25U123 (Pages: 2) Name : .....

Reg. No : .....

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2025

(FYUGP)

(Regular/Supplementary/Improvement)

CC24UCHE1MN104 - BASIC INORGANIC CHEMISTRY AND METALLURGY

(Chemistry - Minor Course)

(2024 Admission onwards)

Time: 2.0 Hours Maximum: 70 Marks

Credit: 4

Part A (Short answer questions)

Answer ***all*** questions. Each question carries 3 marks.

1. Analyse the hybridization in BCl_3 molecules. [Level:4] [CO2]
2. Sate Hund's rule of maximum multiplicity. [Level:1] [CO1]
3. Find out n, l and m values for an electron in the 2px orbital. [Level:1] [CO1]
4. What is lattice energy? Explain the relation between lattice energy and strength of ionic bond. [Level:1] [CO2]
5. State and explain Mendeleev's periodic law. [Level:2] [CO3]
6. Explain primary standard in volumetric analysis with example. [Level:2] [CO4]
7. Copper (II) is precipitated as CuS in dilute HCl medium while Cobalt(II) is precipitated as CoS in ammoniacal medium. Explain. [Level:2] [CO4]
8. Explain the term equivalent mass of an acid. How is equivalent mass of an acid related to its molecular mass? [Level:2] [CO4]
9. How does the reactivity of a metal influence the method used for its reduction to the free metal? [Level:2] [CO5]
10. Explain why electrolysis is used for extracting aluminum instead of a chemical reduction method. [Level:2] [CO5]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

Answer ***all*** questions. Each question carries 6 marks.

11. Draw diagrammatic representation of the s-orbital and the five d-orbitals [Level:3] [CO1]

12. Draw the molecular orbital diagram of O_2 molecule. Calculate the bond order and explain its stability and magnetic behavior. [Level:3] [CO2]

13. Derive de Broglie's relation and explain its significance. [Level:4] [CO1]

14. How does electron affinity vary down a group? Explain the variation. [Level:2] [CO3]

15. Describe normality and how it is used in volumetric analysis. [Level:2] [CO4]

16. Explain the common ion effect and its role in solubility. [Level:2] [CO4]

17. Describe about electrometallurgy. [Level:2] [CO5]

18. Discuss the classification of steels. [Level:2] [CO5]

(Ceiling: 36 Marks)

Part C (Essay questions)

Answer any ***one*** question. The question carries 10 marks.

19. Explain the salient features of VSEPR theory? Explain the structure of $BeCl_2$ and H2O with reference to VSEPR theory. [Level:2] [CO2]

20. (i) Explain complexometric titrations taking EDTA as the chelating agent. [Level:2] [CO4]
    (ii) Discuss metal ion indicators and explain the action of metal ion indicators with a suitable example.

(1 × 10 = 10 Marks)

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