 LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.Sc.** DEGREE EXAMINATION - **CHEMISTRY**

SECOND SEMESTER – APRIL 2012

# CH 2815 / 2809 - CHEMISTRY OF MAIN GROUP ELEMENTS

Date : 19-04-2012 Dept. No. Max. : 100 Marks

Time : 9:00 - 12:00

# Part – A

*Answer* ***all*** *the questions: (10 x 2 = 20)*

1. What is oxidative addition of hydrogen? Give an example.
2. What are fullerenes? Mention any one application.
3. Differentiate the structure of graphite and diamond.
4. What is hetero catenation? Mention any one significance.
5. What is molybdenum blue?
6. Give the structure of porphyrin metal complexes where it act as a tridentate ligand.
7. How does the Tolman cone angle define the steric requirements of a phosphine ligand?
8. Draw the structure of beryllocene and compare it with ferrocene.
9. Why can’t the cis isomer of difluorodiazene be stored in glass vessels?
10. Name the products formed by the disproportionation of xenon trioxide in basic solution.

# Part – B

*Answer any* ***eight*** *questions: (8 x 5 = 40)*

1. Write a brief note on hydroboration and hydrosilaylation. Give mechanisms also.
2. How is it possible to convert closoborane to nido and arachnoboranes? Explain by taking B6H612- as an example.
3. Explain PSEPT theory and apply it to predict the structure of

i) 1,2-CpCoB4H8 ii)NB9H12

1. Explain the classification of silicates. Give an example for each class.
2. Write a brief note on tungsten bronze.
3. Explain why borazines are considered as inorganic benzene where as phosphazenes are not considered as inorganic benzene.
4. What are pthalocyanins? How are they prepared? Mention their uses.
5. Mention a method to synthesis alkyl and aryl silicon halides and explain their hydrolysis reaction to give various polymers.
6. Explain macrocyclic effect with suitable examples.
7. An inorganic sulphur halide ‘A’ having a distinct sulphurodour is made by the reaction between SCl2 and HF in the presence of pyridine to give compound ‘B’. The compound B has an octahedral geometry. Compound ‘A’ can also react with ClF to give compound ‘C’. Compound ‘C’ on reaction with ozone gives peroxide ‘D’. Identify A, B, C and D and write the equations for the above reactions.
8. Give a brief account on the chemistry of oxohalogen fluorides.
9. Write the preparation of chloramine and compare its disinfectant property with chlorine.

# Part – C

*Answer any* ***four*** *questions (4 x 10 = 40)*

1. Compare the reactivity of electron deficient, electron precise and electron rich compounds of main group elements.
2. Discuss the structure, bonding and chemical reactivity of diborane.
3. Derive styx number and possible structure for B4H10.
4. a) Write a brief note on naturally occurring azamacrocycles. (6)

b) Write a note on polypyrazolyl borate (4)

1. a) An inorganic halogen oxide ‘A’ which is used as an air disinfectant is paramagnetic at room temperature and diamagnetic at -150ºC. Identify A and give reason for its different magnetic character by giving its structure. (5)

b) Discuss the nature of metal-phosphorous bond in phosphine ligand. (5)

1. a)Explain the classification of non-metal fluorides as fluorinating agents with suitable examples. (5)

b) Mention the synthetic applications of organolithium compounds. (5)

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