K25U 1308

Reg. No. : .....

Name : .....

II Semester B.Sc. Degree (C.B.C.S.S. – O.B.E. – Supplementary/ Improvement) Examination, April 2025
(2019 to 2023 Admissions)
CORE COURSE IN CHEMISTRY
2B03CHE : Analytical and Inorganic Chemistry – I

Time : 3 Hours Max. Marks : 40

SECTION – A

Very short answer type. **Each** question carries **1** mark. Answer **all 4** questions.

1. Name a statistical parameter used to describe the precision of a set of data in a measurement.
2. What do you mean by a standard solution ?
3. Name an indicator used in the titration of potassium dichromate against Mohr's salt.
4. Among the elements in the 13th group of the periodic table, Al usually shows an oxidation state of +3, while Tl shows a common oxidation state of +1. This is the consequence of the so-called **(4×1=4)**

SECTION – B

Short answer type. **Each** question carries **2** marks. Answer **7** questions out of 10.

5. The standard deviation of a set of numbers 50, 47, 54 and 62 is 6.5. Find the relative standard deviation.
6. Differentiate between precision and accuracy.
7. Describe absolute error and relative error.
8. Calculate the molarity of a solution containing 8 g of NaOH in 500 mL of water.
9. Comment on the variation of the metallic and non-metallic character of the elements in the p-block of the periodic table of atoms.

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10. Explain why oxygen exists as a gas whereas sulphur exists as a solid.
11. Mention two reasons which are responsible for the so called "inert pair effect".
12. What is Lux-Flood concepts of acid and base ? Give examples.
13. Select which of the following are acids and bases according to Arrhenius concept. HNO_3, $AlCl_3$, CO_2, NH_4OH, SO_3, CaO, Na_2CO_3, HCl, $Mg(OH)_2$, CH_3COOH, NaOH.
14. Among the complexes $[Cd(CN)_4]^{2-}$ and $[Cd(NH_3)_4]^{2+}$, which one is more stable ? Explain based on HSAB principle. **(7×2=14)**

SECTION – C

Short essay type. **Each** question carries **3** marks. Answer **4** questions out of 6.

15. The following are the five readings of a particular measurement recorded in cm : 38, 51, 46, 79 and 57. Calculate the standard deviation of the measurement.
16. What are systematic errors ? Give examples. How can we eliminate them ?
17. Illustrate the differences between iodometry and iodimetry.
18. Write a brief description on the oxoacids of Phosphorous.
19. How do the bond angles vary among the following hydrides : NH_3, PH_3, AsH_3 and SbH_3 ? Give reason for the observation.
20. What are hard and soft acids and bases ? Give examples. **(4×3=12)**

SECTION – D

Long essay type. **Each** question carries **5** marks. Answer **2** questions out of 4.

21. What is common ion effect ? How is it applied in the precipitation of cations ?
22. Compare the following characteristics of the hydrides of halogen. Physical state, stability, reducing character, nature of bond and relative strengths as acids.
23. In the p-block of the periodic table elements in the second period show exceptional behaviour. Illustrate and explain the reason for this behaviour.
24. Describe the use of liquid HF as a non-aqueous solvent. Mention important chemical reactions that can be performed in liquid HF as solvent. **(2×5=10)**

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