RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. THIRD SEMESTER EXAMINATION, DECEMBER 2017

SECOND YEAR [BATCH 2016-19]

Date : 16/12/2017 **CHEMISTRY [General]**

Time : 11 am – 1 pm **Paper : III** Full Marks : 25

(Attempt <u>one</u> question from <u>each Unit</u>)

<u>Unit - I</u> [13 marks]

1. a) How will you prepare borazole and N-methyl borazole? Give a short description on the structure and bonding of borazole. [2+2+3]
   b) Compare the (i) acid strength and (ii) reducing properties of H_3PO_4. H_3PO_3 and H_3PO_2 with explanation. [3]
   c) What is 'inert-pair effect'? $SnCl_2$ is a strong reducing agent but $PbCl_2$ is not. Explain. [1+2]

2. a) Give a brief description on phosphazene. [3]
   b) NCl_3 and PCl_3 give different products on hydrolysis. Explain. [3]
   c) Hydroxylamine has both oxidising and reducing properties. Explain with equations. [3]
   d) Explain—
      i) CO_2 is gas but SiO_2 is solid. [2]
      ii) Diamond is an insulator but graphite is a conductor and silicon is a semiconductor. [2]

<u>Unit - II</u> [12 marks]

3. a) SF_6 is inert but TeF_6 gets hydrolyzed easily. Why? [2]
   b) Explain the exceptionally high reactivity of F_2. [2]
   c) How sodium thiosulfate is prepared? Show that sodium thiosulfate is a reducing agent and also a complexing agent. [1+2]
   d) Complete the reactions : [1·5+1·5]
      i) $XeF_6 + SiO_2 \rightarrow$
      ii) $XeF_6 + H_2O \rightarrow$
   e) How will you chemically detect Br^- (bromide) in presence of I^- (iodide)? Give reactions. [2]

4. a) Why helium is very difficult to liquify? [1]
   b) What happens when silver nitrate is added to a solution of sodium thiosulfate? [1]
   c) Arrange the HX (X = F, Cl , Br, I) in terms of their acid strength with appropriate explanation. [2]
   d) Write a short note on S_4N_4. [2]
   e) Discuss the preparations and structures of three xenon fluorides. [3]
   f) State with equations, what happens when—
      i) SO_2 gas is passed through an acidified solution of potassium dichromate. [1·5]
      ii) Sodium hypochlorite is added into cold NH_3 solution. [1·5]

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