



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

THIRD SEMESTER – NOVEMBER 2011

CH 3503 - MAIN GROUP ELEMENTS & SOLID STATE CHEMISTRY

Date : 03-11-2011
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

PART –A

Answer ALL the questions:

(10 x 2 = 20 marks)

1. Give the reaction of sodium with air.
2. Which is a stronger base KOH or Ba (OH)₂? Why?
3. Mention any two uses of soda glass.
4. What is superphosphate of lime?
5. Name the peroxyacids of sulphur.
6. What are pseudohalogens? Give an example.
7. Complete the following:
 - i. $\text{BCl}_3 + \text{H}_2\text{O} \rightarrow$
 - ii. $\text{Al}_2\text{O}_3 + \text{NaOH} \rightarrow$
8. Draw the structure of ClF_3 .
9. Radius of the cation is 82 pm and that of the anion is 125 pm .Calculate the radius ratio.
10. Give the unit cell diagram for CsCl. What is the coordination number of Cs^+ and Cl^- ion in CsCl crystal.

PART –B

Answer any EIGHT questions:

(8 x 5 = 40 marks)

11. Discuss the biological importance of complexes of alkali metals.
12. Write a brief note on the organometallic compounds of Li and Be.
13. How are the following prepared?
 - a. Iodine pentoxide
 - b. Oxygen difluoride
 - c. dichlorine hexaoxide.
14. Discuss the preparation and structure of BrF_3 and IF_5 .
15. What are carbides? How are they classified?
16. Explain limiting radius ratio. How is it used to determine the coordination number and geometry of ionic crystal?
17. Discuss the structure and bonding of diborane.
18. Give the principle of X-ray diffraction.
19. Discuss the preparation, properties and uses of the following:
 - i. Sodium bismuthate
 - ii. hydroxylamine.

20. a. Name the oxy acids of nitrogen.

b. Give the structure of orthophosphoric acid and phosphorous acid.

21. Discuss the preparation and uses of i. boron sesquioxide ii. borohydrides.

22. The strength of halogen acids is of the order $\text{HXO}_4 > \text{HXO}_3 > \text{HXO}_2 > \text{HOX}$. Explain.

PART -C

Answer any **FOUR** questions:

(4 x 10 = 40 marks)

23. Give a comparative account of the oxides, hydroxides, carbonates and halides of alkaline earth metals.

24. How is Beryllium extracted from Beryl?

25. Name important defects in crystals. Discuss Schottky and Frenkel defect in crystals.

26. What are silicates? How are they classified?

27. Discuss the crystal structure of Sodium chloride and Zinc Blende.

28. a) Explain the classification of oxides with examples.

(6)

b) How is triple superphosphate of lime got?

(4)

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