RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2014

SECOND YEAR

Date : 23/05/2014 **CHEMISTRY (Honours)**

Time : 11 am – 12 noon Paper : IV Full Marks : 25

Group – C

(*Answer **one** question from each unit*)

Unit – I

1. a) Explain why Tl(III), Pb(IV) and Bi(V) are strong oxidising agents and get readily reduced to oxidation states that differ from their normal group valence. [3]
   b) Why AlF_3 is almost insoluble in anhydrous HF but it readily dissolves when NaF is added to it. [3]
   c) $(SiH_3)_3N$ and $(CH_3)_3N$ react with HCl to give different products. —Explain. [3]
   d) Explain the dipolemoment of R_3NO and R_3PO. [2]
   e) Why HF has a lower boiling point than H_2O. [2]

2. a) Give a comparative account of the chemistry of group 15 elements with respect to their halides. [3]
   b) Explain why a solution of borax is a good buffer solution. [2]
   c) Compare the structures of H_2O_2 and O_2F_2 giving reason for the difference in O – O bond length. [3]
   d) Comment on the redox behaviour of H_2SO_4, H_2SeO_4 and H_6TeO_6 respectively. [3]
   e) Colours of the halogen vapours change from pale yellow in F_2 to intense violet in I_2. —Explain. [2]

Unit – II

3. a) Discuss the structure and bonding of B_2H_6. [3]
   b) How will you prepare sodium dithionite? Discuss the structure of sodium dithionite ion. [3]
   c) Show the reactivity of pseudohalides with respect to oxidation, precipitation and complexation reactions. [3]
   d) Interhalogens are diamagnetic. Justify.
   With evidence show that interhalogens undergo auto ionization. [3]

4. a) Show the structure of crystalline boric acid and explain its sleepery properties. [2]
   b) Why does NH_2OH show oxidising and reducing properties? Write one reaction in support of each type. [3]
   c) What happens when an aqueous solution of sodium hypochlorite is treated with ammonia in presence of gelatin. [2]
   d) What happens when solution of Mn^{2+} salt in dilute H_2SO_4 is treated with $S_2O_8^{2-}$ in presence of $AgNO_3$. [2]
   e) How can you obtain xenate and perxenate from XeO_3? What is the product of the reaction when XeF_6 is reacted with CsF? [3]