LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – **CHEMISTRY**

FIRST SEMESTER – **NOVEMBER 2014**

CH 1813 / CH 1807 - CONCEPTS IN INORGANIC CHEMISTRY

Date : 03/11/2014 Dept. No. Max. : 100 Marks

Time : 01:00-04:00

Part-A

Answer all the questions. Each question carries two marks: ***(10 x 2 = 20)***

1. Why do noble gases have very high ionization potential?
2. Cite two chemical properties of hydrogen which support its position along with thegroup-I elements.
3. Arrange the solubilityof lithiumhalides in the increasing order and give reasons.
4. What are the common features of *ccp* and *hcp* close packing of ions in crystals?
5. How do crystals develop defects in their structure?
6. Which of the following compounds has high melting point, TlClor $TlCl_3$?Justify your answer.
7. Indicate the type of hybridization and deduce the shape of ClO_4^-.
8. What is Bent's rule? Give an example.
9. What are thermochemical radii?
10. What are hard and soft acids? Cite an example each.

Part-B

Answer any eight questions. Each question carries five marks: ***(8 x 5 = 40)***

11. Account for the following:
    (a) Be and Al show comparable chemical and physical properties though they belong to different groups.
    (b) The electron affinity of fluorine in unexpectedly low.
12 (a) Explain leveling effect with an example.
    (b) What are proton sponges?
13. Calculate the limiting radius ratio for an octahedrally coordinated cation in an ioniccrystal lattice.
14. In LiI crystal, I^- ions form cubic close packing and Li^+ ions occupy octahedral hole. What is the relationship between the edgelength of unit cell and radius of I^- ions? Calculate the ionic radius of Li^+ and I^- ions.
15. Explain the solubility of ionic compounds in polar solvents.
16. Discuss the structure of (i) ClF_3(ii) SF_4 using VSEPR theory.
17. Derive Born-Lande equation to compute the lattice energy of ionic compounds.
18. Why does acetic acid dimerize in CCl_4 but not in water medium?
19. Compare the properties of water and ammonia as solvents.
20. What are point defects, line defects, and plane defects in crystalline solids?
21. Illustrate symbiosis with examples.
22. Give the mechanism of liquefaction of noble gases despite the absence of any dipole moment.

Part-C

Answer any four questions. Each question carries ten marks: ***(4 x 10 = 40)***

23a. Describe the behavior of acids, bases, and neutral species in sulfuric acid medium. (6)

b. How are acids and basesclassified? (4)

24. Explain the structural features of ionic crystal lattices with neat unit cell diagrams.

25. Explain metallic properties and *n*-and *p*-type semiconductors with the help of band theory.

26. Oxygen molecule is paramagnetic, whereas nitrogen molecule is diamagnetic. Explain with the help of molecular orbital theory.

27. Discuss the classification of solvents citing suitable examples.

28a. What are inclusion compounds? How are they classified? (4)

b. Explain the structural features of inclusion compounds. (6)

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