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(University of Choice)

**MASINDE MULIRO UNIVERSITY OF
SCIENCE AND TECHNOLOGY
(MMUST)**

MAIN CAMPUS

**UNIVERSITY EXAMINATIONS
2023/2024 ACADEMIC YEAR**

SECOND YEAR FIRST SEMESTER EXAMINATIONS

MAIN EXAMINATION

**FOR THE DEGREE OF
BACHELOR OF SCIENCE IN DISASTER PREPAREDNESS AND
ENVIRONMENTAL TECHNOLOGY (DPET)**

COURSE CODE: DPE 204

COURSE TITLE: ENVIRONMENTAL CHEMISTRY

DATE: 20/12/2023


TIME: 12-2PM

INSTRUCTIONS TO CANDIDATES

- This paper contains FOUR (4) questions (overleaf)
- Answer **Question One** and **ANY other Three**

DURATION 2 hours

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over 

QUESTION ONE (COMPULSORY)

- (a) Briefly *discuss* any five (5) sources of pollutants in soil **(10 marks)**
- (b) Explain FOUR important physical processes that aid the movement of pollutants in the soil **(10 marks)**
- (c) (i) Using equations where applicable, explain at least 2 ways by which soil acidity is caused **(5 marks)**
- (ii) Discuss at least two (2) ways in which soil acidity can be managed **(5 marks)**

QUESTION TWO

- (a) Explain how the following water parameters can be influenced by the chemical characteristics of water:
- (i) Conductivity **(3 marks)**
 - (ii) Taste and odour **(3 marks)**
 - (iii) pH **(3 marks)**
- (c) (i) What is the importance of *dissolved oxygen* (DO) in water? **(3 marks)**
- (ii) In your opinion, should this (DO) test be carried out in the fields or lab? Justify your answer. **(3 marks)**
- (iii) Suppose a stream water analysis shows low dissolved oxygen, what recommendations would you give to remedy this? **(5 marks)**

QUESTION THREE

- (a) Give and explain any 4 factors that influence the *sorptive* capacity of chemicals in the soils **(8 marks)**
- (b) Briefly explain the characteristics and toxic effects of the following pollutants in soil:
- (i) Polycyclic aromatic hydrocarbons (PAHs) **(4 marks)**
 - (ii) Lead (Pb) **(4 marks)**
 - (iii) Dichloro-diphenyl-trichloroethane (DDT) **(4 marks)**

QUESTION FOUR

- (a) Using chemical equations, explain how atmospheric reactions lead to formation of the following:
- (i) Acid rain **(5 marks)**
 - (ii) Tropospheric Ozone **(5 marks)**
- (b) (i) Give a general description of vertical gaseous molecule distribution in the atmosphere and account for the differences **(5 marks)**
- (ii) What do you understand by the term photochemistry? Explain how it can influence the initiation and reactions chemical species within the atmosphere **(5 marks)**