QP Code: D132573	**Total Pages:1**	**Name:**
		Register No.

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2025

(CUFYUGP)

CHE1MN 105 BASIC INORGANIC AND NUCLEAR CHEMISTRY

2024 Admission onwards

Maximum Time :2 Hours | **Maximum Marks :70**

Section A

All Questions can be answered. Each Question carries 3 marks (Ceiling : 24 Marks)

1	How does ionization enthalpy vary across second period? Explain the reason for irregularities.
2	Why does the atomic size of transition elements remain nearly constant across a period?
3	Explain the trend of electron affinity in halogens and noble gases.
4	Explain how the neutron-to-proton (N/P) ratio influences nuclear stability. Give examples of stable and unstable nuclei.
5	What is packing fraction? How does it vary across the periodic table and relate to nuclear stability?
6	Differentiate between nuclear fission and nuclear fusion.
7	Explain the working principle of an atom bomb.
8	State the group displacement law.
9	Explain the principle and steps involved in the separation of isotopes.
10	Explain the principle of carbon-14 dating.

Section B

All Questions can be answered. Each Question carries 6 marks (Ceiling : 36 Marks)

11	Discuss the limitations of Bohr's model.
12	Predict the molecular shape of XeF_2 and XeF_4 using VSEPR theory.
13	Compare the bonding in CO and O_2 using molecular orbital diagrams.
14	Discuss hybridization in PCl_5 and SF_6 and relate it to their geometry.
15	Explain how solubility product is applied in the selective precipitation of cations.
16	Discuss the role of indicators.
17	Calculate the normality of H_2SO_4 solution if 10 mL of it neutralizes 20 mL of 0.1 N NaOH.
18	Explain common ion effect and its applications.

Section C

Answer any ONE .Each Question carries 10 marks (1x10=10 Marks)

19	Describe in detail the formation of molecular orbitals. Explain bonding and antibonding orbitals using O_2 and N_2 as examples.
20	Explain the theory and practice of volumetric analysis.