

FIFTH SEMESTER B.Sc. DEGREE EXAMINATION, NOVEMBER 2011

(CCSS)

Chemistry—Core Course—V

CH 5B 09—INORGANIC CHEMISTRY—I

Three Hours

Maximum Weightage : 30

I. Answer *all* the twelve questions. Each question carries a weightage of $\frac{1}{4}$. This section contains Multiple Choice, Fill in the blanks and One word answer type questions :

- 1 Hybridisation of chlorine in CH_3 is _____.
- 2 Which is more ionic, SnF_4 or SnCl_4 ?
- 3 Suggest a tetratomic molecule having zero dipole moment.
- 4 Name an adsorption indicator.
- 5 What is inorganic benzene ?
- 6 Name an element that is purified by zone refining.
- 7 Which is more stable Pb^{2+} , or Pb^{4+} ?
- 8 What is boric acid chemically ?
- 9 Identify the most powerful reducing agent among the following :—

(a) HF.	(b) HCl.
(c) HBr.	(d) HI.
- 10 Oxidation number of bromine in one of its monobasic acids is +5. Write the formula of the acid.
- 11 Suggest a molecule containing three sigma and two Pi bonds.
- 12 Shape of IF_7 molecule is _____.

 $(12 \times \frac{1}{4} = 3 \text{ weightage})$

II. Answer *all* the nine questions. Each question carries 1 weightage :

- 13 Explain the bonding in SO_4^{2-} .
- 14 What do you mean by post precipitation ?
- 15 The ionisation of NH_4OH is suppressed by the addition of NH_4Cl . Why ?
- 16 Comment on the electropositive character of iodine.
- 17 Define solubility product.
- 18 Outline the bonding in XeF_2 .
- 19 What is diagonal relationship ? Give *one* example.
- 20 What is aluminothermy ?
- 21 How do electronegativity and electrons affinity vary among halogens ?-

 $(9 \times 1 = 9 \text{ Weightage})$

Turn over

III. Answer any *five* questions. Each question carries 2 weightage :

- 22 In HCl, the internuclear distance is 1.275 \AA . If the observed dipole moment is 1.03 D , find the percentage of ionic character of the molecule. (Assume the value of electronic charge).
- 23 Explain "hydrometallurgy".
- 24 Outline the manufacture of steel by open hearth process.
- 25 Write Born-Landé equation. Explain the terms.
- 26 Briefly explain the production of pure titanium from Rutile.
- 27 Give a brief account of acid-base titrations.
- 28 Discuss the important properties of transition elements.

(5 × 2 = 10 weightage)

IV. Answer any *two* questions. Each question carries 4 weightage :

- 29 (a) What is lattice energy ?
(b) Explain the determination of lattice energy of NaCl by Born-Haber cycle.
- 30 (a) What are interhalogen compounds ? Explain.
(b) Discuss the structure of diborane.
- 31 (a) What is lanthanide contraction ? How does it originate ? What are the important consequences of lanthanide contraction ?
(b) Outline the separation of lanthanides by ion-exchange method.

(2 × 4 = 8 weightage)