



MAASAI MARA UNIVERSITY

**REGULAR UNIVERSITY
EXAMINATIONS
2018/2019 ACADEMIC YEAR
FOURTH YEAR, SECOND SEMESTER**

**SCHOOL OF SCIENCE
BACHELOR OF SCIENCE CHEMISTRY**

COURSE CODE: CHE 417

**COURSE TITLE: BIOINORGANIC
CHEMISTRY**

**DATE: 18TH APRIL 2019
- 1030HRS**

TIME: 0830

INSTRUCTIONS TO CANDIDATES

1. Answer Question **ONE** and any other **TWO** questions
2. No writing on the Question paper

Question One (30 marks)

- (a) Define /explain the following **(12 marks)**
- i. Isomerism
 - ii. Porphyrins
 - iii. Hemethrins
 - iv. Metalloprotein
 - v. Cooperativity
 - vi. Cytochrome
- (b) Explain the functions of hemoglobin **(6 marks)**
- (c) Explain the term lanthanide contraction **(2 marks)**
- (d) Draw the structure of corrin and state one of its functions **(4 marks)**
- (e) Giving at least two examples distinguish between hard and bases soft **(3 marks)**
- (f) Explain why lanthanides especially gadolinium +3 ions make a good agent MRI applications **(3 marks)**

Question Two (20 marks)

- (a) (i) Draw a curve to explain the variations in oxygen affinity to myoglobin and hemoglobin **(5 marks)**
- (ii) Explain the cooperative binding of hemoglobin **(5 marks)**
- (b) Briefly present the aqueous iron chemistry in relation to the mineralization **(5 marks)**
- (c) Give reasons why organisms mineralize iron **(5 marks)**

Question Three (20 marks)

- (a) Draw the structure porphyrin ring **(2 marks)**
- (b) List three functions of Coenzyme-B₁₂ **(3marks)**
- (c) Describe the process of nitrogen fixation **(10 marks)**
- (d) Explain the iron storage protein ferritin **(5 marks)**

Question Four (20 marks)

- (a) Discuss the process of photosynthesis (10 marks)
- (b) Explain transport, formation and degradation of hydrogen carbonate in our body (10 marks)

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