D 93040 **(Pages : 2)** **Name**.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2015

(CUCSS)

Chemistry

CH1 002—ELEMENTARY INORGANIC CHEMISTRY

(2015 Admissions)

Time : Three Hours Maximum : 36 Weightage

Part A

Answer **all** *questions.*
Each question carries 1 weightage.

1. What is meant by hypervalence ? Give an example.
2. Write the type of it-bond involved in ClO_4^-. Sketch it.
3. Classify the following on Lewis acid or Lewis base giving reason :
   (i) CO_2 ; (ii) Mg^{2+}.
4. Give the auto-ionisation reaction in H_2SO_4.
5. Classify the following compounds according to Wade's rule :
   (i) B_4H_{10} ; (ii) $C_2B_8H_{10}$.
6. Write the three molecular orbital wave functions of B_2H_6.
7. Give the synthesis and technical use of a silicone.
8. Suggest a method of preparation of Zeolite and give its uses.
9. Effect the following conversion :

   →

10. **How** is paramolybdate prepared ?
11. Predict the particle ejected in the nuclear reaction

    $^{63}Cu + p \rightarrow {}^{--}Fe$.

12. Write two examples of photonuclear reaction.

(12 x 1 = 12 weightage)

Turn over

Part B

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

13. Isoelectronic molecules are isostructural. Illustrate.
14. Predict the structure of the following by applying VSEPR theory :

    (i) XeF_6 ; **(ii)** TeF_5^- ; **(iii)** ICl_4^-
15. Describe the application of HSAB concept.
16. Illustrate F-strain and B-strain with examples.
17. Write briefly on metallocarboranes.
18. Derive styx code for B_4H_{10} and draw its structure.
19. How does $[PNCl_2]_n$ react with :

    (i) NaOR ; (ii) R_2NH ; (iii) NaF.
20. Give the synthesis of $(SN)_x$ and outline the mechanism of polymerisation. What is t' ısual property observed in this polymer ?
21. Write notes on the Chemistry of super heavy element.
22. Differentiate the characteristics of 4f and 5f orbitals.
23. Discuss the salient features of shell model of nucleus.
24. Write briefly on Scintillation detectors.

(8 x 2 = 16 weight

Part C

Answer any **two** *questions.*
Each question carries **4** *weightage.*

25. Discuss the structure and bonding in (i) S_4N_4 ; (ii) Borazines.
26. Compare and contrast the structural aspects in $[DNCl_2]_3$ with benzene derivatives.
27. Detail the magnetic and spectral properties of lanthanides and actinides.
28. Write the salient features of liquid drop model. How does it explain the nuclear fission reaction ?

(2 x 4 = 8 weightage)