

LIB
25 00
Eastern University

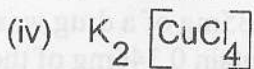
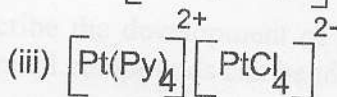
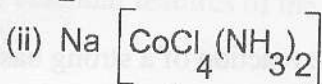
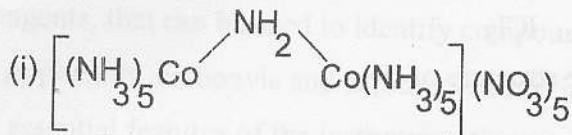
EASTERN UNIVERSITY, SRI LANKA
SECOND EXAMINATION IN SCIENCE
EXTERNAL DEGREE 2002/2003

EXCH 201 CO-ORDINATION CHEMISTRY, MAIN GROUP CHEMISTRY AND ANALYTICAL CHEMISTRY

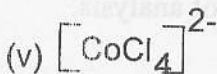
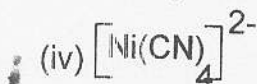
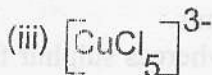
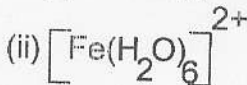
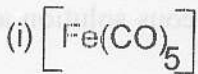
Time : 02 Hours

ANSWER FOUR QUESTIONS ONLY.

1. (a) Write the IUPAC names of the following compounds.



(b) Predict the geometry and draw all the possible structures of the following coordination compounds.



(Fe = 26; Co = 27; Ni = 28; Cu = 29)

(c) Discuss the crystal field splitting of d- orbitals that arise from a square planar arrangement of ligands around the transition metal ion.

Contd....

2. (a) Nitrogen forms trivalent compounds only, whereas phosphorus forms tri and penta-valent compounds. Explain the above observations.
- (b) (i) State the assumptions made in the valence bond theory.
- (ii) Explain why $[\text{Ni}(\text{CN})_4]^{2-}$ is square planar and diamagnetic in nature whereas $[\text{Ni}(\text{Cl})_4]^{2-}$ is tetrahedral and paramagnetic in nature.
- (c) (i) Give one method for the preparation of each of the following inter halogen compounds. Write balanced chemical equations.
 BrF_3 , ICl_3
- (ii) Briefly describe the structure of IF_7
3. (a) Write down balanced chemical equations for the reaction of a strong base with
- (i) Zn (ii) Al (iii) B
- (b) When 10.0ml of an aqueous solution containing 1.235mg of a drug was extracted with 5.0ml of toluene, the organic layer was found to contain 0.346mg of the compound.
- i) Calculate the distribution coefficient for the drug between the two solvents.
- ii) Calculate the amount of drug remaining in the aqueous solution after it was extracted with three 5.0ml portions of toluene.
4. (a) Discuss the dissimilarities of group I and II elements.
- (b) Discuss the difference between Nitrogen and other group V elements.
- (c) "Oxygen forms compounds with the maximum valency 2 only, whereas sulphur forms 2, 4 and 6 valence compounds". Explain this statement.
5. (a) Discuss the basic principles involved in the colorimetric method of analysis.
- (b) Describe briefly how an unknown mixture of two metal ions can be analysed using this method.
- (c) What are the factors that would affect the selectivity of chelate complexes in solvent extraction?



6. (a)(i) Explain the following terms

- (I) Normal phase chromatography
- (II) Reverse phase chromatography

(ii) Indicate the significance of R_f value.

(iii) What are the most commonly used adsorbents for TLC?

(iv) What type of solvents can be used for TLC?

(v) Suggest reagents, that can be used to identify compounds with different functional groups such as phenols, carbonyls and carboxylic acids in chromatography.

(b) Describe the essential features of the instrumentation used in atomic absorption spectroscopy.

(c) Briefly describe the development of paper chromatogram and explain using examples how the separated compounds can be identified and analysed.

XXXXXXXXXXXXXXXXXXXXXXXXXXXX