



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION - CHEMISTRY

FIRST SEMESTER – NOVEMBER 2011

CH 1807 - CONCEPTS IN INORGANIC CHEMISTRY

Date : 03-11-2011

Dept. No.

Max. : 100 Marks

Time : 1:00 - 4:00

Part – A

Answer *all* the questions

(10 x 2 = 20)

1. Why is the ionization energy of nitrogen atom is higher than that oxygen atom?
2. What is the effective nuclear charge felt by a 2p electron of a fluorine atom?
3. Differentiate ccp and hcp close packing of ions in crystals.
4. Which are readily soluble in water (a) PbCl_2 (b) PbCl_4 . Give reason.
5. What is F-center?
6. What are the causes for the variation of bond angle in H_2O as 105.5° and H_2S as 92.5° ?
7. What principle is used in the separation of isomers of nitrophenol?
8. Arrange the following acids in the increasing acid strength with suitable explanation, HOCl , HClO_3 , HClO_2 , HClO_4 . Give reasons.
9. What are Super acids? Give an example.
10. What are constructive interference and destructive interference in X-ray diffraction?

Part – B

Answer any *eight* questions

(8 x 5 = 40)

11. How are atomic radius, ionization potential, electron affinity and electro negativity related to each other. Give examples.
12. Construct Born-Haber cycle for the formation of NaCl and discuss all terms involved.
13. Explain Fajan's rule with suitable examples.
14. Discuss the structure of (i) SeCl_2 (ii) TeCl_4 using VSEPR theory.
15. Discuss the structure of (i) XeO_3 (ii) SO_3^{2-} using hybridization theory.
16. Explain why bond order of O_2^{2+} ion is greater than O_2 molecule on the basis of molecular orbital theory.
17. Explain any five biological significances of hydrogen bond.
18. How is pK_a of a weak acid determined by titration?
19. Explain the following terms with examples.
(i) symbiosis (ii) proton sponges
20. Explain principle of Fourier synthesis and its application in X-ray diffraction studies.
21. What are Miller indices and Weiss Indices? Draw the following planes, whose Miller indices are (i) (210) (ii) (222)
22. Explain the structures of fluorite and antiferite.

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Part – C

Answer any **four** questions.

(4 x 10 = 40)

23. What is lattice energy? How is it determined theoretically? What are the factors affecting lattice energy?
24. Explain why CO molecule is diamagnetic while NO is paramagnetic on the basis of molecular orbital theory.
25. How does band theory of metals explain the conducting properties of metals and n-type and p-type semiconductors?
26. What are van der Waal's forces? How are they classified?
27. Give a detailed account of non-aqueous solvents their classification and few applications.
28. Compare advantages, disadvantages of X-ray diffraction, neutron diffraction and electron diffraction techniques.
