

20



*(University of Choice)*

**MASINDE MULIRO UNIVERSITY OF  
SCIENCE AND TECHNOLOGY**

**(MMUST)**

**MAIN CAMPUS**

**UNIVERSITY EXAMINATIONS**

**2023/2024 ACADEMIC YEAR**

**THIRD YEAR FIRST SEMESTER EXAMINATIONS**

**FOR THE DEGREE**

**OF**

**BACHELOR OF SCIENCE DISASTER MANAGEMENT AND  
SUSTAINABLE DEVELOPMENT**

**COURSE CODE: DSM 304**

**COURSE TITLE: APPLIED ENVIRONMENTAL CHEMISTRY**

**DATE: 13/12/2023**

**TIME: 8-10 A.M**

**INSTRUCTIONS TO CANDIDATES**

---

Answer Question ONE (1) and any other TWO questions

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over.

## SECTION A: COMPULSORY (30 Marks)

### Question ONE

- (a) Explain the term acid rain. (5 Marks)
- (b) Explain the main forms of UV radiation (10 Marks)
- (c) The contribution of Nitrogen oxides in pollution can be reduced by recirculation/reburn of exhaust gases. How is this possible? (5 marks)
- (d) Explain the operation of the following particulate separation techniques
  - (i) Thermal precipitation (3 marks)
  - (ii) Electrostatic precipitation (3 marks)
  - (iii) Condensation sampling (4 marks)

## SECTION B: ANSWER ANY TWO QUESTIONS (40 Marks)

### Question TWO

Discuss the processes that lead to the generation of O<sub>3</sub> in the stratosphere and troposphere (20 Marks)

### Question THREE

- (a) Briefly explain the process of formation of Ammonium nitrate from NO<sub>2</sub> in the atmosphere (10 Marks)
- (b) Darkening of the sky and reduction of visibility during the day may be caused by physico-chemical factors. Explain this statement (10 Marks)

### Question FOUR

- (a) Using suitable examples, explain the mechanisms in mobilization of trace elements in the environment (12 Marks)
- (b) Outline the activities that can lead to radioactive pollution of water (8 Marks)

### Question FIVE

- (a) Why is there concern about heavy metals in the environment?
- (b) Using suitable equations, explain the following ways of eliminating heavy metals from human settled areas.
  - (i) Membrane Technologies (5 Marks)
  - (ii) Adsorption (5 Marks)
  - (iii) Ion Exchange (5 Marks)
  - (iv) Biosorption (5 Marks)