

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.SC. FOURTH SEMESTER EXAMINATION, MAY-JUNE 2013

SECOND YEAR

CHEMISTRY (Honours)

Date : 21/5/2013

Time : 11 am – 1 pm

Paper : IV

Full Marks : 25

Group – C

Unit - I

Answer **any one** question :

1. a) What are thionic acids? How does dithionates differ from polythionates? [1+2]
b) Write equations for the 1:1 reaction of C_5F with GeF_2 explaining the formation of the product and suggest the structure of product. [3]
c) Give comparative account of the oxidation state, hydrides and halides of As, Sb and Bi respectively. [2+1+2]
d) Explain : XeF_6 is distorted octahedral but $TeCl_6^{2-}$ is regular octahedral in shape though they are isoelectronic pair. [2]
2. a) Furnish a comparative account for the elements of Group-14 in respect of the catenation and their halides. [3]
b) Xenate ion disproportionates in basic solution to yield xenon, perxenate ion and oxygen. Give a balanced equation for this reaction. [2]
c) Complete the reaction : $Cl_2 + ClF + AsF_5 \xrightarrow{-78^\circ C} ?$ [1]
d) Acidity of $HClO_x$ increases as X increases from 1 to 4, but oxidising power decreases from 4 to 1. Explain. [3]
e) When I_2 dissolves in oleum a bright blue solution is obtained, which is paramagnetic but when cooled to about $-70^\circ C$, there occurs a drop in paramagnetic susceptibility and electrical conductivity accompanied by reversible colour change to red. Explain. [2]
f) The I-I bond distance in $[Me_4N]^+[I_3]^-$ is $2.92\text{\AA}$, whereas I-I distance in I_2 is $2.66\text{\AA}$. Explain. [2]

Unit - II

Answer **any one** question :

3. a) Elucidate the structure and bonding of phosphazines. [4]
b) What happens when
i) $SO_2(g)$ is passed through a concentrated solution of $NaNO_2$ and Na_2CO_3 in 2:1 molar proportion at below $0^\circ C$ until just acidic. [2]
ii) Sodium thiosulphate solution is separately added to (1) $AgNO_3$ and (2) $FeCl_3$ solutions. [1½+1½]
c) Briefly describe the chemistry of pseudohalides. [3]
4. a) Give the preparation of the following (**any two**) : [2×2]
(i) per-iodic acid (ii) Caro's acid (iii) potassium perbromate
b) Why borazine is called Inorganic benzene? Discuss its structure and bonding. [1+3]
c) Complete the following equations and explain in favour of the product(s) written : [½×2+1]
 $(H_3C)_3N + HCl \rightarrow$
 $(H_3Si)_3N + 4HCl \rightarrow$
d) Calculate the acidimetric and oxidimetric equivalent weight of $KH(IO_3)_2$ (assume molecular weight of the compound = M) [2]

