QP Code: U25DRIS029

Reg. No : ....
Name : ....

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

I SEMESTER (FYUGP) DEGREE EXAMINATIONS, NOVEMBER 2025
(Regular/Improvement/Supplementary)
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)***

1. Explain the differences between constant error and proportional error.
2. Identify whether the given set of results should be rejected or retained by using the Q test. 66.00, 65.55, 65.90, 67.85, 66.85, 69.90 and 65.00 and $Q_{critical}$ is given as 0.51.
3. Use the concept of variable covalency to explain the formation of PCl_3 and PCl_5.
4. Analyze the given set of concentrations of Cu in ppm and calculate the mean and average deviation from the mean. 20.8, 21.2, 20.3, 22.0, 19.9, 20.6, 21.6.
5. Explain how dipole moment values can be used to distinguish between isomeric aromatic compounds, with suitable examples.
6. Illustrate the structure, geometry and hybridisation of SF_4.
7. Comment on two synthesis approaches of nanomaterials.
8. Discuss the electronic applications of nanomaterials.
9. Suggest the right indicator for the following titration. (1) CH_3COOH vs. NaOH (2) $KMnO_4$ vs. Oxalic acid (3) I_2 vs. $Na_2S_2O_3$
10. What are the major components of PPE?

Section B

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

11. Explain the method of least squares and its significance in quantitative analysis.
12. The electron affinity value of Fluorine is not the highest among halogens. Why?

Turn Over

13. Evaluate the bonding and magnetic behavior of nitric oxide (NO) using the molecular orbital energy diagram. Justify how the MO theory explains its stability and paramagnetic nature.

14. Determine the hybridization of Xenon in XeO_3 and XeO_4. Explain the molecular structure.

15. Discuss about different kinds of Carbon based nanomaterials.

16. Propose the methods of preparation of the following nanoparticles. (i) Au (ii) CdS (iii) TiO_2

17. (a) What is meant by the mole fraction of a component in a solution?
(b) Calculate the mole fractions of components in a solution prepared by dissolving 21.5 g of naphthalene ($C_{10}H_8$) in 58.5 g of benzene (C_6H_6).

18. Explain the method for disposal of the following (a) Sodium (b) Broken Mercury thermometer.

Section C

Answer ***any one****. Each question carries* ***10*** *Marks.* ***(1x10=10marks)***

19. Evaluate the importance of the Born Haber cycle in the formation of NaCl. Explain the applications of the cycle.

20. Apply your understanding of nanotechnology to explain common techniques used in the synthesis of nanomaterials. Support your answer with appropriate real-world examples.

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