LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – **CHEMISTRY**

THIRD SEMESTER – **APRIL 2016**

CH 3507/CH 3503/CH 4501 – MAIN GROUP ELEMENTS & SOLID STATE CHEMISTRY

Date: 02-05-2016 Dept. No. Max. : 100 Marks

Time: 09:00-12:00

PART A

ANSWER ALL QUESTIONS **(10 x 2 = 20 Marks)**

1. What are the main causes for the anomalous behaviour of Li and Be?
2. Write the chemical formula of caustic soda, washing soda, baking soda and hypo.
3. How is Caro's acid prepared?
4. Mention the oxidation state of Cl in ClF_3 and Cl_2O_7.
5. Which is called laughing gas? Mention the important application of that compound.
6. Distinguish quartz from glass.
7. What are pseudo halogens?
8. Mention any four nitrogen containing fertilisers.
9. What is a unit cell?
10. State True or False: i) The number of atoms arranged in simple cubic arrangement is 1 atom. ii) The number of atoms arranged in face centred cubic arrangement is 8 atoms.

PART B

ANSWER ANY EIGHT QUESTIONS **(8 x 5 = 40 Marks)**

11. a) Write the mathematical expression of Bragg's law and explain the terms in it.
    b) Mention the coordination number and the preferred hole geometry of wurtzite, caesium chloride and rutile.
12. Discuss the conducting behaviours of graphite and diamond based on the structure.
13. Sketch and explain the structure of Zinc blende.
14. Outline the method of preparation of sodium hydroxide by electrolysis.
15. Mention the uses of organometallic compounds of s-block elements.
16. Draw and discuss the structure of diborane, borazine.
17. Write a note on three dimensional silicates.
18. Mention the name and oxidation number of nitrogen in N_2O, N_2O_3, N_2O_4, NO and N_2O_5.
19. Write a note on the importance of urea and phosphate fertilizers.
20. Explain the oxoacids of Sulphur with suitable examples.
21. How is bleaching powder prepared? Compare and explain the acid strength of HClO, $HClO_2$ $HClO_3$ and $HClO_4$.
22. What are inter-halogen compounds? How are they classified and provide suitable examples.

PART C

ANSWER ANY FOUR QUESTIONS **(4 x 10 = 40 Marks)**

23. a) Write a note on stoichiometric defects in solids. (6)

    b) Explain i) Weiss indices ii) Miller indices. (4)

24. a) Mention any six differences between lithium and the other Group 1 elements. (5)

    b) Explain the function of Sodium-Potassium Pump. (5)

25. a) How do you classify carbides? Provide an example for each type.

    b) Write a note on the classification of silicates based on their structural framework of Si-O linkage. (5+5)

26. a) Write a note on the reactivity of halogens towards i) water ii) phosphorus iii) sulphur. (6)

    b) Mention the number of Bond pairs, lone pairs, hybridisation and geometry in IF_7 and BrF_5. (4)

27. a) Write a note on the importance of sulphuric acid. (5)

    b) Draw the structures of oxyacids of phosphorus and provide the name also for the structures. (5)

28. a) Write a note on the chemical properties of the elements belonging to nitrogen family. (5)

    b) Starting from ammonia how will you prepare i) hydrazine ii) hydrazoic acid. (5)

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