

CHE 503N

M.Sc. (Ist SEMESTER) EXAMINATION, 2024-25

(CBCS MODE)

CHEMISTRY

(Main Group Elements)

1409



Time : Three Hours] [Maximum Marks : 75

Note: There are **three** sections (A, B and C) and Candidate has to attempt questions from all sections. Marks are indicated against each section.

Section-A

1. Answer all questions : 5×3=15
- (a) Draw the structure of a polygon having gyroelongated square bipyramidal structure.
 - (b) Why amine oxides decompose easily upon heating while phosphine oxides do not show this property ?
 - (c) Classify organometallic compounds on the basis of polarity of M-C bond.
 - (d) Why there are two different Al-C bond lengths in $Al_2(CH_3)_6$?
 - (e) What change do you expect in bond angle for an s-pure hybrid orbital ?

Section-B

Note: Answer all questions of the following : $4 \times 5 = 20$

2. (a) What do you understand by Bent's rule ?
Discuss its significance in structure determination of simple inorganic molecules.

Or

- (b) What is the significance of hybridization energy ? Where do you expect change in hybridization energy ?
3. (a) Describe the synthesis and commercial uses of organoaluminium compounds.

Or

- (b) Give an account of preparation properties and structure of aryls and alkyls of lithium.
4. (a) What are crown ether complexes ? Explain alkali metal and alkaline earth metal crown ether complexes with suitable examples.

Or

- (b) Define polyions. Discuss polyions of antimony with suitable examples.

5. (a) Give the classification of boranes and briefly explain metalloboranes.

Or

- (b) Give the preparation and classification of salt like carbides.

Section-C

Note: Answer any two questions of the following : $2 \times 20 = 40$

6. What are the different types of bonds present in boranes ? Explain Wade's rule with suitable examples.
7. Briefly explain the classification of silicates.
8. Give an account of preparation, properties, bonding and structure of polythiazyl. Why it is known as one dimensional metal ?
9. Discuss dr-pr bonding with suitable illustrations. What are the consequences of this type of bonding on molecular structure ?

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