CHUKA  **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF MASTERS OF SCIENCE IN CHEMISTRY

CHEM 814: BIO INORGANIC CHEMISTRY

STREAMS: MSC (CHEM) **TIME: 3 HOURS**

DAY/DATE: TUESDAY 14/04/2020 **11.30 AM – 2.30 PM**

INSTRUCTIONS:

ANSWER ALL QUESTIONS

QUESTION ONE (20 MARKS)

a) Explain why transition metals are extremely good catalytic active sites in enzymes. (4marks)

b) i) Enumerate the four principal components of $VitB_{12}$ complex. (2marks)

ii) Draw the macrocyclic corrin ligand (2marks)

c) i)Draw the structure of the porphyrin nucleus (1mark)

ii) Using a drawing differentiate between Type I and Type II porphyrins (3marks)

iii) Draw the structure of heme (2marks)

d) Differentiate between

i) Active transport and simple diffusion (2marks)

ii) Haemoglobin and myoglobin (2marks)

e) Discuss the Bohrs effect (2marks)

QUESTION TWO (20 MARKS)

a) Write short notes on the following (6marks)

i) Haeme Proteins
ii) Sodium/Potasssium pump

b) i) Define a metalloporphyrin (1mark)

ii) Give two examples of metaloporphyrins (1mark)

c) i) Write short notes on siderophores (3marks)

ii) Explain two proposed mechanism for siderophore activity (3marks)

d) i) Briefly discuss ionophores (3marks)

iii) Discuss the two classes of ionophores (3marks)

QUESTION THREE (2O MARKS)

a) Write short note son the following

i) Transferrin (3marks)
ii) Hemerythrin family (3marks)
iii) Hemocyanin (3marks)

b) In the synthesis of synthetic oxygen carriers iron-porphyrin models, simple iron(II)porphyrins are easily oxidized to give μ-peroxodimers which can react further to give μ-oxo dimers. How can this problem be overcome (4marks)

c) Give three requirements for a haemoglobin system (3marks)

d) Write short notes on

i) Iron-sulphur proteins (2marks)

ii) Cytochromes (2marks)
