



EASTERN UNIVERSITY, SRI LANKA

SECOND EXAMINATION IN SCIENCE-2014/2015 (November/December' 2016)

FIRST SEMESTER

CH 201 COORDINATION CHEMISTRY & MAIN GROUP CHEMISTRY

(Repeat)

Answer all questions

Time Allowed: One hour

1 (a) What is the spectrochemical series, and explain its importance?.

(10 Marks)

(b) Describe the Jahn-Teller effect in octahedral complexes of Cr^{2+} and Cu^{2+} .

(10 Marks)

(c) Explain each of the following with a suitable example

i. Crystal Field Stabilization Energy (CFSE)

ii. Linkage isomerism

(20 Marks)

(d) Write down the IUPAC name of the following complexes:

i. $[\text{Co}(\text{NH}_3)_4\text{Cl}_2]^+$

ii. $\text{Ni}(\text{CO})_4$

iii. $\text{K}_4[\text{Fe}(\text{CN})_6]$

iv. $[\text{Cr}(\text{en})_3]\text{Cl}_3$

(20 Marks)

Contd...

(e) Write down the formula of the following:

- i. Decaammine- μ -hydroxodichromium(III) bromide
- ii. Tetrakis(ethylenediammine)- μ -amido- μ -hydroxo-dicobalt(III) sulphate
- iii. Dichlorobis(ethylenediammine) chromium(III) ion
- iv. Potassium hexacyanoferrate(III)

(20 Marks)

(f) Hydrogen can be placed with alkali metals or with halogens. Give four reasons for each and explain why it is placed in period I.

(20 Marks)

2 (a) Give the salient features of Valence Bond (VB) theory for a complex.

(10 Marks)

(b) $[\text{NiCl}_4]^{2-}$ is paramagnetic whereas $[\text{Ni}(\text{CN})_4]^{2-}$ is diamagnetic, explain this statement.

(10 Marks)

(c) Give the names and illustrate all types of isomers that are possible in an octahedral complex compound of one cobalt (iii) ion, two *en* molecules two chlorides ions and one nitrate ion.

(20 Marks)

(d) Draw the energy level diagram and indicate the occupancy of orbitals (splitted) in d^6 (octahedral low spin) and d^6 (square planer).

(20 Marks)

Contd..

(e) Calculate the CFSE in units of Δ_0 of the following complexes

- i. $[\text{Fe}(\text{CN})_6]^{4-}$
- ii. $[\text{Cu}(\text{NH}_3)_4]^{2+}$

(20 Marks)

(f) Experimentally observed value for magnetic moment of following three compounds are given below.

Compound	Magnetic moment (B.M)
Co(II)	1.8
Ni(II)	0.0

Using above information find out the coordination number of each and state whether weak or strong field complex.

(20 Marks)
