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**University Examinations 2016/2017**

SECOND YEAR, FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE PHYSICAL,BIOLOGICAL AND BACHELOR OF EDUCATION

**SCH 2400: COMPERATIVE STUDY OF TRANSITION ELEMENTS**

**DATE: December, 2016 TIME: HOURS**



**INSTRUCTIONS:** *Answer questions* ***one*** *and any other* ***two*** *questions .*

**QUESTION ONE - (30 MARKS)**

1. Explain why transition elements exhibit high enthalpies of atomization. (3 Marks)
2. Why is the highest oxidation state of a metal exhibited in its oxide or fluoride compound only? (3 Marks)
3. (i) What is meant by “dispropositionation of an oxidation state”? Give an example.

(3 Marks)

(ii) Explain why Cu+ ion is not stable in aqueous solutions? (3 Marks)

1. State a catalytic process catalysed by the following; (4 Marks)
2. Vanadium (v) Oxide
3. Finely divided iron
4. Nickel
5. Palladium (II) chloride / Cu2+
6. Why is KMnO4 added to wells and lakes from where water is drawn for drinking?

(2 Marks)

1. Provide a name and formular of metal ore from which each of the following transition metal elements can be extracted. (6 Marks)
2. At a site , low grade copper ores are available and zinc and iron scraps are also available. Which of the two scraps would be more suitable for reducing the leached copper ore and why? (3 Marks)
3. Write short notes on Ziegler-natta catalyst. (3 Marks)

**QUESTION TWO (20 MARKS)**

1. Define each of the following terms as they are used in metallurgy. (2 Marks)
2. An ore
3. Gangue
4. flux
5. Smelting
6. The extraction and isolation of metals from ores involves five major steps. Concentration of crushed ore is one of these steps. List three factors to consider when choosing a method of concentration for any particular metal ore. (1 ½ Marks)
7. Describe four methods of ore concentration. (8 Marks)
8. Briefly explain the laboratory conversion of potassium chromate to potassium dichromate. (3 Marks)
9. Why is TiO2 the best base of white paints relative to PbO? (2½ Marks)
10. Briefly explain an observation that would be made when anhydrous titanium tetrachloride is exposed to moist air. (3 Marks)

**QUESTION THREE (20 MARKS)**

1. What is a metal cluster? (1 Mark)
2. While giving examples, describe any four types of transition metal clusters.(12 Marks)
3. Describe any one method by which transition metal clusters can be synthesized(3 Marks)
4. State two industrial applications of metal clusters. (4 Marks)

**QUESTION FOUR (20 MARKS)**

1. What is bioinorganic chemistry? (2 Marks)
2. Explain one biological function for each of the following transition metal.
3. Mo (2 Marks)
4. Mn (2 Marks)
5. Fe (2 Marks)
6. Ni (2 Marks)
7. Draw a structure of vitamin B12. (2 Marks)
8. In reference to Wilkinson catalyst cycle, explain how catalyst works in a given catalytic process. (8 Marks)