(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2026

(Fourth Semester)

Branch – **CHEMISTRY**

ADVANCED ANALYTICAL CHEMISTRY

Time: Three Hours Maximum: 75 Marks

SECTION-A (10 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	Separation of ions by ion – exchange Chromatography depends on a) nature of the analyzed substance b) nature and structure of the of the ion exchange c) temperature of the experiment d) all of the above are correct	K1	CO1
	2	Helium rather than Argon, often is used as the carrier gas in GLC when TCD is used as the detector because, a) He has a higher ionization potential b) He is more inert c) He has stable isotopes which separate and cause a change in column behavior. d) He has a higher thermal conductivity	K2	CO1
2	3	Separation of ions in mass spectrometer takes place on the basis of which of the following? a) Mass b) Charge c) Molecular weight d) Mass to charge ratio	K1	CO2
	4	In mass spectrum M-18 peak indicates loss of a) Hydroxyl group b) Hydrogen c) Methyl group d) Water molecule	K2	CO2
3	5	The region of the flame in which the maximum emission or absorption occurs in atomic spectroscopy depends upon a) Droplet size b) Type of the flame used c) Tendency for species to enter into oxide formation d) All of the above correct	K1	CO2
	6	The most widely used flame in atomic absorption is a) air-coal gas b) air-propane c) air acetylene d) oxyacetylene	K2	CO2
4	7	In DTA, thermal effects are caused by chemical reaction such as a) disassociation or decomposition b) oxidation or reduction c) dehydration d) all of the above are correct	K1	CO3
	8	The property measured in differential scanning calorimetry a) Change of temperature b) Difference in temperature c) Rate of change of enthalpy d) Change in weight	K2	CO3
5	9	The supporting electrolyte is added in voltammetry to arrest a) Convection current b) Migration current c) Diffusion current d) Limiting current	K1	CO4
	10	In a polarogram, the wave height is a measure of a) migration current b) diffusion current c) residual current d) decomposition current	K2	CO2

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SECTION - B (35 Marks)

Answer **ALL** questions

ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	i) Develop the principle of ion exchange chromatography. (3Marks) ii) Analyze the types of resin used in ion exchange chromatography. (4 Marks)	K3	CO1
		(OR)		
	11.b.	Construct the application of high performance liquid chromatography.		
2	12.a.	Explain the significance of base peak and metastable peaks in mass spectrum.	K2	CO2
		(OR)		
	12.b.	Interpret mass spectrum of n-butane and n-nonane.		
3	13.a.	Compare total consumption and Premix burners used in AAS	K4	CO3
		(OR)		
	13.b.	Examine the sequence of events in the flame atomic absorption spectroscopy.		
4	14.a.	List the different types of thermal analytical methods and mention the property measured in each method.	K5	CO4
		(OR)		
	14.b.	Discuss the complementary nature of the TGA and DTA with suitable example.		
5	15.a.	Examine importance of i) Half wave potential ii) Kinetic current in polarography.	K4	CO5
		(OR)		
	15.b.	Explain how cyclic voltammetry is used in the determination of electrochemical reversibility, quasi reversible and irreversible redox system.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	Apply gas chromatography for the separation of mixture of compounds available in small amounts.	K3	CO1
2	17	Illustrate i) Mclaffrty rearrangement ii) Retro Diels-Alder rearrangement (5 + 5 Marks)	K2	CO2
3	18	Analyze the principle of AAS and discuss the various types of interferences in AAS.	K4	CO3
4	19	Elaborate principle and applications of DSC.	K6	CO4
5	20	i) Examine principle and working of coulometric titration (5 Marks) ii) List out the advantages and disadvantages of coulometric titration (5 Marks)	K4	CO5

Z-Z-Z END