



*(University of Choice)*

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

**MAIN CAMPUS**

**SUPPLEMENTARY/SPECIAL EXAMINATIONS**

**2021/2022 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: 01/08/2022**

**TIME: 2 – 4 PM**

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**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 following methods by which trace elements are mobilized in the environment:
- (i) Primary Dispersion (10 Marks)
  - (ii) Secondary Dispersion (5 Marks)
  - (iii) Tertiary Dispersion (5 Marks)
- (b) Briefly explain the process of collection and analysis of hydrocarbon contaminants in air. (5 Marks)
- (c) Explain the procedure for determination of levels of PM<sub>2.5</sub> in the atmosphere. (5 Marks)

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

### Question TWO

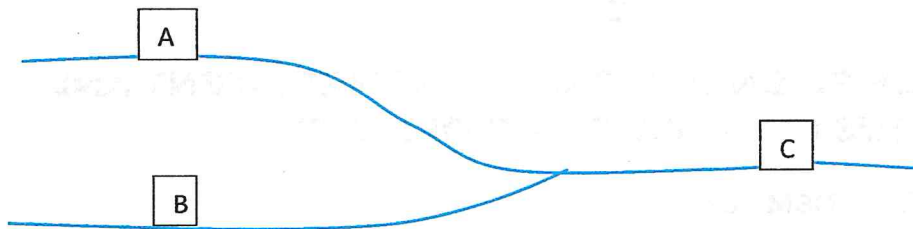
- (a) Explain ways in which Carbon monoxide is reduced in (i) Car engine (ii) Car exhaust system. (10 Marks)
- (b) How are high rates of conversion achieved in the reactions in (a) above? (5 Marks)
- (c) Explain the main causes of anthropogenic pollutants in the environment. (5 Marks)

### Question THREE

- (a) Explain the natural sources of Carbon monoxide in the air. (10 Marks)
- (b) Discuss the sources and nature of toxicity of Chromium in the environment. (10 Marks)

### Question FOUR

- (a) Two streams, A and B converge as shown in the sketch below



Parameters at point A are: Flow = 3.7 m<sup>3</sup>/s, Temperature = 21°C and DO = 4.5 mg/L while at point B parameters are Flow = 2.5 m<sup>3</sup>/s, Temperature = 17 °C and DO = 7.5 mg/L. Determine the following conditions at point C.

- (i) Flow (5 Marks)
  - (ii) Temperature (5 Marks)
  - (iii) DO (5 Marks)
- (b) What are the main sources of Oxygen for surface waters? (5 Marks)

### Question FIVE

Currently, synthetic Organic Compounds pose major risks to the hydrosphere and lithosphere. Using relevant examples, discuss this statement. (20 Marks)