22ZOU311N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION DECEMBER 2025
(Third Semester)

Branch - **ZOOLOGY**

CHEMISTRY -I

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-set-I	K Level	CO
1	1	Which type of orbital is spherical in shape? a) p-orbital b) d-orbital c) s-orbital d) f-orbital	K1	CO1
	2	Calculate the oxidation number of sulfur (S) in H_2SO_4. a) +4 b) +6 c) -2 d) +2	K2	CO1
2	3	Name the common alkaloid found in tobacco. a) Piperine b) Nicotine c) Coniine d) Morphine	K1	CO2
	4	How terpenoids like geraniol are related to the isoprene rule? a) They are polymers of ethylene b) They follow the isoprene (C5) building block pattern c) They are derived from benzene d) They are alkaloid derivatives	K2	CO2
3	5	For the crystallization and sublimation as purification methods for solids. Identify the correct sentence a) Both involve change of state from solid to liquid b) Crystallization involves solubility differences; sublimation involves vapor pressure c) Both require high temperature d) Both are used only for liquids	K1	CO3
	6	Which chromatographic technique is used for separating ionic species. a) Paper chromatography b) Thin layer chromatography c) Ion-exchange chromatography d) Gas chromatography	K2	CO3
4	7	The term 'molecularity' in kinetics is a) Number of molecules in product b) Number of reactant molecules in rate-determining step c) Order of reaction d) Rate constant	K1	CO4
	8	What is the role of promoters in catalytic reactions. a) They deactivate catalysts b) They enhance catalyst activity c) They are reactants d) They are products	K2	CO4
5	9	Choose an effect associated with excessive nutrients in water bodies. a) Acid rain b) Eutrophication c) Global warming d) Ozone depletion	K1	CO5
	10	Compare BOD and COD in assessing water quality. a) BOD measures biodegradable; COD measures total oxidizable organic matter b) BOD > COD always c) Both measure only inorganic pollutants d) They are identical	K2	CO5

Cont...

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.	Calculate the oxidation numbers of Chromium in $K_2Cr_2O_7$ and explain the role of chromium as an oxidizing agent.	K3	CO1
		(OR)		
	11.b.	Explain Lewis concept for acid-base interactions with examples like BF_3 (acid) reacting with NH_3 (base).		
2	12.a.	Analyze the structural features that make benzene aromatic according to Huckel's rule and discuss its industrial significance.	K4	CO2
		(OR)		
	12.b.	Discuss the isolation, and uses of Coniine.		
3	13.a.	Explain the following concentration terms. (i) Normality (ii) Molarity (iii) Mole fraction (2+2+3 Marks)	K3	CO3
		(OR)		
	13.b.	Explain steam distillation method of separate water - immiscible organic solvents.		
4	14.a.	Derive an expression for rate constant for first-order reactions in kinetics.	K3	CO4
		(OR)		
	14.b.	Discuss the effect of promoters and catalytic poisons on the efficiency of catalytic reactions.		
5	15.a.	Discuss the significance of water quality parameters like COD in assessing pollution levels.	K3	CO5
		(OR)		
	15.b.	Identify the major sources and discuss the environmental impacts of air pollutants leading to issues like acid rain.		

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	Assume a scenario where you have transition metal complexes like $[Fe(CN)_6]^{3-}$ and $[Fe(H_2O)_6]^{2+}$. Examine how ligand field strength (CN^- vs H_2O) affects the oxidation state, spin state, and stability of these complexes relating to crystal field theory.	K4	CO2
2	17	(1) Explain the classification of terpenoids (5 marks) (2) Discuss the importance of camphor. (3 Marks)	K4	CO3
3	18	Discuss the principle and applications of Thin Layer chromatography techniques for separating organic compounds.	K2	CO4
4	19	Discuss the characteristics of enzyme catalysis and factors affecting enzyme activity.	K4	CO5
5	20	Explain the processes and effectiveness of primary, secondary, and tertiary water treatment methods.	K4	CO5

Z-Z-Z END