



Reg. No.:

Name:.....



University of Kerala
First Semester Degree Examination, November 2024
Four Year Under Graduate Programme
Discipline Specific Course
CHEMISTRY
UK1DSCCHE104- GENERAL INORGANIC CHEMISTRY
Academic Level: 100-199

Time: 1½ Hours

Max.Marks:42

Part A.

Answer All Questions, Objective Type. 1 Mark Each.
(Cognitive Level: Remember/Understand) 6 Marks. Time: 6 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
1.	Provide an example of a chelate ligand	Remember	CO-4
2.	What rule states that electrons fill degenerate orbitals singly before pairing?	Remember	CO-1,2,3
3.	State the relation between half-life period and decay constant for a radioactive reaction	Understand	CO-7
4.	Suggest a suitable indicator for the titration of NaOH against HCl.	Understand	CO-5,6
5.	The quantum numbers $n=5$ and $l=3$ corresponds to which orbital?	Understand	CO-1,2,3
6.	How is a β - particle produced in the nucleus?	Understand	CO-7

Part B.

Answer All Questions, Short Answer. 2 Marks Each.
(Cognitive Level: Understand/Apply) 8 Marks. Time: 24 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
7.	Which of the following is paramagnetic- $[\text{NiCl}_4]^{2-}$ or $[\text{NiCN}_4]^{2-}$? Explain Why.	Understand	CO-4
8.	Comment on the shape and geometry of XeF_4 molecule.	Understand	CO-1,2,3
9.	Describe how radioactivity is applied in neutron activation analysis and explain its practical uses.	Apply	CO-7
10.	How would you prepare 100 mL of 0.5 N and 0.5 M oxalic acid? Molecular mass of oxalic acid = 126.	Apply	CO-5,6

Part C.

**Answer all 4 Questions, choosing among options within each question. Long Answer. 7 marks each.
(Cognitive Level: Understand/Apply/Analyze) 28 Marks. Time: 60 Minutes**

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
11.	a. Describe the electronic configurations and crystal field theory of $[\text{Co}(\text{NH}_3)_6]^{3+}$ and $[\text{CoF}_6]^{3-}$. Explain why the former is diamagnetic and the latter is strongly paramagnetic. OR b. Discuss the application of coordination compounds in qualitative and quantitative analyses.	Understand	CO-4
12.	a. Applying the concept of hybridization, propose molecules having linear, tetrahedral, trigonal bipyramidal, and octahedral geometries. OR b. (I) Consider a hydrogen atom in which an electron makes a transition from the $n=3$ energy level to the $n=1$ energy level. i) Using Bohr's atomic model, calculate the energy of the photon emitted during this transition. ii) What is the frequency and wavelength of this photon? (II) The Balmer series of the hydrogen atom corresponds to electronic transitions that end at the $n=2$ energy level. Calculate the wavelength of the photon emitted when an electron in a hydrogen atom transitions from the $n=4$ to $n=2$ energy level.	Apply	CO-1,2,3
13.	a. Discuss the various applications of radioactivity in medicine, industry, and environmental science. Explain the benefits and potential risks associated with each application. OR b. Apply the factors that influence nuclear stability and the processes which leads to stabilization of the nucleus with reference to the various radioactive disintegration series.	Apply	CO-7
14.	a. Analyse the principle of permanganometric titrations, focusing on the redox reactions involved and the behavior of potassium permanganate as a titrant. OR b. Analyze how colorimetry can be used in the estimation of glucose.	Analyze	CO-5,6