D 51521 (Pages : 2) Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, NOVEMBER 2018

(CUCSS—PG)

Chemistry

CH 1C 02—ELEMENTARY INORGANIC CHEMISTRY

(2015 Syllabus Year)

Time : Three Hours Maximum : 36 Weightage

Section A

Answer **all** *questions, each question carries* 1 *weightage.*

1. Compare the basicity of trimethyl ammonium hydroxide and tetramethyl ammonium hydroxide.
2. What is meant by formal charge ? Calculate the formal charge of P in H_3PO_4.
3. Define Acid and Base according to Lux-Flood concept.
4. "The role of NH_4Cl in liquid NH_3 solution is same as that of HCl in aqueous solution". Substantiates the statement.
5. Calculate the "styx" number of B_4H_{10}.
6. List the isomers of $C_2B_{10}H_{12}$.
7. Discuss any *two* applications of ZSM-5.
8. Explain the preparation of $(SN)_x$.
9. How to relate acidity and pH with isopoly anions ?
10. What is meant by Latimer diagrams ?
11. Explain the liquid drop model of nucleus.
12. Define the term Nuclear reaction cross-section.

(12 × 1 = 12 weightage)

Section B

Answer any **eight** *questions, each carries* 2 *weightage.*

13. Illustrate the following concepts (a) Super octet ; and (b) Isoelectronic molecule.
14. What is meant by Walsh diagram ? Explain with example.
15. Discuss the following (a) symbiosis ; and (b) super acids.

Turn over

16. Why nitric acid, sulphuric acid and perchloric acid are not behaves as acid in anhydrous hydrogen fluoride ?

17. Explain the following statements :—

    (a) BF_3 is a weaker electron acceptor than BCl_3.

    (b) Boron trichloride is monomeric while aluminium trichloride is dimeric.

18. What are the products obtained when borazine and benzene react with HCl and Br_2 ?

19. Discuss the metallic character of $(SN)_x$.

20. Compare the magnetic and spectral properties of lanthanides and actinides.

21. Write a note on carbides and their uses.

22. Explain the preparation and structure of hetropoly acids.

23. What are the different products obtained during the radiolysis of water ?

24. Write a note on neutron activation analysis ?

(8 × 2 = 16 weightage)

Section C

Answer any **two** *questions, each carries* 4 *weightage.*

25. Briefly discuss the following :

    (a) Determination of molecular structure by X-ray diffraction ; and

    (b) Applications of HSAB concept.

26. (a) Explain the Wade's rules used to determine the structure of boranes.

    (b) What are metalloboranes and metallocarboranes ?

27. Explain the principle and working of GM and scintillation counter.

28. What is Ellingham diagram ? Draw the diagram for important metals and carbon. Explain the important characteristics and applications of the diagram in metallurgical process.

(2 × 4 = 8 weightage)