



**LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034**

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

**SECOND SEMESTER – APRIL 2013**

**CH 2815/2809 - CHEMISTRY OF MAIN GROUP ELEMENTS**

Date : 29/04/2013

Dept. No.

Max. : 100 Marks

Time : 9:00 - 12:00

**PART – A**

Answer *all* the questions

(10 x 2 = 20)

1. What are carbon nanotubes? Mention any one application.
2. What are electron deficient compounds? Cite an example.
3. What are pyrazoboles? Give two examples.
4. What is ZSM-5? Mention any one application.
5. What is the chemical formula for ammonium molybdate? Mention the application of this chemical in qualitative analysis.
6. Calculate the number of electrons contributed by  $\text{Fe}(\text{CO})_3$  to the polyhedra?
7. Name any two chiral phosphines and draw their structure.
8. Which is the decomposition product of aqua regia? How is it prepared?
9. What are compartmental ligands? Give one example.
10.  $\text{SbF}_5$  is a strong fluorinating agent compared to  $\text{SbF}_3$ . Illustrate with an example.

**PART – B**

Answer any *eight* questions

(8 x 5 = 40)

11. Explain the mechanism involved in hydroboration and hydrosilylation reactions.
12. Explain the classification of binary compounds of hydrogen compounds and their characteristic properties..
13. Explain the structure and bonding in diborane.
14. Explain the classification of silicates. Give an example for each.
15. Write a brief note on tungsten bronze and molybdenum blue..
16. Discuss the number of electrons contributed by i)  $\text{Fe}(\text{CO})_3$  ii)  $\text{CpNi}$  to the polyhedral.
17. Explain the structure of protoporphyrin in heme.
18. Discuss the chlorinating and oxidizing reactions of halogen oxides.
19. Describe the structure of organolithium and organoaluminium compounds.
20. Briefly mention the oxidizing and fluorinating properties of xenon fluorides.

21. Explain how template effect plays an important role in synthesizing macrocyclic imine complexes.

22. Discuss the classification of fluorinating agents with suitable examples.

### PART – C

Answer any **four** questions

(4 x 10 = 40)

23. Discuss the reactivity of electron deficient, electron precise and electron rich compounds of main group elements.

24. a) What are carboranes? How are they classified? (4)

b) Apply PSEPT theory to predict the structure of

i)  $C_2B_3H_5Fe(CO)_3$       ii)  $N_2B_4H_6$  (6)

25. a) Bring out the significances of zeolite

b) Why is borazine considered as inorganic benzene?

26. a) Write notes on the following:

(i) phthalocyanins      (ii) Silsesquioxanes (6)

b) What are Schiff bases? How are they synthesized? (4)

27. a) An inorganic sulphur compound 'A' is prepared by passing disulphur dichloride through heated potassium fluoride. It undergoes disproportionation in the presence of acid catalyst to sulphur and compound 'B'. B on reaction with ClF gives compound 'C' which is a colorless gas. Identify A, B and C and give the corresponding equations. (5)

b) Write a note on polydentate phosphines. (5)

28. a) Discuss the preparation and properties of alkyl and aryl silicon halides. (6)

b) Explain the structure of xenon fluorides . (4)

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