

**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

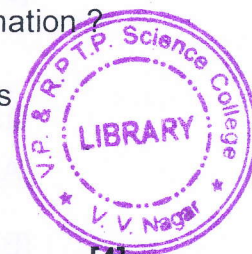
Note: (i) All questions are to be attempted. (ii) Figures to the right indicate marks.

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.



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 $\text{C}_3\text{H}_7\text{Cl}$.
- [C] Give the name and structure for the following ligand:
(i) $(\text{dmg})^-$ (ii) $(\text{ox})^{2-}$

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 $[\text{Ag}^+]$ when the first salts starts to precipitates ?
[Given : $K_{\text{sp}}[\text{AgCl}] = 2.8 \times 10^{-10}$ & $K_{\text{sp}}[\text{AgI}] = 8.5 \times 10^{-17}$].

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 $\text{Ca}(\text{NO}_3)_2$ solution. (Given K_{sp} of $\text{CaF}_2 = 1.7 \times 10^{-10}$).

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) $[\text{Co}^{\text{III}}(\text{NH}_3)_6][\text{Cr}^{\text{III}}(\text{C}_2\text{O}_4)_3]$ (b) $[\text{Ag}^{\text{I}}\text{Cl}_2]^-$ (c) $[\text{Cu}^{\text{II}}(\text{NH}_3)_4]^{+2}$

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 $[\text{Co}(\text{NH}_3)_6]\text{Cl}_3$.

- The oxidation state of cobalt ion is -----
- The co-ordination number of cobalt ion is -----
- The dentate character of different ligands are -----
- Ionic charge on complex cation is -----
- The number of non co-ordinated chlorine ion is -----

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