

M.Sc Sem-3 Examination

504

Chemistry EI-2 (Spectro-II)

November-2024

Time : 2-30 Hours]

[Max. Marks : 70

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

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- (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.
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