



# KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS  
2020/2021 ACADEMIC YEAR

FOURTH YEAR SECOND SEMESTER  
MAIN EXAMINATIONS

FOR THE DEGREE OF BACHELOR OF CHEMISTRY

**COURSE CODE:** SCH 413

**COURSE TITLE:** BIO – INORGANIC CHEMISTRY

**DURATION:** 2 HOURS

**DATE:** 7/10/2021 **TIME:** 8:00-10:00AM

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**INSTRUCTIONS TO CANDIDATES**

- Answer **QUESTION ONE** (Compulsory) and any other two (2) Questions.
- Indicate **answered questions** on the front cover.
- Start every question on a new page and make sure question's number is written on each page.

This paper consists of 3 printed pages. Please Turn Over



KIBU observes ZERO tolerance to examination cheating

### QUESTION ONE.

[a].Outline the biological functions of the following

- |      |  |       |
|------|--|-------|
| i.   | Mg   | 2mrks |
| ii.  | P other than being a component of Vitium B <sub>12</sub> | 3mrks |
| iii. | Cl   | 2mrks |
| iv.  | Fe   | 2mrks |
| v.   | Mo   | 2mrks |

[b].Explain what you understand by the following

- |      |  |        |
|------|--|--------|
| i.   | Dinitrogen fixation  | 1mrk   |
| ii.  | Biological nitrogen fixation   | 2mrks  |
| iii. | State clearly the necessary condition for biological nitrogen fixation   | 3mrks  |
| iv.  | During biological nitrogen fixation, it's presumed that dinitrogen is coordinated to one of the transition metals.                                       |        |
| a.   | List the two metals found in nitrogenase   | 2mrks  |
| b.   | Give two examples of dinitrogen complexes  | 2mrks. |
| c.   | Describe a simple experiment that support the idea that before dinitrogen is converted to ammonia, it is actually coordinated to one of these metal ions | 5mrks. |
| d.   | Discuss the structure and function of chlorophyll in photosynthesis  | 5mrks  |

### QUESTION TWO

[a].Vitamin B<sub>12</sub> is a naturally occurring organometallic complex, support this statement by drawing the structure of the prosthetic group showing clearly this Vitamin 15mrks.

[b].State the biological role of this vitamin 5mrks.

### QUESTION THREE.

(a).Draw a structure of the prothetic group in myoglobin showing all the main features 10marks.

(b).Differentiate between myoglobin and haemoglobin and specify the biological function of these molecules 10marks.

### QUESTION FOUR

[a], Using examples, discuss the role of biomolecules in the photosynthesis process under the following sub topics 10marks.

- I. Chlorophyll (structure and functions)
- II. Role of Mn in photosynthesis
- III. Mg in porphyrin

[b].Discuss the role of ~~nitrogennase~~ **nitrogenase** in nitrogen fixation metal complexes 10mrks.

**QUESTION FIVE.**

[a]. Briefly describe the toxicity due to Co on the 'heme'

4mrks

[b]. Using diagrams, describe the intake of oxygen by deoxyhemoglobin and the release of oxygen by hemoglobin

16marks.