QP Code: D 112832	**Total Pages:2**	**Name:**
		Register No.

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2024

(CUFYUGP)

CHE1MN 101: BASIC INORGANIC AND NANO CHEMISTRY

2024 Admission onwards

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

Section A

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

1	Explain the key differences between an orbit and an orbital.
2	What is the Schrödinger wave equation? Write down the time-independent Schrödinger equation and explain each term in it.?
3	How does the principal quantum number affect the size and energy of an electron's orbital?
4	Explain the bonding in acetylene.
5	Discuss the concept of electron affinity and its periodic trends. How does it differ from electronegativity?
6	Explain the trends in ionization enthalpy across the second period in the periodic table. Why do these trends occur?
7	What is the inert pair effect, and how does it manifest valency of group 14 elements in the periodic table?
8	Calculate the molality of a solution prepared by dissolving 10 grams of NaCl in 500 grams of water. (atomic mass of Na = 23, Cl = 35.5 g /mol)
9	If a water sample contains 0.005 grams of lead in 1 liter, what is the concentration in ppm?
10	How much water should be added to 100 ml of a 2 M NaOH solution to dilute it to 0.5 M?

Section B

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

11	Draw Molecular orbital energy level diagram of CO and calculate bond order.
12	How do hydrogen bonds affect the properties of water?
13	Describe a real-world scenario where the common ion effect is applied in industrial processes.
14	How is the common ion effect utilized in the separation of Group II and Group IV metal ions in qualitative analysis?
15	Explain the difference in solubility of AgCl in pure water and in dilute NaCl solution.
16	How would you standardize a $KMnO_4$ solution using a primary standard?

17	Describe the electric arc discharge method for synthesizing carbon nanotubes.
18	What are the main applications of carbon nanotubes?
Section C	
Answer any ONE. Each Question carries 10 marks (1×10 = 10 Marks)	
19	Explain the quantum numbers and their significances.
20	Explain top-down and bottom-up process of making nano particles with examples