

24U119

(Pages: 2)

Name :

Reg. No :

FIRST SEMESTER UG DEGREE EXAMINATION, NOVEMBER 2024

(FYUGP)

CC24U CHE1 CJ101 - INORGANIC CHEMISTRY - I

(B.Sc. Chemistry - Major 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. Distinguish between the terms constant errors and proportionate errors. [Level:2] [CO1]
2. Define the terms mean, deviation from mean and average deviation from mean with regard to a set of analytical measurements. [Level:1] [CO1]
3. Arrange the molecules HF, HCl, HBr and HI in the increasing order of polarity of the hydrogen-halogen bond in them. Justify your answer with proper reasoning. [Level:4] [CO2]
4. Although CO₂ and H₂O are both triatomic molecules, the dipole moment of CO₂ is zero while that of water has a non-zero value. Explain this difference. [Level:2] [CO2]
5. Illustrate the use of the precipitation method in the preparation of semiconductor nanoparticles with one example. [Level:2] [CO3]
6. How does quantum confinement become significant in determining the optical properties of quantum dots? [Level:1] [CO3]
7. Mention how nanomaterials find application as drug delivery vehicles in biomedicine. [Level:2] [CO3]
8. Explain the terms nanoparticles and nanomaterials. [Level:2] [CO3]
9. What is graphene ? Explain. [Level:1] [CO3]
10. Define equivalent mass of a base. How is the equivalent mass of a base related to its molecular mass? Illustrate with an example. [Level:2] [CO4]

(Ceiling: 24 Marks)

Part B (Paragraph questions/Problem)

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

11. Distinguish between the terms qualitative analysis and quantitative analysis with suitable examples. [Level:2] [CO1]

12. Explain the variation of electron affinity along a period. [Level:2] [CO2]
13. What are the conditions for effective linear combination between atomic orbitals? [Level:1] [CO2]
14. Discuss the characteristics of ionic compounds. [Level:2] [CO2]
15. Calculate the Madelung constant for MgO from the following data: equilibrium internuclear distance = 0.21 nm; Born exponent = 7; electronic charge = 1.6022×10^{-19} C; $\epsilon_0 = 8.854 \times 10^{-12}$ C² m⁻¹ J⁻¹; lattice energy = -3940 kJ mol⁻¹ [Level:3] [CO2]
16. Give a brief account of acid-base titrations. [Level:1] [CO4]
17. Explain the term MSDS of chemicals and its significance. [Level:2] [CO4]
18. What are the advantages of the double burette method used in titrimetry over the conventional single burette method? [Level:1] [CO4]

(Ceiling: 36 Marks)

Part C (Essay questions)

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

19. What is meant by orbital hybridization? Mention the salient features of the concept. [Level:1] [CO2]
Explain the molecular geometries associated with sp^2 and sp^3 hybridizations with illustrative examples.
20. Discuss LCAO-MO approach to bonding in (i) a homonuclear diatomic molecule; and [Level:2] [CO2]
(ii) a heteronuclear diatomic molecule.

(1 × 10 = 10 Marks)
