25U122 (Pages: 2) Name : .....

Reg. No : .....

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2025

(FYUGP)

(Regular/Supplementary/Improvement)

CC24UCHE1MN102 - BASIC INORGANIC AND BIOINORGANIC CHEMISTRY

(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. Discuss Sp^3d^3 hybridization with an illustrative example. [Level:2] [CO2]
2. Discuss the significance of de Broglie wavelength in understanding the behavior of particles at the atomic level. [Level:2] [CO1]
3. Predict the shape of BeF_2 molecule on the basis of VSEPR theory. [Level:2] [CO2]
4. Discuss the significance of the principal quantum number (n) in determining the energy levels of electrons in an atom. Generalize the influence the electron's distance from the nucleus? [Level:2] [CO1]
5. Describe the Law of Octaves and its significance in the periodic classification of elements. [Level:2] [CO3]
6. Expalin molarity of a solution. [Level:2] [CO4]
7. Summarize the relationship between sample size and the accuracy of microanalysis? [Level:2] [CO4]
8. Explain the term equivalent mass of an base. How is equivalent mass of an base related to its molecular mass? [Level:2] [CO4]
9. Describe the structural features of Cyanocobalamine. [Level:2] [CO5]
10. Describe the features of dark reaction in photosynthesis. [Level:2] [CO5]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

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

11. Illustrate the diagrammatic representation of the s-orbital, the three p orbital and the five d-orbitals. [Level:2] [CO1]

12. Explain the significance of the terms HOMO and LUMO. Draw the MO energy diagram of O_2 molecule and indicate the HOMO and LUMO for the molecule. [Level:2] [CO2]

13. Arrange the following elements in the increasing order of their ionization energies and Justify your answer : B, C, N, O. [Level:2] [CO3]

14. Describe the common ion effect and its significance in qualitative analysis. Provide an example of how it can be applied. [Level:2] [CO4]

15. Discuss the significance of indicators in acid-base titrations and how to select an appropriate indicator for a given titration. [Level:2] [CO4]

16. Discuss the structure of Haemoglobin. [Level:2] [CO5]

17. Illustrate the pumping mechanism of sodium potassium and highlighting the role of eversion of the enzyme. [Level:2] [CO5]

18. Explain the mechanism of action of cisplatin as an anticancer drug. Expalin its limitations. [Level:2] [CO5]

(Ceiling: 36 Marks)

Part C (Essay questions)

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

19. (a) Discuss Born Haber cycle with respect to NaCl. [Level:2] [CO1]

    (b) Explain the term hydrogen bonding. Discuss the hydroge bonding in water and explain the consequent unique properties of water.

20. 4. Explain: [Level:2] [CO4]

    (i) The action of diphenylamoine as redox indicator.

    (ii) Self indicator action of potassium permpermagnganate in permanganometry.

    (iii) External indicator method and internal indicator method used in dichrometric titrations.

(1 × 10 = 10 Marks)

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