25U118 (Pages: 2) Name : .....

Reg. No : .....

FIRST SEMESTER UGDEGREE EXAMINATION, NOVEMBER 2025

(FYUGP)

(Regular/Supplementary/Improvement)

CC24UCHE1CJ101 - INORGANIC CHEMISTRY - I

(B.Sc. Chemistry - Major 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. Give a reasonable explanation of the term science. [Level:2] [CO1]
2. Define the terms 'mean' and 'median' with regard to a number of analytical measurements. [Level:2] [CO1]
3. Which has greater bond dissociation energy O_2 or O^{2-} ? Why? [Level:4] [CO2]
4. How can dipole moment studies help to differentiate between ortho, meta, and para dichlorobenzene? [Level:4] [CO2]
5. Explain the variation of colour of gold nanoparticles upon decreasing their sizes. [Level:2] [CO3]
6. What do the terms quantum structures and quantum confinement mean? [Level:2] [CO3]
7. Explain what is meant by sol-gel synthesis. [Level:2] [CO3]
8. Explain the comparative catalytic efficiencies of nanometals and their bulk forms. [Level:2] [CO3]
9. What are carbon nanotubes? What are the two types of carbon nanotubes? [Level:2] [CO3]
10. Name three indicators used in acid-base titrations. Indicate the pH range over which they change colour. [Level:3] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

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

11. Discuss different types of indeterminate errors. [Level:2] [CO1]
12. Define ionic, covalent and coordinate bonds. Explain each with an example with regard to their formation. [Level:3] [CO2]

13. What are the conditions for effective linear combination between atomic orbitals? [Level:4] [CO2]

14. What are the conditions which favour ion polarization? [Level:2] [CO2]

15. Discuss applications of lattice energy determinations. [Level:3] [CO2]

16. Define the terms mass fraction and mole fraction of a component in a solution. How are these affected by a temperature change? [Level:2] [CO4]

17. Explain the significance of 'R phrases' and 'S phrases' on the MSDSs of chemicals. [Level:2] [CO4]

18. Explain the function of complexometric indicators. [Level:3] [CO4]

(Ceiling: 36 Marks)

Part C (Essay questions)

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

19. Explain the molecular geometries of (i) XeF_2 and (ii) SF_4 on the basis of hybridization. [Level:4] [CO2]

20. Define ionization energy and discuss the factors that determine the ionization energy of an element. Explain the variation of ionization energy along a period and down a group of the periodic table. [Level:3] [CO2]

(1 × 10 = 10 Marks)

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