D1BCH2302 (PAGES 2) **Reg.No.....**

Name: .....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2023

(Regular/Improvement/Supplementary)

CHEMISTRY: COMPLEMENTARY COURSE FOR PHYSICS, BOTANY & ZOOLOGY

GCHE1C01T: GENERAL CHEMISTRY

Time: 2 Hours **Maximum Marks: 60**

SECTION A: Answer the following questions. Each carries *two* marks.

(Ceiling 20 Marks)

1. Define 1 mole. What is the relationship between the mass of a sample of a substance and the number of moles present in it?
2. What is meant by 'solubility product' of a sparingly soluble salt? Write an expression to show the relationship between solubility and solubility product of Calcium Chloride.
3. Is $KMnO_4$ a self-indicator? Substantiate your answer.
4. State the Schrodinger equation and explain the terms.
5. Write the Born-Lande equation and explain the terms.
6. Define ionic bond.
7. Write the nuclear equation for:
   (i) the emission of α-particle from $_{90}Th^{232}$
   (ii) the emission of β-particle from $_{88}Ra^{228}$
8. What is the reaction responsible for the energy production in sun?
9. How is C-14 formed in the atmosphere? Give equation.
10. Give two examples each for bulk and trace elements in biological system.
11. Why sodium-potassium pump is an example of active transport?
12. What is the chemical name of Vitamin B_{12} and the metal ion is present in it?

SECTION B: Answer the following questions. Each carries *five* marks.

(Ceiling 30 Marks)

13. Distinguish between primary and secondary standards as applied to volumetric titrations.
14. The kinetic energy of an electron (mass = 9.1×10^{-31} kg) is 4.55×10^{-25} J. Calculate the wavelength. ($h = 6.6 \times 10^{-34}$ J s).
15. Define lattice energy. How does it affect the solubility of an ionic substance?
16. Briefly explain the theory of radioactive disintegration with examples.

(PTO)

17. An item of old wooden furniture shows a C-14 activity which is 30% of the activity found in the fresh sample. Find the age of the wood that was used to make the object, Half-life of C-14 is 5760 years.
18. Discuss on the similarities and differences between Myoglobin and Hemoglobin molecules in their biological function and molecular structure.
19. Give the name and biochemical function of two compounds containing zinc and one compound containing cobalt.

SECTION C: Answer any *one* question. Each carries *ten* marks.

20. a) Discuss the oxidation number concept of oxidation and reduction.
    b) Identify the oxidant and reductant in each of the following reactions:
        (i) $Zn + 10HNO_3 \rightarrow 4Zn(NO_3)_2 + NH_4NO_3 + 3H_2O$
        (ii) $MnO_2 + 4HCl \rightarrow MnCl_2 + Cl_2 + 2H_2O$
        (iii) $3H_2S + 2HNO_3 \rightarrow 2NO + 3S + 4H_2O$
    c) Discuss the advantages of double burtte method of titration.
21. Discuss the with illustrative examples the rules that determine the ground state electronic configuration of atoms.

(1 x 10 = 10 Marks)