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D1BCH2102 (S3) **Reg. No.....**

Name: .....

FIRST SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2024

(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. Calculate the wavelength of the spectral line obtained in the Lyman series if the electron the hydrogen atom has been excited to the 3^{rd} energy level.
2. How much potassium ion attach to the protein pump?
3. Explain the structure of Corrin ring system and mention its difference from porphyrin.
4. Point out any two applications of lattice energy determinations.
5. The tremendous amount of energy released during nuclear fission chain reaction can be used for constructive as well as destructive purposes. Justify the statement.
6. Calculate the number of bond pairs and lone pairs present in PCl_5, SF_6 and IF_7 molecules.
7. Give any three features of γ – rays.
8. What do you mean by primary standards in volumetric analysis? Give two examples.
9. Give any three applications of radioactive isotopes in radio diagnosis.
10. What is the metal present in vitamin B12?
11. Define the term gram atomic mass with example.
12. How does N-phenyl anthranilic acid function as an indicator in the titration of ferrous against dichromate?

SECTION B: Answer the following questions. Each carries *five* marks. (Ceiling 30 marks)

13. What are the theories of acid-base titrations? Explain one theory in detail.
14. Write a note on the essential features of Planck's Quantum Theory.

(PTO)

15. Distinguish between the terms molarity, normality and molality.
16. Discuss the role of haemoglobin molecule in oxygen transport and carbon dioxide transport.
17. Calculate the mass in grams required to prepare 250 mL of 0.05 M solution of sodium carbonate, so that molar mass of sodium carbonate is 106 $gmol^{-1}$.
18. Compare the structures of haemoglobin and myoglobin.
19. Calculate the enthalpy of formation of magnesium fluoride (MgF_2) from the following data: Sum of the first and second ionization enthalpies of Mg = 2184 $kJmol^{-1}$; electron affinity of fluorine = -334.7 $kJmol^{-1}$; dissociation energy of F_2 = 158.9 $kJmol^{-1}$ enthalpy of sublimation of Mg = 146.4 $kJmol^{-1}$; lattice energy of MgF_2 = -2922.5 $kJmol^{-1}$.

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

20. Write short note on:
    (a) Concept of orbitals.
    (b) Dual nature of electrons.
21. Explain briefly the process of:
    (a) Radiocarbon dating.
    (b) Rock dating.

(1 x 10 = 10 Marks)