

FIRST SEMESTER M.A./M.Sc./M.Com. DEGREE EXAMINATION  
DECEMBER 2019

(CBCSS)

Chemistry

CHE 1C 02--ELEMENTARY INORGANIC CHEMISTRY

(2019 Admissions)

Time : Three Hours

Maximum : 30 Weightage

**Section A***Answer any eight questions.**Each question carries a weightage of 1.*

1. With suitable examples, explain the solvent system concept of acids and bases.
2. Which of the following is expected to form stable complexes with Pd (II) ? (i) F<sup>-</sup> and (ii) I<sup>-</sup>. Why ?
3. The carboranes, 1-7 B<sub>10</sub>C<sub>2</sub>H<sub>12</sub>, is more stable than the 1,2- B<sub>10</sub>C<sub>2</sub>H<sub>12</sub>. Why ?
4. Find styx numbers for B<sub>6</sub>H<sub>10</sub>.
5. S<sub>4</sub>N<sub>4</sub> is puckered, whereas [S<sub>4</sub>N<sub>4</sub>]<sup>2+</sup> is planar. Explain.
6. Phosphazene rings do not have a totally delocalized π - system. Explain.
7. Absorption spectra of the lanthanide cations are sharp and line like. Why ?
8. What is a dosimeter ? How does it work ?
9. Explain surface plasmon resonance and its effect on the colour of the nanocrystals.
10. What is the difference between bottom-up and top-down approach to fabricate Nanomaterials ?

(8 × 1 = 8 weightage)

**Section B***Answer any six questions.**Each question carries a weightage of 2.*

11. Explain the theoretical basis of HSAB concept.
12. Write a note on super acids. How can we calculate the acidity of super acids using Hammett acidity function ?
13. Discuss the synthesis, structure and bonding of borazine.
14. Explain the differences between 4f and 5f orbitals and consequences of this on the properties of lanthanides and actinides.

**Turn over**

15. Write a note on the applications of Ellingham diagram in metallurgy.
16. Explain the principle and working of scintillation counters.
17. Discuss the diagnostic and therapeutic applications of nanomaterials.
18. Write a note on the application of SEM and TEM in the characterization of nanomaterials.

(6 × 2 = 12 weightage)

### Section C

*Answer any two questions.*

*Each question carries a weightage of 5*

19. Write an account on reactions in non-aqueous solvents.
20. Discuss the preparation, reactions, structure and bonding of the boron hydrides.
21. Write an account on isopoly and heteropoly acids of tungsten and molybdenum.
22. Explain the liquid drop and shell models of the nucleus. What are the advantages and disadvantages of these models?

(2 × 5 = 10 weightage)