LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

THIRD SEMESTER – APRIL 2010

CH 3503/CH 4501 - MAIN GROUP ELEMENTS & SOLID STATE CHEMISTRY

Date & Time: 26/04/2010 / 1:00 - 4:00 Dept. No. Max. : 100 Marks

PART – A

Answer ALL questions. (10 x 2 = 20 marks)

1. Why does the basic strength of hydroxides of alkali metals increase on moving down the group?
2. Mention the types of complexes formed by alkaline earth metals.
3. What are ceramics? Write two applications of ceramics
4. Give the chemical composition of muscovite mica and beryl.
5. How is hydroxylamine prepared?
6. How does nitric acid react with acidified potassium permanganate?
7. Explain why HF is polymeric.
8. Give the preparation of perchloric acid.
9. Calculate the Miller indices of a crystal plane with the intercepts (2a,-3b,-3c).
10. What are the coordination numbers of Zn and S in zinc blende structure?

PART – B

Answer any EIGHT questions. (8 x 5 = 40 marks)

11. Discuss the anomalous behaviour of lithium.
12. In which form does$BeCl_2$ exist in (i) vapour phase (ii) in solution and (iii) in solid state?
13. Using diborane as example, discuss the nature and basis of three-centered bonds.
14. What are carbides? How are they classified? Mention their uses.
15. Give a brief description of sulphides of phosphorus.
16. Discuss the Crystal structure of sodium chloride.
17. How is orthophosphoric acid prepared? Write its structure.
18. How are permono and perdisulphuric acids prepared? Write their structures.
19. Give any four properties of perchloric acid.
20. Write a note on oxyacids of chlorine.
21. Discuss the salient features of Frenkel and Schottky defects.
22. Derive Bragg's equation for X-ray diffraction.

(P.T.O.)

PART – C

Answer any FOUR questions **(4 x 10 = 40 marks)**

23. Give an account of chemical properties of alkali metals with special reference to reaction with water, air and hydrogen.

24. a) How does aluminium react with dilute mineral acids and strong alkali solutions? (4)
    b) Discuss the structures and properties of sheet silicates. (6)

25. Write a note on acidic, basic amphoteric and neutral oxides.

26. a) How is ozone prepared? Establish its structure. (5)
    b) How is sulphur trioxide prepared? Mention two of its chemical properties. (5)

27. Give an account of inter halogen compounds and pseudo halogens.

28. Draw the unit cells of the following and explain the salient features of their structures.
    a. Wurtzite b.fluorite.

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