



EASTERN UNIVERSITY, SRI LANKA

SECOND YEAR SECOND SEMESTER EXAMINATION IN SCIENCE-2013/2014

(OCTOBER/NOVEMBER' 2016)

CH 205 BORON CHEMISTRY AND SILICATES

(PROPER)

Answer all questions

Time: ONE Hour

a) State the 'Wade's rule'

(10 Marks)

b) Discuss the type of bonding and structure of the following boron compounds using Wade's rules



(30 Marks)

c) Write a plausible product for the interaction of  $Li[B_{10}H_{13}]$  with  $Al_2(CH_3)_6$ ? Give reason(s).

(10 Marks)

d) A boron-based compound is composed of boron, carbon, chlorine, and oxygen with the molecular formula of the  $B_4CCl_6O$ . Spectral measurements indicate the molecule has two types of B atoms, with tetrahedral and trigonal planar geometry in a ratio of 1:3 respectively. These spectra show the presence of a CO triple bond.

Suggest a possible structure for the above molecule.

(30 Marks)

Contd..

e) How would be the following transformations be effected through organo-metal intermediate(s)?



2. a) Derive the possible "styx" number for  $\text{B}_5\text{H}_9$  and draw the most possible schematic diagram(s) corresponding "styx" number.

b) Explain the type of bonding and structure of the following carboranes compounds

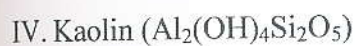
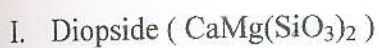
Wade's rules

i.  $\text{CB}_5\text{H}_9$

ii.  $\text{C}_3\text{B}_3\text{H}_7$

c) i. List the structural types of silicates.

ii. Classify the following silicates into different structural types and describe their structure.



(30 Marks)

) Show by means of equations how the following transformations could be effected via organometallic intermediates



(20 Marks)

**End of paper**