

17. (a) Explain Born-Haber cycle with a suitable example.

Or

- (b) Explain Important chemical reactions occur in liquid ammonia medium.
18. (a) Discuss band theory of conductors, semi conductors and insulators.

Or

- (b) Explain Frenkel and Schottky defects with examples.
19. (a) Explain the structures of calcite and wurtzite.

Or

- (b) Explain the principle and use of X-ray diffraction in structural determination.
20. (a) Describe the chemistry of separation of Np, Pu and Am for uranium.

Or

- (b) Compare the properties of lanthanides with that of transition metals.

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M.Sc. (CBCS) DEGREE EXAMINATION,
NOVEMBER 2012.

First Semester

Chemistry

INORGANIC CHEMISTRY — I

(For those who joined in July 2012 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. He₂ molecule doesn't exist why?
2. State Bent's rule.
3. What are the types of H-bonds? Give an example each.
4. What do you mean by leveling solvent?
5. What is meant by non-stoichiometric defect?
6. Define photovoltaic effect.

7. Sketch hexagonal and cubic close packing structures using spheres.
8. Draw the structure of CsCl.
9. The separation of lanthanides, in general, is difficult-why?
10. Lanthanides normally give very weak peaks in electronic spectra-why?

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) Explain Walsh diagram of water molecule.
Or
(b) What are fluxional molecules? Write a note on their characterization.
12. (a) Define the terms electronegativity and electron affinity. Explain their periodicity.
Or
(b) Explain the classification of solvents with examples.
13. (a) Write a note on line and plane defect in solids.
Or
(b) Explain the applications of n-p junction.

14. (a) Show that the ideal r_M / r_X for the cation-anion and anion-anion contact for a tetrahedral arrangement of anions around a cation is 0.225.

Or

- (b) Explain the use of electron diffraction in structural determination.
15. (a) Write a note on the nuclear fission process.

Or

- (b) Discuss the use of lanthanide complexes as shift reagents with examples.

PART C — (5 × 8 = 40 marks)

Answer ALL questions, choosing either (a) or (b).

16. (a) Draw the MO diagram of NO molecule. Compare the magnetic properties of NO, NO⁺ and NO⁻.
Or
(b) Write a note on the geometrical isomerism exhibited by square planar and octahedral complexes with examples.