Vithalbhai Patel & Rajratna P. T. Patel Science College
Vallabh Vidyanagar.

B. Sc. (First Semester)

Subject : GENERAL CHEMISTRY (US01CCHE01)

Date : 02-12-2014 **Internal Test - 2014** **Marks : 25**

Day : Tuesday **Time : 11.00 a.m.to 12.00 noon**

Note: (i) All questions are to be attempted. (ii) Figures to the right indicate marks.

Given : Atomic weight of C = 12, O = 16, H = 1, N = 14, S = 32, Cl = 35.5 gm/mole.

Q.1 Choose the correct option for the following : **[3]**

(i) According to Lewis concept, BF_3 is ----------
(a) neutral (b) basic (c) acidic (d) amphoteric.

(ii) Which gas will be liberated in the Kjeldahl quantitative nitrogen estimation ?
(a) NO_2 (b) N_2O_5 (c) N_2 (d) NH_3

(iii) In a co-ordination compound primary valency of a central metal ion is satisfied by ----------
(a) ligand (b) anion (c) radical (d) cation.

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Q.2 Answer the following (Attempt any two) : **[4]**

[A] Define pH. How pH scale is useful to classify the solutions ?

[B] Calculate % composition for the compound having molecular formula C_3H_7Cl.

[C] Give the name and structure for the following ligand:
(i) $(dmg)^-$ (ii) $(ox)^{-2}$

Q.3 **[6]**

[A] Discuss in detail the Arrhenius concept of acids and bases. What are the limitations of this concept ?

[B] Silver ion is added to a solution that contains Cl^- and I^- both at 0.01 M concentrations. (i) Which salt will precipitates first, AgCl or AgI ? (ii) What is the values of $[Ag^+]$ when the first salts starts to precipitates ?
[Given : K_{sp} [AgCl] = 2.8×10^{-10} & K_{sp} [AgI] = 8.5×10^{-17}].

OR

Q.3 **[6]**

[A] Explain : All Lewis bases are Lowery- Bronsted bases, but all Lewis acids are not Lowery-Bronsted acids.

[B] Calculate the solubility of CaF_2 in (i) pure water, and in (ii) 0.1 M $Ca(NO_3)_2$ solution. (Given K_{sp} of $CaF_2 = 1.7 \times 10^{-10}$).

Q.4 **[6]**

[A] Discuss the Lassaign test for the detection of 'N' 'S' & 'X' elements in an unknown organic compound.

[B] Combustion of 6.51 mg of an organic compound gave 20.47 mg of CO_2 and 8.3 mg of H_2O. The molecular weight was found to be 84 gm/mole. Calculate molecular formula for the compound.

P.T.O.

OR

Q.4 **[6]**

[A] The names given below are objectionable. Rewrite their correct IUPAC name and structure.
(a) 1,1,1-trimethylpentane (b) 3-pentene (c) 2-propyl-1-propene.

[B] Dumas nitrogen analysis of a 5.72 mg of an organic compound gave 1.31 mL of nitrogen at 20°C and 746 mm. The gas was collected over saturated aqueous KOH solution (the vapor pressure of water is 6 mm). Calculate the percentage of nitrogen in an organic compound.

Q.5 **[6]**

[A] What are chelates ? Give the classification and uses of chelates.

[B] Write IUPAC name for the following :
(a) $[Co^{III}(NH_3)_6]\,[Cr^{III}(C_2O_4)_3]$ (b) $[Ag^{I}Cl_2]^-$ (c) $[Cu^{II}(NH_3)_4]^{+2}$

OR

Q.5 **[6]**

[A] Define coordination number and discuss the geometry of complex having coordination number- **4** & **6**.

[B] Identify the followings in the co-ordination complex $[Co(NH_3)_6]Cl_3$.
(i) The oxidation state of cobalt ion is ----------
(ii) The co-ordination number of cobalt ion is ----------
(iii) The dentate character of different ligands are ----------
(iv) Ionic charge on complex cation is ----------
(v) The number of non co–ordinated chlorine ion is ---------

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