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Department of Sciences, Manipal University
II SEMESTER M.Sc END SEMESTER EXAMINATIONS, MAY 2016
SUBJECT: Inorganic chemistry-II [CHM-602]

Time: 3 Hours Date: 04.05.2016 MAX. MARKS: 50

Instructions to Candidates:

- Answer **ANY FIVE FULL questions**.
- Write diagrams, equations or examples wherever necessary

1. A. i) Describe the instrumentation involved in thermogravimetric technique. Discuss two instrumental related factors that affect the results.

ii) a) The distribution ratio for a solute in a water-organic solvent system is 25. Calculate the percentage of solute extracted from 10 mL of water by 10 mL of organic solvent where a) all of it is used all at once and b) extraction with two separate 5.0 mL portions**.** Which is more effective?

b) Write a note on the stability constants of complex metal ions. Explain two factors that affect the stability constants of complexes.

B. i) Explain the Soxhlet extraction technique for extraction of solids.
ii) Define and illustrate the following technical terms as they are used in solvent extraction: **a)** Distribution ratio **b)** Distribution coefficient **c)** Separation coefficient **d)** Percentage extraction (**6+4**)

2. A. Explain the principle and outline procedure of electrogravimetric method during the deposition of copper. How do you test for completeness of electrolysis?

B. i) Give reasons for the following;
a) A small sample weight is desirable during the decomposition of CaC_2O_4 to $CaCO_3$
b) A sharp endothermic peak at 950 ^{o}C is observed in DTA of $SrCO_3$ whereas no peak appears in TGA.
ii) Explain four principal reasons why transition metals contribute to the effectiveness of catalysis. **(6+4)**

3.A. **i)** Explain the working principles of TCD and ECD used in GC.
ii) What is temperature programming in GC? How is it useful in chemical analysis?

B. **i)** Give reasons for the following;

a) $[Cu(MeCN)_4]^+$ is colorless while $[Cu(Phen)_2]^+$ has orange red color

b) $[Fe(H_2O)_6]^{2+}$ is a high spin complex whereas $[Fe(CN)_6]^{4-}$ is a low spin complex

ii) How do you determine the magnetic susceptibility of a sample using Gouy's method?

(6+4)

4. A. i) What do you mean by R and T state of hemoglobin? Explain the oxygen saturation curve of hemoglobin and myoglobin.

ii) Write the special features and functions of the following;

a) Cytochrome C **b)** Cytochrome P-450 **c)** Carbonic anhydrase

B. i) What are enzyme inhibitors? Explain the different mode of enzyme inhibition

ii) Explain the structure and functions of ferredoxin and rubredoxin

(6+4)

5. A. i) Distinguish between respiration and photosynthesis. Explain the role of coenzyme- B_{12} in glutamate mutase and dioldehydrase.

ii) Distinguish between each of the following;

a) Corrin and porphyrin ring systems

b) Fuel cell and galvanic cells

c) Alloys and composites

B. i) Explain the manufacture of Portland cement with reactions occurring at different temperatures of the kiln.

ii) Describe the electro-optic effect of liquid crystals.

(6+4)

6. A. **i)** What are photovoltaic cells? Explain the construction and working of these cells.

ii) Discuss the conditions leading to failure of refractories. Explain the manufacture and properties of carbon and fireclay refractories

B. i) What are advanced ceramics? Mention four applications of advanced ceramic materials.

ii) What are thin films? Describe the techniques of physical vapor deposition.

(6+4)

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