

CHE-2

BACHELOR OF SCIENCE (B.Sc.)

Term-End Examination

June, 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

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

Mg, Ca, Ba

(ii) Name the most electronegative element in the periodic table.

(iii) Write the IUPAC name of the element having atomic number = 105.

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P.T.O.

(iv) NaH is an example of which type of the following hydrides ?

- (a) Metallic hydride
- (b) Covalent hydride
- (c) Ionic hydride

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

CsF, RbF, KF

(vi) Which one of the following is thermally the most stable ?

MgCO₃, CaCO₃, SrCO₃

(vii) Which silicon compound is used as a dehydrating agent ?

(viii) Name the most effective method used for the separation of lanthanides.

(ix) What is the shape of XeF₄ molecule ?

Square planar or Tetrahedral

(x) Which one of the following is a pseudohalogen ?

(CN)₂, I₂, HCl

(xi) Which one of the following is called inorganic benzene ?

Borazole, Diborane, Borax

(xii) Name the radioactive isotope of hydrogen.

- (xiii) What is the other name given to *f*-block elements ?
Transition elements, Inner-transition elements,
Representative elements
- (xiv) What is the coordination number of cobalt in the complex $[\text{Co}(\text{H}_2\text{O})_3\text{Cl}_3]$?
- (xv) Froth floatation process is used to concentrate which type of the following ores ?
Sulphide ores, Halide ores, Nitrate ores

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

OR

How is diborane prepared ? Draw its structure and discuss the nature of bonding.

- (b) Define hydrogen bond. Discuss intermolecular and intramolecular hydrogen bonding giving suitable example in each case. 4

OR

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

- (i) Nitrogen exists as a gas but phosphorus exists as a solid.
- (ii) Boric acid behaves as a weak monobasic acid.
- (iii) CCl_4 is not hydrolysed but SiCl_4 gets readily hydrolysed.

(c) What are fluorocarbons ? Name the product obtained when C_2F_4 is polymerised thermally. 2

3. (a) Give any three properties in which lithium or nitrogen or fluorine differ from other members of its respective group. 3

(b) What are different forms of hydrogen molecule ? How do they differ from each other ? 2

OR

What are silicones ? Give the structure of a linear or a cross linked silicone polymer.

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

(i) Reaction of XeF_2 with water

(ii) Reaction of $Al(OH)_3$ with excess aqueous NaOH

(iii) Reaction of $SnCl_2$ with $FeCl_3$

(iv) Reaction of concentrated HNO_3 on copper metal

(v) Reaction of NCl_3 with H_2O

(d) Why is Contact process preferred over Lead chamber process for the preparation of sulphuric acid ? 2

4. (a) Account for any **two** of the following : 2×2

- (i) SO_3 is not dissolved in water directly during preparation of sulphuric acid.
- (ii) An aqueous solution of NaOCl is alkaline in nature.
- (iii) Noble gas compounds are formed only with oxygen and fluorine.
- (iv) Bond dissociation energy of F_2 is much lower than expected.

(b) Predict the spin only magnetic moment for Fe^{2+} ion (At. no. of Fe = 26). 3

OR

Explain the term, lanthanide contraction and discuss its consequences.

(c) Arrange HOCl , HOClO , HOClO_2 and HOClO_3 in the increasing order of acidic strength. Give reason for your arrangement. 3

5. (a) Write short notes on any **two** of the following : 4+4

- (i) Werner's coordination theory
- (ii) Interhalogen compounds
- (iii) Froth floatation process
- (iv) Metallic hydrides