LOYOLA COLLEGE (AUTONOMOUS) CHENNAI – 600 034

U.G. DEGREE EXAMINATION – **ALLIED**

SECOND SEMESTER – **APRIL 2025**

UCH 2303 – CHEMISTRY FOR PHYSICS

Date: 05-05-2025 Dept. No. Max. : 100 Marks

Time: 09:00 AM - 12:00 PM

	SECTION A - K1 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
1.	**State TRUE or FALSE**	**(5 x 1 = 5)**
a)	Precision represents the reproducibility of the measurements.	
b)	Mohr's salt is an example of double salt.	
c)	Electrochemical cells are devices capable of converting chemical energy into electrical energy.	
d)	Smaller surface area decreases the rate of a reaction.	
e)	Hard water can be used in boilers.	
2.	**Fill in the blanks.**	**(5 x 1 = 5)**
a)	The concentration term, ppm, is ----------.	
b)	The coordination number is called as the ---------- valency.	
c)	The ionic product of water is ----------.	
d)	An increase in temperature, ---------- the rate of the reaction.	
e)	Temporary hardness is due to the presence of ----------.	
	SECTION A - K2 (CO1)	
	Answer ALL the Questions	**(10 x 1 = 10)**
3.	**Match the following**	**(5 x 1 = 5)**
a)	Accuracy ---- Disinfection	
b)	Ligand ---- Thermal reaction	
c)	Buffer ---- Ammonia	
d)	Non-radiative ---- Maintains pH	
e)	ozone ---- Nearness to true value	
4.	**Define the following**	**(5 x 1 = 5)**
a)	Molarity	
b)	Chelate effect	
c)	Lowry-Bronsted acid	
d)	Beer-Lambert's law	
e)	Chlorination	

	SECTION B - K3 (CO2)	
	Answer any TWO of the following	**(2 x 10 = 20)**
5.	a) Discuss the methods of minimization of errors. b) List any five differences between primary and secondary standard substances.	(5+5)
6.	a) Write the rules for naming the coordination compounds. b) Classify the types of ligands based on the charge and give example for each type.	(5+5)
7.	a) Derive Henderson equations of acidic buffer and mention its significance. b) State the postulates of Werner's theory and its limitations.	(5+5)
8.	a) Describe the construction and working principle of Lithium-ion battery with a neat diagram. b) Enumerate the differences between primary and secondary batteries.	(7+3)

	SECTION C – K4 (CO3)	
	Answer any TWO of the following	**(2 x 10 = 20)**
9.	a) Explain the valence bond theory and its limitations. b) Compare and contrast rate and rate constant of a reaction.	(5+5)
10.	How will you estimate the hardness of water using EDTA method?	
11.	a) Explain the fluorescence and phosphorescence using Jablonski diagram. b) Compare the thermal and photochemical reactions.	(5+5)
12.	a) Explain the types of errors in analysis. b) Define Normality. Calculate the normality of solution obtained by dissolving 0.437 g of NaOH in 250 ml of water.	(5+5)
	SECTION D – K5 (CO4)	
	Answer any ONE of the following	**(1 x 20 = 20)**
13.	a) Predict the geometry and magnetic properties of the following compounds using VB theory (i) $[CoF_6]^{3-}$ (ii) $K_4[Fe(CN)_6]$ b) Explain the safety rules to be followed in storing and handling the chemicals in the chemical laboratory.	(10+10)
14.	a) Illustrate the working principle of Lead-acid battery and write the electrode reactions. b) Derive the expression for the rate constant of a second-order reaction, $2A \rightarrow$ Products. c) List the differences between order and molecularity.	(10+5+5)
	SECTION E – K6 (CO5)	
	Answer any ONE of the following	**(1 x 20 = 20)**
15.	a) Explain the cell representation with an example. b) Distinguish between electrochemical and electrolytic cells. c) Discuss the factors affecting the rate of a reaction.	(5+5+10)
16.	a) Explain the different types of hardness of water. b) Describe the water purification process by Reverse Osmosis method. c) List out the disadvantages of hardness of water.	(5+10+5)
