

## M.Sc Sem-3 Examination

504

## Chemistry EI-2 (Spectro-II)

November-2024

[Max. Marks : 70]

Time : 2-30 Hours]

**Q. 1** (A) Explain in brief about the principle, instrumentation, and factors affecting Thermogravimetry Analysis. **07**

(B) What is Braggs Law? Derive Braggs Equation with schematic representation and application. **07**

**OR**

(A) Discuss the principle, instrumentation, and application of Differential Thermal Analysis with DTA curve. **07**

(B) What Simultaneous DSC-TGA can tell you? **07**

**Q. 2** (A) Explain Auger electron in Auger Electron Spectroscopy (AES)? How AES technique differ from XPS and UPS techniques. **07**

(B) What are the Strength and limitations of XPS, UPS and AES techniques? **07**

**OR**

(A) Why XPS is called ESCA? Write down its importance in industry. **07**

(B) Give a brief idea about data collection and data analysis of X-Ray Photoelectron Spectroscopy (XPS). **07**

**Q. 3** (A) Discuss various stages of atomization for converting elements into their atomic state. **07**

(B) What is a hollow cathode lamp. Discuss its working mechanism. **07**

**OR**

(A) Write a short note on flame photometry. **07**

(B) Describe the principle and theory of ICP-OES. **07**

**Q. 4** (A) Write a note on Basic principle of 'Mass-Spectrometry' and any 2 modes of Ionization. **07**

(B) Discuss fragmentation of Hydrocarbons in Mass Spectrometry. **07**

**OR**

(A) Describe: General rules for predicting prominent peaks in EI spectra **07**

(B) Explain Mass spectra of Alcohols. **07**

(P.T.O)

Q. 5

**Answer any seven out of twelve**

14

- (i) What type of standard do you need for the calibration of heat and temperature of DSC?
- (ii) Give; Full Form of TGA, DTA, and DSC.
- (iii) Distinguish diffraction vs reflection in XRD.
- (iv) What type of materials we can analyse in XPS?
- (v) What is wide and narrow scan in XPS spectra?
- (vi) If you use Xray for long time in XPS, what will happen? Can you get a better data set?
- (vii) Why atomic emission is more complex than atomic absorption.
- (viii) Why do you get line spectra in atomic spectroscopy and band spectra in molecular spectroscopy.
- (ix) Which electrode (anode or cathode) is made up of the element to be determined.
- (x) Why in long chain ketones are hydrocarbon peaks indistinguishable from the aryl peaks?
- (xi) Give any 2 characteristics of Mass spectra of aromatic amides.
- (xii) Name different factors of reporting High Resolution Mass Spectral data.

---