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22CHP419N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2025
(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	Each peak in HPLC chromatograms represents ----- present in the sample. a) the mixture of the components b) Individual components c) Amount of the component d) concentration of the component	K1	CO1
	2	Which of the following is not used as a carrier gas in gas chromatography? a) Nitrogen b) Helium c) Hydrogen d) Chlorine	K2	CO1
2	3	What is the "base peak" in a mass spectrum? a) the peak with the lowest intensity b) the peak with the highest m/z value c) the peak with the lowest m/z value d) the peak with the greatest intensity	K1	CO2
	4	The molecular ion peak is usually intense for a) aromatic compounds b) Ethers c) alcohols d) Neoalkane	K2	CO2
3	5	In Atomic Absorption Spectroscopy, which of the following is the generally used radiation source? a) Tungsten lamp b) Xenon mercury arc lamp c) Hydrogen or deuterium discharge lamp d) Hollow cathode lamp	K1	CO3
	6	Atomic absorption spectroscopy involves the study of the absorption of radiation usually in the ultraviolet and visible region by the atoms in the ---------- a) Gaseous state b) Vapor state c) Solid state d) All of these	K2	CO3
4	7	The property measured in TGA is a) change in weight b) rate of change of change of weight c) heat evolved or absorbed d) change in temperature	K1	CO4
	8	In DTA ----------is used as reference material. a) Alumina b) $MgSO_4$ c) CaO d) $SiCl_4$	K2	CO4
5	9	Dropping mercury electrode used in polarography act as a) counter electrode b) reference electrode c) working electrode d) auxiliary electrode	K1	CO5
	10	The peak potential in cyclic voltammetry experiment is depends on a) concentration of the electro active species b) area of the electrode c) scan rate d) nature of the electro active species	K2	CO5

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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.	Develop four important applications of ion-exchange chromatography in analytical chemistry.	K3	CO1
		(OR)		
	11.b.	Build principle and applications of paper electrophoresis.		
2	12.a.	Interpret i) McLafferty rearrangement ii) Nitrogen rule in Mass Spectroscopy	K2	CO2
		(OR)		
	12.b.	Explain origin and importance of meta stable peak? Calculate position of meta stable peak in case of toluene		
3	13.a.	i) Distinguish between Single and double beam spectrophotometry ii) Examine the type of emission spectra	K4	CO3
		(OR)		
	13.b.	Analyze the applications of Atomic and emission spectroscopy.		
4	14.a.	With the help of TGA thermo gram explain the various thermal changes occurring in decomposition of i) Calcium oxalate monohydrate ii) Copper sulphate penta hydrate	K5	CO5
		(OR)		
	14.b.	i) Interpret the principle of thermometric titration. ii) Describe the thermometric titration between HCl vs NaOH		
5	15.a.	What is dropping mercury electrode? List the advantages of using DME in polarography.	K4	CO4
		(OR)		
	15.b.	Analyze the origin of i) Residual current ii) Migration current iii) Diffusion current in polarography		

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	i) What is the principle of HPLC? (2 Marks) ii) Discuss some available packing material used in HPLC and their characteristics (5 Marks) iii) Give four main applications of HPLC. (3 Marks)	K2	CO1
2	17	Explain the significance of i) Base peak (3.5 Marks) ii) Metastable peak (3.5 Marks) iii) Isotopic peak (3 Marks)	K2	CO2
3	18	Compare the flame emission and atomic absorption spectrophotometry with respect to instrumentation and inferences.	K4	CO3
4	19	Discuss the factors that affect TGA and DTA curves.	K6	CO4
5	20	Examine principle and applications of cyclic voltammetry.	K4	CO5

Z-Z-Z END