

MSc Semester-3 Examination

504

Chemistry (I) EA2- Spectro-II

April-2023

Time : 2-30 Hours]

[Max. Marks : 70

Q. 1 (A) Discuss the principle, instrumentation, and advantages of Differential Thermal Analysis with DTA curve. **07**

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

OR

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

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

Q. 2 (A) What are the Strength and limitations of XPS, UPS and AES techniques? **07**

(B) Write a brief instrumentation of X-Ray Photoelectron Spectroscopy. **07**

OR

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

(B) What is Electron Spectroscopy (ES)? Give some examples of ES techniques that are commercially used. **07**

Q. 3 (A) Compare and discuss flame and graphite furnace for atomization. **07**

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

OR

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

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

Q. 4 (A) Write the applications of mass spectral data. **07**

(B) Discuss the mass spectra of ketones with examples. **07**

OR

(A) Define it: Parent peak, Base peak, Molecular ion peak and metastable peak. **07**

(B) Discuss electrons-spray ionization techniques for mass spectrometry. **07**

Q. 5 Answer any seven out of twelve 14

(i) What is Heat Capacity?

(ii) Who proposed Bragg's diffraction?

(iii) Distinguish diffraction vs reflection in XRD?

(iv) What is wide and narrow scan in XPS spectra?

(v) How binding energy of an electron affect its kinetic energy in ES?

(vi) Does all elements can be analyzed in XPS?

(vii) What are matrix modifiers and state their importance.

(viii) What do you understand by the process of atomization?

(ix) What is meant by nebulization?

(x) Write the full form of HRMS.

(xi) What is the nitrogen rule in mass spectrometry, explain with an example.

(xii) What is negative mode in mass spectral data?

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