D 131269 **(Pages : 2)** **Name.....**

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE (REGULAR/SUPPLEMENTARY) EXAMINATION, NOVEMBER 2025

(CBCSS)

Chemistry

CHE 1C 02—ELEMENTARY INORGANIC CHEMISTRY

(2019 Admission onwards)

Time : Three Hours Maximum : 30 Weightage

Section A

Answer any **eight** *questions.*
Each question has 1 *weightage.*

1. Explain Usanovich concept of acids and bases.
2. The colour of metal-ammonia solution does not depend on the nature of metal dissolved. Justify this statement.
3. Classify the following compounds into *closo*, *nido* and *arachino* structures :
   (a) B_5H_9 ;
   (b) $C_2B_{10}H_{12}$;
   (c) B_5H_{11} ; and
   (d) $[B_5H_5]^{2-}$.
4. Find out the styx code for diborane.
5. Account for the water repellent nature of silicones.
6. How is phospham prepared ?
7. What are Latimer diagrams ? Explain taking the case of iron.
8. Uranium forms oxo-cation, while lanthanum cannot, why ?
9. A fusion reaction is called a thermonuclear reaction ; why ? How does it work in sun ?
10. Explain the bottom-up synthesis of nanomaterials with a suitable example.

(8 × 1 = 8 weightage)

Turn over

Section B

Answer any **six** *questions.*
Each question carries 2 *weightage.*

11. Give an account of the precipitation reactions taking place in liquid ammonia.

12. Discuss the action of diborane with ammonia.

13. Give a brief account of the classification of silicates based on their structure.

14. Comment on the magnetic properties of lanthanides and actinides.

15. Describe the principle and working of GM counter.

16. Differentiate between the principle and experimental set-up involved in the working of SEM and TEM.

17. Describe the synthesis, structure and properties of $(SN)_x$, S_2N_2 and S_4N_4.

18. Bring out the differences between 4f and 5f orbitals and explain, how they affect the properties of lanthanides and actinides.

(6 × 2 = 12 weightage)

Section C

Answer any **two** *questions.*
Each question carries 5 *weightage.*

19. Describe the HSAB concept of acids and bases. How this concept is useful in the study of co-ordination compounds.

20. Discuss the importance of icosahedral frame work of boron atoms and Wade's rule in describing structure and bonding in boron hydrides.

21. Discuss the principle and experimental set-up involved in neutron activation analysis. What are its merits and demerits ?

22. Give an account of the diagnostic and therapeutic applications of nanomaterials.

(2 × 5 = 10 weightage)