

24U121

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Name : .....

Reg. No : .....

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2024

(FYUGP)

CC24U CHE1 MN105 - BASIC INORGANIC AND NUCLEAR CHEMISTRY

(B.Sc. Chemistry - Minor Course)

(2024 Admission - Regular)

Time: 2.0 Hours

Maximum: 70 Marks

Credit: 4

**Part A** (Short answer questions)

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

1. What is covalent bond? Explain with an example. [Level:1] [CO2]
2. State Hund's rule of maximum multiplicity. [Level:1] [CO1]
3. What is hydrogen bond? Explain with an example. [Level:1] [CO2]
4. Explain why does fluorine have a lower electron affinity than chlorine. [Level:2] [CO3]
5. State common ion effect? [Level:1] [CO4]
6. Define normality of a solution [Level:1] [CO4]
7. Name three indicators used in acid-base titrations. Indicate the pH range over which they change colour. [Level:1] [CO4]
8. Explain the term isotopes with suitable examples? [Level:2] [CO5]
9. Bi-210 decays by  $\beta$ -emission. Name the product formed and in which group of the periodic table will it lie? [Level:1] [CO5]
10. Explain the release of a large amount of energy during nuclear fission. [Level:2] [CO5]

**(Ceiling: 24 Marks)**

**Part B** (Paragraph questions/Problem)

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

11. Discuss the construction of molecular orbitals by LCAO principle. [Level:2] [CO2]
12. Explain Schrodinger wave equation. Discuss the significance of the term wave function. [Level:2] [CO1]
13. Explain the limitation of Bohr atom model. [Level:2] [CO1]
14. Explain the significance of Moseley's X-ray studies in the development of the periodic table. [Level:2] [CO3]

15. Discuss are the advantages of the double burette method used in titrimetry over the conventional single burette method? [Level:2] [CO4]
16. Explain the role of acid-base indicators in titration. [Level:2] [CO4]
17. What is a nuclear reactor? Mention its applications. [Level:1] [CO5]
18. Briefly explain radiocarbon dating. [Level:2] [CO5]

**(Ceiling: 36 Marks)**

**Part C (Essay questions)**

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

19. Discuss the different types of hybridization involving s, p and d orbitals with suitable examples. [Level:2] [CO2]
20. Define oxidation number. Discuss the oxidation number concept of oxidation and reduction. Explain the terms oxidant and reductant with an illustrative example for a redox reaction. [Level:2] []

**(1 × 10 = 10 Marks)**

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