

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2023

(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. Write the type of π -bond involved in ClO_4^- . Sketch it.
2. What is meant by hyper valence? Give an example.
3. Which is expected to be a better Lewis acid: BCl_3 or $\text{B}(\text{CH}_3)_3$? Justify your answer.
4. Write Lux-Flood definition of acid and base with examples.
5. Elaborate on the levelling effect of solvents.
6. What happens when 1,2-dicarboclosodecaborane [12] is heated?
7. Explain the merits and demerits of liquid drop model.
8. What are interstitial carbides? Give an example.
9. Illustrating an example, explain briefly thermonuclear reactions.
10. What are critical size and critical mass? Explain its importance in nuclear reactions.
11. What is Ellingham diagram? What information do we get from this diagram?
12. Explain Bethe's notation of nuclear reactions.

(8 x 1 = 8 weightage)

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

13. Briefly explain Walsh diagram.
14. Discuss briefly the different types of hydrogen bonding and its consequences.
15. Give a detailed account of HSAB principle.
16. How borazines are synthesized? Give an account of their chemical reactivity.
17. Discuss the synthesis, structures and chemical properties of S_4N_4 .
18. Explain Pourbaix diagrams and discuss their applications.
19. Describe the role of HF as a non-aqueous solvent.

(4 x 3 = 12 weightage)

(P.T.O.)

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

20. What are silicones? Discuss their synthesis, structure and applications.
21. Describe the structure and bonding in diborane. How is it synthesized? Explain its reaction with ammonia.
22. Write notes on:
- i) GM counter;
 - ii) Radiation dosimetry;
 - iii) Nuclear Fission;
 - iv) Nuclear fusion.
23. Give a detailed account on heteropoly and isopoly acids of tungsten and molybdenum and its applications.

(2 x 5 =10 weightage)