

End Semester Examinations - 2015-16 Even Semester - May 2016

15CH3017 Main Group Chemistry

Set B

Time : 3 hrs
Total Marks: 100

1.
 - a. (i). Give an account on “Lariat crown ether”. (4+4) Marks
 - (ii). Explain the synthesis and structure of beryllium carboxylate.
 Why the structure of beryllium carboxylate is different from that of other alkaline earth metal carboxylates? Explain.
 - b. Discuss the Bingel and Prato reactions of C_{60} . 8 Marks
 - c. Write the synthesis of cryptand-222 via diaza-18-crown-6. 4 Marks

OR
2.
 - a. Write the synthesis of the following compounds 9 Marks
 - (i) Dibenzo-18-crown-6 (ii) Dibenzo-14-crown-4 (iii) Dibenzo-12-crown-4
 - b. Differentiate between allotropes and polymorphs. 4 Marks
 - c. Draw the structure of the following compounds. 4 Marks
 - (i) Mellitic acid (ii) Dimethyl beryllium (iii) $t\text{BuLi}$ in THF (iv) Beryllium chloride
 - d. Explain the double C-H activation of acetylene. 3 Marks
3.
 - a. Discuss the synthesis and structure of allotropes of phosphorous. 6 Marks
 - b. Describe pyroxenes and amphiboles with examples. 5 Marks
 - c. Explain the synthesis and structures of the following compounds. 6 Marks
 - (i) ICl (ii) ClF_3 (iii) IF_7
 - d. What is enantiotropic allotrope? 3 Marks

OR
4.
 - a. Explain the different forms of sulphur with their corresponding temperatures. 6 Marks
 - b. Draw the structure of the following compounds. 6 Marks
 - (i) Titanocene Pentasulfide (ii) Cyclo- S_6 (iii) $\text{Si}_2\text{O}_7^{6-}$ (iv) Se_2O_5 (v) IF_3 (vi) Cyclo- S_{12}
 - c. (i). Discuss about cyclic silicates with specific examples. (4+4) Marks
 - (ii). Write a short note on gaseous allotropes of Sulphur.
5.
 - a. Differentiate between metal-enmeshed polymers and metal-backbone polymers. 4 Marks
 - b. How to synthesize cyclo-hexasulphur from cyclo-octasulphur? 4 Marks
 - c. Write the synthesis of the following compounds from boric acid. 6 Marks
 - (i) B(OMe)_3 (ii) B(OH)_4^- (iii) $\text{B}_3\text{O}_3(\text{OH})_4^-$
 - d. Describe the synthesis and structures of XeF_4 and XeO_3 . 6 Marks

OR

6. a. Draw the structures of $\text{N}(\text{SiH}_3)_3$ and trimethylamine. 5 Marks
- Why the structure of $\text{N}(\text{SiH}_3)_3$ is different from trimethylamine?
- b. Explain the synthesis and structure of XeOF_4 and XeO_2F_2 . 5 Marks
- c. (i). Draw the structure of the following compounds. 4 Marks
- (i) $\text{B}_5\text{O}_6(\text{OH})_4^-$ (ii) Croconate (iii) $[\text{XeO}_6]^{4-}$ (iv) $[\text{S}_4]^{2+}$
- d. Describe the structures of boron oxide, metaboric acid and boric acid. 6 Marks
7. a. Describe the synthesis of polyphosphazene and poly(carbophosphazene). 6 Marks
- b. (i). Discuss the synthesis of cyclic and polymeric silicones. (8+2) Marks
- (ii). How gas storage is possible in MOF?
- c. Explain the structure of $(\text{NPCl}_2)_4$. 4 Marks
- OR**
8. a. Write the synthesis of the following compounds from $[\text{NPCl}_2]_3$. 8 Marks
- (i) $(\text{NPPH}_2)_3$ (ii) $(\text{NPF}_2)_3$ (iii) $(\text{NPCl}_2)_3 \cdot \text{HClO}_4$ (iv) $(\text{N}_3\text{P}_3\text{Cl}_5\text{O})^- (\text{AsPh}_4)^+$
- b. Write a short note on “Coordination polymers”. 6 Marks
- c. Explain $d\pi-p\pi$ bonding in cyclotriphosphazene. 6 Marks
9. a. Explain the synthesis and structures of $\text{Re}_2\text{Cl}_8^{2-}$. 4 Marks
- b. Use Wade’s rules to predict the structures of the following: 9 Marks
- (i) $\text{B}_8\text{H}_8^{2-}$ (ii) B_6H_{10} (iii) $\text{C}_2\text{B}_5\text{H}_7$
- c. Describe the STYX number for B_6H_{10} with structures. 7 Marks

Wishing you All the Best
