

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

AD 8

THIRD SEMESTER – NOVEMBER 2007

CH 3503 - MAIN GROUP ELEMENTS & SOLID STATE CHEMISTRY

Date : 31/10/2007
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

PART – A

Answer ALL the questions.

(10 x 2 = 20 marks)

1. Explain how Li, Na and K react with water.
2. Complete the following: (a) $NaOH + NH_4Cl \rightarrow \dots\dots\dots$
(b) $NaOH + H_2S \rightarrow \dots\dots\dots$
3. Write the reactions of aluminium with acids and alkalis.
4. Draw the structures of sodium borohydride and aluminium borohydride.
5. How is phosphine prepared?
6. Write the structures of N_2O_4 and N_2O_5
7. Give a method of preparation and use of hypochlorous acid.
8. What is pseudohalogen? Give examples.
9. Differentiate between crystalline and amorphous solids.
10. What are Miller indices?

PART – B

Answer any EIGHT questions.

(8 x 5 = 40 marks)

11. Write a note on the biological importance of alkali metals.
12. How beryllium differs from the other alkaline earth metals?
13. How is boron extracted from borax? Write its uses.
14. Write a short note on salt-like carbides.
15. What are the reactions of hydrazine with O_2 , an acid and Zinc.
16. How is PCl_5 prepared? Draw its structure based on VSEPR theory.
17. Describe the preparation and properties of sulphur trioxide.
18. Compare the reactivities of halogens.
19. Write the preparation, properties and structure of dichlorine monoxide.
20. Compare Schottky and Frankel defects.
21. What are the types of crystals? Give one example for each.
22. Write the crystal structures of fluorite and rutile.

PART – C

Answer any FOUR questions.

(4 x 10 = 40 marks)

23. (a) Compare and explain the properties of peroxides and superoxides of alkali metals. (6)
(b) How is beryllium extracted from its ore? (4)
24. (a) Discuss the structure of diborane. (5)
(b) Draw the structures of five different types of silicates. (5)
25. (a) Describe the preparation and properties of nitric acid. (5)
(b) Write a note on orthophosphoric acid. (5)
26. (a) How is ozone prepared? Write its structure and uses. (4)
(b) Compare the properties of peroxide, basic oxide and acidic oxide (6)
27. (a) Describe the preparation of
(i) ClF_3 (ii) IF_7 (iii) ICl (6)
(b) Draw the structures of (i) IF_5 and (ii) IF_7 (4)
28. (a) Derive Bragg's equation for diffraction of X-rays by crystals (5)
(b) How is X-ray diffraction technique used in the study of crystals? (5)
