

QP Code : U24A040

Reg. No :

Name :

ST MARY'S COLLEGE (AUTONOMOUS), THRISSUR-20

I SEMESTER B.Sc (FYUGP) DEGREE EXAMINATION, November 2024

B.Sc Chemistry

CHE1CJ101 : Inorganic Chemistry I

2024 Admission Onwards

(Credits: 4)

Time : 2 Hours

Maximum Marks : 70

Section A

[Answer all. Each question carries 3 Marks] (Ceiling: 24 Marks)

- Determine the number of significant digits in the following reported values. [BTL3]
(a) 0.0021
(b) 82.190
(c) 3.30×10^2
- What is Redox titration? Give an example. [BTL1]
- Apply MO theory to explain the bonding and bond order in the Nitrogen molecule [BTL3]
- Compare ionic and covalent bonds in molecules. [BTL4]
- Compare atomic radius and covalent radius? [BTL1]
- How does the Lewis dot structure represent the formation of covalent bonds? [BTL2]
- Outline the classification of Nanomaterials based on electron confinement. [BTL2]
- Elucidate the significance of surface area to volume ratio in improving the catalytic properties of nanomaterials. [BTL4]
- Differentiate between Iodometry and Iodimetry titrations. [BTL3]
- Calculate the mole fraction of each component in a solution containing 25% water, 40% ethanol, and 35% acetic acid by mass. [BTL4]

Section B

[Answer all. Each question carries 6 Marks] (Ceiling: 36 Marks)

- Comment on the relevance of Q-test and how it is applied to a set of replicated analytical measurements. [BTL4]
- Analyze the effect of lone pairs on the hybridization and geometry of ClF_3 and SF_4 [BTL4]
- Nitrogen molecule is diatomic while oxygen molecule is paramagnetic. Explain this on the basis of MOT. [BTL4]

Turn Over

14. Illustrate the difference between polar and non-polar covalent bonds with examples. [BTL2]
15. Explain the difference between the sol-gel method and co-precipitation method of preparation of nanoparticles. [BTL3]
16. Discuss the biological and environmental application of nanomaterials [BTL1]
17. (a) Molarity is temperature dependent but molality is not. Why? Justify your answer. [BTL4]
(b) Define molar volume and Calculate the volume occupied by 0.5 mole of hydrogen atoms at 0°C and 1 atm.
18. What are adsorption indicators? Give an example. Explain the principles behind the use of adsorption indicators. [BTL4]

Section C

[Answer any one. Each question carries 10 Marks] (1x10=10 Marks)

19. Evaluate the effectiveness of the following as a predictor of chemical reactivity. [BTL5]
a) Ionic radius
b) Ionization energy
c) Electronegativity
d) Electron affinity
20. Describe the common methods of synthesis of nanomaterials with suitable examples. [BTL2]

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