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G. VENKATASWAMY NAIDU COLLEGE (AUTONOMOUS), KOVILPATTI – 628 502.



UG DEGREE END SEMESTER EXAMINATIONS - NOVEMBER 2025.

(For those admitted in June 2021 and later)

PROGRAMME AND BRANCH: B.Sc., CHEMISTRY

SEM	CATEGORY	COMPONENT	COURSE CODE	COURSE TITLE
V	PART-III	CORE	U21CH508	INORGANIC CHEMISTRY-IV

Date & Session: 03.11.2025/FN

Time: 3 hours

Maximum: 75 Marks

Course Outcome	Bloom's K-level	Q. No.	SECTION – A (10 X 1 = 10 Marks) Answer <u>ALL</u> Questions.
CO1	K1	1.	Which of the following is an Arrhenius base? a) HCl b) NH ₃ c) NaOH d) CO ₂
CO1	K2	2.	Which of the following concepts explains acid-base behavior in both aqueous and non-aqueous solvents? a) Arrhenius b) Lewis c) Lowry-Brosted d) All of these
CO2	K1	3.	Which of the following is a protic solvent? a) DMSO b) Acetone c) Water d) Benzene
CO2	K2	4.	The reaction of metal salts forming insoluble products in liquid ammonia is called _____. a) solvolysis b) neutralization c) precipitation d) complex formation
CO3	K1	5.	The oxidation number of oxygen in most compounds is _____. a) +1 b) -1 c) -2 d) 0
CO3	K2	6.	The number of electrons lost or gained by 1 mole of species in redox reaction is known as _____. a) molarity b) normality c) n-factor d) valency
CO4	K1	7.	Which of the following proteins contains iron and is responsible for oxygen transport in blood? a) myosin b) haemoglobin c) albumin d) keratin
CO4	K2	8.	Vitamin B ₁₂ contains which metal ion? a) iron b) cobalt c) magnesium d) zinc
CO5	K1	9.	Cisplatin is a coordination complex of which metal? a) silver b) gold c) platinum d) palladium
CO5	K2	10.	Cadmium (Cd ²⁺) toxicity primarily affects which organ? a) heart b) brain c) skin d) kidney

Course Outcome	Bloom's K-level	Q. No.	SECTION – B (5 X 5 = 25 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)
CO1	K3	11a.	State the Arrhenius definition of acids and bases. Classify the following substances as Arrhenius acids or bases: HCl, NaOH, NH ₃ , CH ₃ COOH. (OR)
CO1	K3	11b.	State the Lux-Flood definition of acids and bases. Classify the following oxides accordingly: SO ₃ , CaO
CO2	K3	12a.	Classify solvents into protic and aprotic categories with at least two examples each. (OR)
CO2	K3	12b.	List any two advantages and two disadvantages of using liquid ammonia as a solvent.
CO3	K4	13a.	Analyze the difference between oxidation number and covalency/valency of an element with suitable examples. (OR)
CO3	K4	13b.	Differentiate between direct and indirect redox reactions with examples.
CO4	K4	14a.	Differentiate between metalloproteins and metalloenzymes. How do their roles differ in biological systems? (OR)
CO4	K4	14b.	Differentiate between ionophores and ion channels.
CO5	K5	15a.	Evaluate the role of chelating agents in the treatment of metal poisoning. (OR)
CO5	K5	15b.	Analyze how chromium's oxidation states determine its essentiality versus toxicity.

Course Outcome	Bloom's K-level	Q. No.	SECTION – C (5 X 8 = 40 Marks) Answer <u>ALL</u> Questions choosing either (a) or (b)
CO1	K3	16a.	Apply the Usanovich concept to justify why even redox reactions can be considered acid-base reactions. Give an example. (OR)
CO1	K3	16b.	Apply the solvent system concept to explain acid-base behavior in non-aqueous solvents like liquid ammonia.
CO2	K4	17a.	Compare the dielectric constants and dipole moments of water, ammonia, and HF. (OR)
CO2	K4	17b.	Analyze the advantages of using liquid SO ₂ for solvolytic and precipitation reactions over water.
CO3	K4	18a.	Compare the oxidation number of sulfur in different compounds like H ₂ S, SO ₂ , and H ₂ SO ₄ . (OR)
CO3	K4	18b.	Analyze the concept of oxidation and reduction using electron transfer and oxidation number changes. Give one example where both interpretations apply.
CO4	K5	19a.	Compare and evaluate the physiological roles of Na ⁺ and K ⁺ ions in nerve impulse conduction. (OR)
CO4	K5	19b.	Assess the potential and risks of using synthetic ionophores in medical treatments.
CO5	K5	20a.	Discuss the advantages and risks associated with gadolinium-based MRI contrast agents. (OR)
CO5	K5	20b.	Evaluate the toxicological impact of cadmium, mercury, and chromium on human health.