

CHE-2

BACHELOR OF SCIENCE (B.Sc.)

Term-End Examination

December, 2005

CHEMISTRY

CHE-2 : INORGANIC CHEMISTRY

Time : 2 hours

Maximum Marks : 50

Note : Answer all the **five** questions.

1. Answer any **ten** of the following : **1×10=10**

(i) Which of the following species is the largest in size ?



(ii) Name the halogen which has the highest electron affinity.

(iii) What is the name of the form of hydrogen molecule in which the two nuclei spin in the same direction ?

ortho hydrogen **or** para hydrogen

(iv) Which of the following has the highest solubility in water ?



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P.T.O.

(v) Which silicon compound is used as a cation exchanger ?

(vi) Name the process used for the purification of nickel.

(vii) What is the shape of XeF_2 molecule ?

Linear or Angular

(viii) How do alkali metals dissolved in liquid ammonia behave ?

As Oxidising agents or Reducing agents

(ix) Which one of the following is an interhalogen compound ?

HF , ClF , NaCl

(x) Which one of the following involves hydrogen bridge structure ?

B_2H_6 , C_2H_6 , N_2H_4

(xi) Which of the following is the strongest acid ?

HF , HCl , HBr , HI

(xii) Write the formula of heavy water.

(xiii) Write the coordination number of Cr in the complex $[\text{Cr}(\text{H}_2\text{O})_4\text{Cl}_2]^+$.

(xiv) What will be the type of complex formed, when P is greater than Δ_o ? (P = pairing energy)

High spin or Low spin

(xv) What are the two chief constituents of water gas ?

2. (a) Define atomic radius. Giving reasons, explain, how does it vary across the period and down the group. 4

OR

How is beryllium hydride prepared ? Draw the structure of beryllium hydride polymer and discuss the nature of bonding in it.

- (b) How is borazole (borazine) prepared ? With the help of necessary equations, give two of its chemical properties. Draw its structure also. 4

OR

Account for any **two** of the following :

- (i) Ice has lower density compared to water.
 - (ii) Lithium forms more complexes than other alkali metals.
 - (iii) Thermal stability of alkali metal carbonates increases down the group.
- (c) Why is there a steady increase in boiling point from helium to radon ? 2

3. (a) What is catenation ? Name the element of group 14 which shows maximum catenation. Justify your answer. 3

OR

Compare NaBH_4 and LiAlH_4 as reducing agents.

(b) With the help of valence bond theory discuss the structure of XeF_2 or XeF_4 . 2

(c) Give balanced chemical equations for any **three** of the following : 1×3=3

(i) Reaction of PCl_3 with HI

(ii) Reaction of sodium thiosulphate with I_2

(iii) Reaction of SiF_4 with water

(iv) Reaction of XeF_2 with hydrogen

(v) Reaction of copper metal with concentrated H_2SO_4

(d) How is aqua regia prepared ? Give its reaction with gold metal. 2

4. (a) Give any two properties of actinides in which they resemble lanthanides. 2

(b) Explain any **two** of the following : 2×2=4

(i) Transition metals form large number of complexes readily.

(ii) Aluminium metal cannot be obtained by reduction of its oxide with carbon.

(iii) NCl_3 and PCl_3 give different types of products on hydrolysis.

(iv) Fluorine cannot be obtained by electrolysis of an aqueous solution of NaF .

(c) Ionic azides are more stable than covalent azides.
Explain. 2

(d) Discuss the amphoteric nature of SnO_2 or Al_2O_3 with
the help of suitable reactions. 2

5. (a) Write short notes on any **two** of the following : 4×2=8

(i) Ionisation isomerism and linkage isomerism

(ii) Hydrogen bonding

(iii) Electron affinity

(iv) Smelting

(b) Give the formula of **one** of the following
complexes : 1

(i) Potassium trioxalatoferrate(III)

(ii) Hexaamminecobalt(II) chloride

(c) Write the IUPAC name of any **one** of the following
complexes : 1

(i) $\text{K}_2[\text{PtCl}_6]$

(ii) $[\text{Co}(\text{en})_3]\text{Cl}_3$