

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF MASTER OF SCIENCE IN  
CHEMISTRY

CHEM 815: SPECIAL TOPICS IN INORGANIC CHEMISTRY

STREAMS: MSC (CHEM)

TIME: 3 HOURS

DAY/DATE: WEDNESDAY 15/04/2020

11.30 A.M. – 2.30 P.M.

**INSTRUCTIONS: ANSWER ALL QUESTIONS**

**QUESTION ONE (20 MARKS)**

- a) Explain the term amorphous alloys (2 marks)
- b) Write short notes on the following
  - i) Chill block melt spinning (3 marks)
  - ii) Planar flow casting (3 marks)
- c) Give the three major difference between a high vacuum and a Schlenk line (3 marks)
- d) i) Define a cannula (1 mark)  
ii) Write short notes on the use of a cannula (3 marks)
- e) Briefly explain the two common methods of crystal growth for organometallic compounds (4 marks)
- f) Briefly discuss briefly the glove bag (2 marks)

**QUESTION TWO (20 MARKS)**

- a) Briefly explain the following terms
  - i) Magnetorestrictive strain (2 marks)
  - ii) Engineering magnetorestriction (2 marks)
- b) List four common methods for addition of compounds under an inert atmosphere (2 marks)

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- c) Enumerate four factors to be considered when choosing a catalyst (2 marks)
- d) Using equations explain the hydroformylation (oxo) process (3 marks)
- e) Discuss polymer supported catalysts (3 marks)
- f) Using an equation define asymmetric synthesis (3 marks)
- g) Differentiate between a catenand and a catenate (2 marks)
- h) Define olefin metathesis (1 mark)

### QUESTION THREE (20 MARKS)

- a) Write short notes on the Glove box (3 marks)
  - b) Differentiate between
    - (i) Homogeneous and heterogeneous catalysts (2 marks)
    - (ii) Physisorption and chemisorption (2 marks)
  - c) Briefly explain the following terms
    - i) Catalytic cycle (2 marks)
    - ii) Catalytic Turn over number (TON) (2 marks)
    - iii) Biphasic catalysts (2 marks)
  - d) Draw a schematic representation of an alkene polymerization on the surface of a Ziegler-Natta catalyst (5 marks)
  - e) Write the application of the following techniques in surface science (2 marks)
    - i) XPS
    - ii) XANES
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