KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS
2017/2018 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER
MAIN EXAM

FOR THE DEGREE OF BACHELOR OF SCIENCE

COURSE CODE: SCH 350

COURSE TITLE: ENVIRONMENTAL CHEMISTRY
DURATION: 2 HOURS

DATE: 17TH JANUARY 2018 **TIME:** 9 – 11AM

<u>**INSTRUCTIONS TO CANDIDATES**</u>
- 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. Define the term environmental chemistry (2mks)

b. Explain the importance of studying environmental chemistry (3mks)

c. Atmosphere plays a vital role in sustaining both plants and animal life. Explain (5mks)

d. Explain the following by use of equation

i. Production of ozone in the stratosphere (3mks)

ii. Destruction of ozone in the stratosphere (3mks)

e. Describe the role played by ozone in the stratosphere (2mks)

Question two

a. The most important photochemical reaction in the atmosphere is the dissociation of NO_2 through the following equation:

$$NO_{2g} \rightarrow NO_g + O_g$$

i. Give the sequence of reactions that follow this primary photochemical reaction in the atmosphere (6mks)

ii. What chemical species is finally formed in sequence (i) above (2mks)

iii. Explain how the final chemical species in (ii) above is removed from the atmosphere? (4mks)

b. Sketch a graph showing how mean temperature, mean ozone density and altitude vary (8mks)

Question three

a. Briefly explain the following terms as used in environmental chemistry (8mks)

i. Dissolved oxygen (DO)

ii. Chemical oxygen demand (COD)

iii. Biological oxygen demand (BOD)

iv. Sink

b. COD levels of 50mg/l were measured in ground water. What concentration of hydrocarbons from fuel is necessary to account for all the cod observed? Assume the fuel hydrocarbons have a unit formula CH_2. And that the reaction is: (5mks)

$$CH_{2g} + 11/2O_2 \rightarrow CO_{2g} + H_2O_g$$
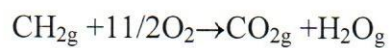
c. Explain the environmental risks associated with the use of synthetic fertilizers.　　　(5mks)

Question four

a. Using a sketch, outline the water treatment stages for municipal purposes　　　(10mks)

b. What environmental problems are associated with in appropriate waste/ refuse disposal (8mks)