Reg. No ..... Name **24U231**

B. Sc. DEGREE END SEMESTER EXAMINATION - MARCH 2024

SEMESTER 2 - CHEMISTRY

COURSE : **19U2CRCHE02 - THEORETICAL AND INORGANIC CHEMISTRY II**

(For Regular - 2023 Admission and Improvement / Supplementary – 2022/2021/2020/2019 Admissions)

Time : Three Hours Max. Marks: 60

PART A
Answer All (1 mark each)

1. Define Bond Order.
2. Define dipole moment.
3. Ozone molecule consists of ---------- sigma bonds.
4. Why HNO_3 behaves as a base in liq.HF?
5. Give an example each for Hard acid and Hard base.
6. Define modern periodic law.
7. State Octet rule.
8. What is mobile phase in chromatography?

(1 x 8 = 8)

PART B
Answer any 6 (2 marks each)

9. Explain why metallic oxides are basic in nature.
10. Explain with an example, acid-base reaction in liq.SO_2 as solvent.
11. Compare the bond lengths of C-C, C=C, C≡C in organic compounds.
12. Differentiate the concept of Atomic Orbital and Molecular Orbital.
13. How does ionisation energy vary in general across a period and down the group?
14. Differentiate between sigma and pi bond?
15. Why water has high melting and boiling point compare to other hydrides of oxygen family in the periodic table?
16. What is the principle behind solvent extraction?

(2 x 6 = 12)

PART C
Answer any 4 (5 marks each)

17. Discuss any three type of reactions in liq.NH_3 as a solvent.
18. Describe Slater rules for determining the effective nuclear charge. Calculate the effective nuclear charge experience by a 2p electron in oxygen atom.
19. Give the postulates of MO theory and explain.
20. Give reasons for the following : (i) Covalent bonds are directional bonds while ionic bonds are nondirectional. (ii) Water molecule has bent structure whereas carbon dioxide molecule is linear.
21. Explain the concept of resonance with examples.
22. Define the term Lattice energy. What are the factors affecting lattice energy of ionic compounds.

(5 x 4 = 20)

PART D

Answer any 2 (10 marks each)

23. Explain the paramagnetic and diamagnetic behaviour of O_2 and N_2 molecules respectively on the basis of MO theory.
24. Explain in detail the different theories of acids and bases with examples.
25. Discuss the concept of hybridization with respect to the geometry of methane, ethylene and acetylene molecules.
26. Discuss in detail the principle and procedure of the gravimetric estimation of Barium as Barium Sulphate.

(10 x 2 = 20)