D1ACH2502 **(2 Pages)** **Name……**

Reg.No…….

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2025

(Regular/Improvement/Supplementary)

CHEMISTRY

FCHE1C02-ELEMENTARY INORGANIC CHEMISTRY

Time: 3 Hours **Maximum Weightage: 30**

Section A: Short answer questions. Answer any *eight* questions. Each carries *one* weightage.

1. Distinguish between inter-molecular and intra-molecular hydrogen bonding with suitable examples.
2. Write a short note on the Bent rule and its application in hybridization.
3. Explain why all Bronsted bases are Lewis bases but all Bronsted acids are not Lewis acids?
4. On the basis of HSAB concept, why H_2S is insoluble and $Hg(OH)_2$ is soluble in dilute HCl?
5. What is styx number? Write the styx number for B_4H_{10}, B_5H_9 and $B_{10}H_{14}$.
6. Give one method of preparation and structure of S_4N_4.
7. What are carboranes? How they are obtained?
8. Distinguish between ionic and covalent carbides.
9. What are trans-actinide elements?
10. Distinguish between photonuclear and thermonuclear reactions.
11. Explain the underlying process that generates the energy of the sun and stars.
12. What are Ellingham diagrams? Give its advantages and disadvantages.

(8 × 1 = 8 weightage)

Section B: Short essay questions. Answer any *four* questions. Each carries *three* weightage.

13. Discuss the importance of liquid NH_3 as a non-aqueous solvent.
14. Write a note on Walsh diagrams.
15. Give the preparation, structure and bonding of diborane.
16. Discuss the important classification of silicates.
17. Give an account of isopoly anions of W and Mo.
18. Write a note on Neutron activation analysis.
19. Explain the principle and working of scintillation counter.

(4 × 3 = 12 weightage)

(P.T.O.)

Section C: Essay questions. Answer *any two* questions. Each carries *five* weightage.

20. Discuss the synthesis, structure and uses of silicones.

21. Discuss the Arrhenius, Bronsted-Lowry, Lux-Flood and Usanovich concepts of acids and bases with suitable examples.

22. a) How will you determine molecular structure by X-ray diffraction?

    b) Give the preparation, properties, and structure of borazine.

23. a) Explain how Wade's rule helps to elucidate the structure of boranes and carboranes.

    b) Briefly discuss the salient features of Latimer diagrams.

(2 × 5 = 10 weightage)