



# **MAASAI MARA UNIVERSITY**

## **REGULAR UNIVERSITY EXAMINATIONS 2017/2018 ACADEMIC YEAR FOURTH YEAR SECOND SEMESTER**

### **SCHOOL OF SCIENCE BACHELOR OF SCIENCE CHEMISTRY**

#### **COURSE CODE: CHE 417 COURSE TITLE: BIOINORGANIC CHEMISTRY**

**DATE: 20<sup>TH</sup> APRIL 2018**

**TIME: 1100 - 1300 HRS**

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#### **INSTRUCTIONS TO CANDIDATES**

1. Answer Question **ONE** and any other **TWO** questions
2. No writing on the Question paper
3. Use of mobile phone in the exam room is prohibited

*This paper consists of TWO printed pages. Please turn over.*

### Question one (30 marks)

- (a) Define /explain the following (12 marks)
- i. Ferritin
  - ii. Siderophores
  - iii. Hemethrins
  - iv. Metalloenzyme
  - v. Cooperativity
  - vi. Cytochrome
- (b) Explain the functions of hemoglobin (6 marks)
- (c) Explain the term lanthanide contraction (2 marks)
- (d) State the reason why  $Ce^{3+}$  is a powerful oxidising agent and find application as an oxidizing agent while  $Eu^{2+}$  is a reducing agent find applications as a reducing (4 marks)
- (e) Giving at least two examples distinguish between hard and bases soft (3 marks)
- (f) State three similarities between lanthanides and actinides (3 marks)

### Question two (20 marks)

- (a)(i) With help of an illustration of a curve explain cooperativity i.e. the variations in affinity of myoglobin and oxygen to heamoglobin (5 marks)
- (ii) List five applications of Lanthanides (5 marks)
- (b) Briefly present the aqueous iron chemistry in relation to the mineralization. (5 marks)
- (c) Give reasons why organisms mineralize iron (5marks)

### Question three (20 marks)

- (a) Draw the following structures (2 marks)
- (i) Porphyrin ring
  - (ii) Corrin ring
- (b) List three functions of Coenzyme- $B_{12}$  (3marks)
- (c) Describe the process of nitrogen fixation (10 marks)
- (d) Explain the iron storage protein ferritin (5 marks)

### Question four (20 marks)

- (a) Define the term photosynthesis and describe the internal and external factors that affect the rate of photosynthesis. (10 marks)
- (b) Explain transport, formation and degradation of hydrogen carbonate in our body (10 marks)

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