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# DBW-003-028201

Seat No. _____

## PGDSAIT. (Sem. II) Examination

**July - 2022**

## Advance Spectroscopic & Thermal Methods of Analysis for Pharma & Chemical Products : Paper-201

**Faculty Code : 003**
**Subject Code : 028201**

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

**Instructions :** (1) All questions are compulsory.
(2) All questions carry equal marks.

**1** Answer the following : (Any **Seven**) **14**

(a) Define the terms : Wavelength and Wavenumber.

(b) Why TMS is used as an internal reference standard in NMR spectroscopy ?

(c) Define the term : Base peak and Molecular ion peak.

(d) How will you distinguish cis-stilbene and trans-stilbene using UV spectroscopy ?

(e) Write the application of TGA.

(f) Differentiate, TGA and DSC.

(g) Calculate the wave number of stretching vibration of carbon-carbon double bond. (Force constant $k=10\times10^5$ dynes $cm^{-1}$,)

(h) Enlist the application of $^{13}C$ NMR.

(i) Give the applications of DTA.

(j) Write the strength and limitations of X-ray power diffraction.

2 Answer the following : (Any **two**) **14**

(a) State the principle of TGA and explain the TGA curve of $CuSO_4.5H_2O$.

(b) Explain various types of electronic transition in UV spectroscopy.

(c) Explain McLafferty rearrangement with suitable example.

3 Answer the following : **14**

(a) Explain instrumentation of Mass spectrometry with schematic diagram.

(b) Explain various fundamental vibration modes in IR spectroscopy.

**OR**

3 Answer the following : **14**

(a) Explain the factors affecting the TGA curve and explain the TGA curve for $AgNO_3$.

(b) State the principle of DTA and explain its instrumentation.

4 Answer the following : **14**

(a) Explain Bragg's law in powder XRD method.

(b) Give the application of DSC and IR spectroscopy.

5 Answer the following : (Any **Two**) **14**

(a) Describe various factors affecting chemical shift in NMR spectroscopy.

(b) Write a note on overtone and fermi resonance.

(c) Explain electron impact and chemical ionization method in mass spectrometry.

(d) Explain instrumentation of DSC.

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