MANIPAL
ACADEMY of HIGHER EDUCATION

Reg. No.										

DEPARTMENT OF SCIENCES, IV SEMESTER M.Sc (CHEMISTRY)
END SEMESTER EXAMINATIONS, APRIL 2018

Subject: INORGANIC CHEMISTRY II [CHM 4202]
(REVISED CREDIT SYSTEM-2017)

Time: 3 Hours Date: 16.04.2018 MAX. MARKS: 50

Note: (i) Answer ALL questions

(ii) Draw diagrams, and write equations wherever necessary

1. A. i) Explain the three principal types of distortion found in real octahedral complexes.

ii) Describe six principal reasons why transition metals contribute to the effectiveness and widespread roles in catalysis.

B. i) Illustrate geometric, linkage, optical, and ionization isomerism by writing formulas or drawing structures related to any one of the following complexes;

a) $[Co(NH_3)_4Br_2]Cl$ b) $[Pd(NH_3)_2(ONO)_2]$ c) Cis-$[V(en)_2Cl_2]^+$

ii) Sketch all the possible stereoisomers of the following complexes;

a) tetrahedral $[Cd(H_2O)_2Cl_2]$ b) square-planar $[IrCl_2(PH_3)_2]^-$

c) octahedral $[Fe(o\text{-}phen)_2Cl_2]^+$

(6+4)

2. A. i) Describe three mechanisms responsible for the transport of dissolved ions to and from an electrode surface.

ii) Explain the three instrumental factors that affect the results of TGA.

B. i) Discuss the following terms as they are used in solvent extraction/chromatography;

a) Separation coefficient b) Stability c) Percentage extraction d) Sensitivity

ii) Write the working principle of ECD used in GC instrument.

(6+4)

3. A. i) Describe the determination of magnetic susceptibility of complexes using Gouy balance.

ii) Write a technical note on the applications of electrogravimetry.

iii) Give reasons for the following;

a) Multiple extractions lead to a clean separation while single extraction does not achieve the desired degree of purity.

b) Disadvantages of isothermal operation may be avoided by using PTGC

B. i) Explain the electrooptic effect of liquid crystals and its application in display systems.

ii) What are the characteristics of good refractories? Discuss the preparation, properties and uses of firebrick and carbon refractories.

(6+4)

4. A. i) What is nitrogen fixation? Explain the mechanism of biological nitrogen fixation.

ii) Distinguish between coenzyme and prosthetic group. Describe the competitive and non-competitive enzyme inhibition.

B. i) Describe the sources of contamination and toxicity of the following metals

a) Mercury b) Lead c) Cadmium d) Arsenic

ii) What do you mean by R and T state of hemoglobin? Explain the structural features of hemoglobin.

(6+4)

5. A. i) What are the roles of matrix and reinforced phase in composites? Explain the various types of fiber composites.

ii) Distinguish between a fuel cell and a galvanic cell. Describe the formation of thin films by PVD methods.

B. i) What are ceramics? Explain the manufacture of cement with relevant reactions.

ii) What are superconductors? Mention their applications. Write an explanatory note on the chromic materials.

(6+4)

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