR spectra. (2x5)

VI. a) Differentiate between the Ferret and Martin's diameter in particle analysis.

b) Why do we get bands instead of peaks in UV-Vis spectroscopy? What is the application of absorption spectroscopy? (2x5)

P.T.O.

VII. a) Describe the Jablonski diagram and how it can be used to explain the fluorescence properties of a material.

b) Discuss the various components of X-ray fluorescence in detail. (2x5)

x-x-x