63 (FY)SEM–3/MAJ/CHMMAJ2014

2024

CHEMISTRY

Paper : CHMMAJ2014

(Inorganic Chemistry–I)

Full Marks : 50

Pass Marks : 20

Time : Two hours

The figures in the margin indicate full marks for the questions.

1. Choose the correct answer : 1×5=5

   (a) Which of the following metal hare similar properties to that of Li^+ metal ion.

   (i) Be^{2+}

   (ii) Mg^{2+}

   (iii) Ca^{2+}

   (iv) Sr^{2+}

Contd.

(b) Which one is the best levelling solvent for acids—

(i) H_2SO_4

(ii) H_2O

(iii) NH_3

(iv) $(CH_3)_2SO$

(c) The molecular formula of Iodinetrichloride is—

(i) I_3Cl_9

(ii) ICl_3

(iii) ClI_3

(iv) I_2Cl_6

(d) Which straight chain polymer of silicones are used as silicones fluid

(i) 1 to 5 unit chain

(ii) 6 to 15 unit chain

(iii) 15 to 19 unit chain

(iv) 20 to 500 unit chain

(e) Which of the compouns exhibit super-conductivity at law temperature.

(i) $(SN)_x$

(ii) S_4N_4

(iii) S_2N_2

(iv) $B_3N_3N_6$

2. Answer ***any five*** of the following questions : 2×5=10

(a) Explain the clathrates compounds with at least one example of Xe-compounds.

(b) What do you mean by phosphazenes ? Explain its structure. 1+1=2

(c) Why NH_3 is consider as Bronsted-Lowry base ? Arrange NH_3, CH_3NH_2, $(CH_3)_2NH$ & $(CH_3)_3N$ 1+1=2

(d) What do you mean by pseudohalogens ? Give examples and reactions resembelance to that of halogens. 1+1=2

(e) Explain the shape of $XeOF_2$ in the light of VSEPR theory.

(f) Write short notes on polyhalides.

(g) Explain the anomalous behaviour of B with the rest members of its group.

3. Answer ***any five*** of the following questions : 5×5=25

(a) What are Boranes ? Give the preparative methods for Diborane and Explain its structure. 1+2+2=5

(b) Explain the transformation of Blue colour to Bronze colour of Metal solution in liquid NH_3.

(c) What do you mean by Allotropy ? Explain the different allotropic form of carbon.

(d) Describe the uses of the noble gases– *He, Ne, Ar, Kr* and *Xe*.

(e) What is Barazines ? How the Barazines can be prepared ? Explain its structure and give one example of its addition reaction. 1+2+2=5

(f) Explain the shape and acidic strength of ClO^-, ClO_2^-, ClO_3^- and ClO_4^- and arrange them in increasing order of their acidic strength.

(g) Describe the following recetions in liquid NH_3 solvent—

(i) Precipitation reaction

(ii) Neutralization reaction

(iii) Amphoteric behaviour

(iv) Solvolysis reaction

(v) Disproportionation reaction

(h) Draw the Frost diagram from the given Latimer diagram and predict the stability of the oxidation state of chlorine.

ClO_4^- 1.201 ClO_3^- 1.18 $HClO_2$ 1.70

$HClO$ 1.63 Cl_2 1.358 Cl^-

4. Answer the following question : ***(any one)*** 10×1=10

(a) Write short notes on the following : 5+5=10

(i) Oxy acids of nitrogen

(ii) Peroxy acids of sulphur

(b) (i) Compare the valence bond and molecular orbital treatments to understand the bonding in XeF_2. 5

(ii) What are silanes ? Explain why silanes are more reactive than alkanes. 5