

Uva Wellassa University, Sri Lanka
Faculty of Science and Technology
Science and Technology Degree Program
200 Level 1st Semester Examination May/July 2017
SCT 231-1 Inorganic Chemistry



Instructions to candidates

Number of questions: Two (02)

Answer all questions

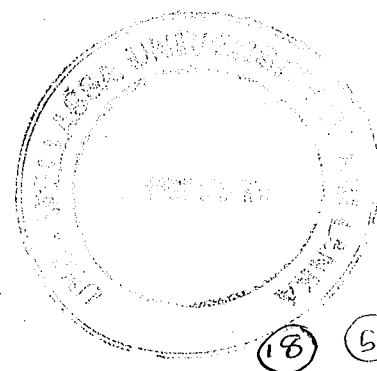
Time allocation: One (01) hour

Total marks allocated: 200

Scientific calculators are allowed, Periodic tables are not allowed

1. i. What is the major difference between covalent bonds and co-ordination bonds?
- ii. Write four properties of co-ordination compounds.
- iii. What is the main difference between a salt and a co-ordination compound?
- iv. What are the ions forms when carnalite is dissolved in water?
- v. What are the different types of ligands in metal complex?
- vi. Name following two ligands [Hint - the pair of dots indicate ligating atom].
a. $:\text{NCS}^-$, b. $:\text{ONO}^-$
- vii. Name following chemical structures according to IUPAC nomenclature.
a. $[\text{CoCl}(\text{NH}_3)_5]^{2+}\text{SO}_4^{2-}$, b. $\text{Na}_2[\text{ZnCl}_4]$
- viii. Draw following structures
a. Pentaamminechlorocobalt(III) chloride,
b. μ -Hydroxobis(pentaamminechromium(III)) chloride
- ix. Name five d orbitals in transition metals.
- x. Among these d orbitals which orbital has the highest energy at the ground state?

(100 marks)



2. i. Cr^{3+} mostly forms octahedral complexes. Suggest the energy diagram of $[\text{Cr}(\text{H}_2\text{O})_6]^{3+}$ and $[\text{Cr}(\text{CN})_6]^{3-}$ using crystal field theory. Calculate the total spin number and crystal field stabilizing energy for $[\text{Cr}(\text{CN})_6]^{3-}$.

ii. Derive the following equation starting from total magnetic momentum of coordination compound metal ion, $\mu_{spin} = \sqrt{n(n+2)}$ where n is number of unpaired electrons.

Calculate the μ_{spin} for the high spin compound composed from Mn^{+2} ions.

(100 marks)