

Bago University
Department of Chemistry
Second Semester Examination, September 2019

Second Year BSc
(Chemistry Specialization)
Answer any six Questions

Chem 2106
Inorganic Chemistry II
Time Allowed: (3) hours

1. (a) Fill in the blanks with the correct word(s), unit(s), and etc., as necessary.
- (i) Potassium alum is a _____ which retains its identity in solution.
 - (ii) One of the most powerful chelating agents known is _____.
 - (iii) "aca" is the abbreviation of _____ ion.
 - (iv) The attractive forces that hold atoms together in compounds are called _____.
 - (v) All bonds have at least some degree of both ionic and _____ character.
 - (vi) The coordination ratio of CsCl is _____.
- (b) Select the correct statement(s), word(s), unit(s) and etc., given in the followings.
- (i) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_4]$ is a (electrolyte, non-electrolyte, conductor).
 - (ii) Primary valencies of the metal are satisfied by (positive, negative, neutral) ions.
 - (iii) EDTA is used in shampoos in order to remove (Ca^{2+} , Mg^{2+} , Ba^{2+}) ion.
 - (iv) Crystals are classified into (eight, seven, six) different crystal system.
 - (v) The arrangement of the simpler particles in a crystalline array is called (unit cells, lattice, structure).
 - (vi) The coordination ratio of zinc Blende structure is (4:4, 6:6, 8:4).
2. (a) Give the systematic name (IUPAC) for the following coordination compounds.
- (i) $\text{K}_2[\text{Co}(\text{CN})_5\text{NO}]$
 - (ii) $[\text{Cr}(\text{OH}_2)_4\text{Cl}_2]^+$
 - (iii) $[\text{Ag}(\text{NH}_3)_2]\text{Br}$
 - (iv) $[\text{Cu}(\text{NH}_3)_4]\text{SO}_4$
- (b) Write down the structural formulae of the following
- (i) Sodium trisoxalatoferrate(III)
 - (ii) Hexacarbonylvanadium(0)
 - (iii) Sulphatotetraamminecobalt(III) nitrate
 - (iv) Nitropentaamminecobalt(III) ion
3. (a) (i) Describe about two examples of important biological substances which contain coordinated metal atom or ion.
- (ii) In which areas do the coordination compounds have many important applications?
- (b) Determine the oxidation number and the effective atomic number of central metal ion in the following complexes.
- (i) $[\text{Pt}(\text{NH}_3)_2\text{Cl}_2]$
 - (ii) $[\text{Co}(\text{OH}_2)_4\text{Cl}_2]^+$
 - (iii) $\text{K}_4[\text{Fe}(\text{CN})_6]$

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4. (a) Describe the postulate of Werner's theory of coordination compounds.
(b) Give the structure of the following compounds.
(i) Haemoglobin (ii) Chlorophyll
5. (a) Draw the structure of sodium chloride and calculate the stoichiometry ratio of this structure.
(b) Explain the four different types of three dimensional unit cells.
6. (a) Describe the Zinc blende structure and calculate the coordination ratio of Zn:S.
(b) Draw the Nickel Arsenic structure and prove that the stoichiometric ratio of Ni:As is 1:1.
7. (a) Give the structure of Corundum (Al_2O_3) and explain the coordination ratio of Al:O.
(b) Determine the net number of Na^+ and Cl^- ions in the NaCl unit cell.
