UNIVERSITY EXAMINATIONS

2022/2023 ACADEMIC YEAR

FOURTH YEAR FIRST SEMESTER

MAIN EXAM

FOR THE DEGREE OF BACHELOR OF EDUCATION SCIENCE

COURSE CODE: SCH 418

COURSE TITLE: COMPARATIVE STUDY OF D BLOCK ELEMENTS

DATE: 27/04/2023 **TIME: 2:00-4:00PM**

QUESTION ONE **(30 MARKS)**

1. a). Explain giving reason why transition metals form a large number of complex compounds. (3Marks)
   b). Explain which of the d-block elements may not be regarded as the transition elements (3Marks)
   b). State four reason why most transition elements act as good catalysts (4Marks)
   c). Giving examples explain what are interstitial compounds and state their properties. (5marks)
   d). Name two characteristic properties exhibited by d – block elements due to their partly filled d orbitals. (2Marks)
   e). Explain $CuSO_4.5H_2O$ is blue while $CuSO_4$ is colorless (2Marks)
   f) Differentiate between heterogeneous catalysts and homogeneous catalysts (4Marks)
   g). Provide systematic name for each of the following complex. (4 Marks)
   a. $[Cr(NH_3)_3(H_2O)_3]Cl_3$
   b. $[Pt(NH_3)_5Cl]Br_3$
   c. $[Pt(H_2NCH_2CH_2NH_2)_2Cl_2]Cl_2$
   d. $Pt(NH_3)_2Cl_4$

h). What are the characteristics of the transition elements and why are they called transition elements (3Marks)

QUESTION TWO (20 MARKS)

2 a) What is lanthanoid contraction (2Marks)

b) State the consequences of lanthanoid Contraction (5Marks)

c). Account for each of the following

I. Atomic radii of d-block elements in a series decrease with increase in atomic number but the decrease in atomic size is small after midway. (5Marks)

II. At the end of the period, there is a slight increase in the atomic radii (3Marks)

III. The atomic radii increase down the group (3marks)

IV. The ionisation enthalpy gradually increases with increase in atomic number along a given transition series though some irregularities are observed. (2Marks)

QUESTION THREE (20 MARKS)

3a) Transition elements show variable oxidation state explain (4Marks)

b) Explain the various steps involved in Potassium dichromate (6Maks)

c). Explain the mechanism of Ziegler – Natta Catalytic Polymerization (10Marks)

QUESTION FOUR (20 MARKS)

4 a). Explain the application of coordination compounds (10marks)

b). Describe the four types of structural isomerism encountered in coordination compounds. (10 Marks)

QUESTION FIVE (20 MARKS)

5. a). Explain the various types of ligands (10marks)

b). Explain the uses and oxidizing properties of potassium permanganate (10Marks)