



MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY
(MMUST)

Main CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

Semester I

THIRD YEAR SUPPLEMENTARY AND SPECIAL EXAMINATION

(BSC Education Science, BSC Chemistry & Industrial Chemistry)

FOR THE DEGREE

OF

BACHELOR OF SCIENCE IN CHEMISTRY

COURSE CODE: SCH 350

COURSE TITLE: Environmental Chemistry

DATE: 23/07/2022

TIME: 11 am – 1.00 pm

INSTRUCTIONS TO CANDIDATES

Answer all the Questions

Find the attached periodic table

TIME: 2 HOURS

MMUST observes ZERO tolerance to examination
cheating

Question One (20 marks)

1. a. The reactive inorganic forms of environmental carbon are CO_3^{2-} , HCO_3^- and CO_2 . In aqueous environment, these chemical species depend on pH. Discuss the pH dependence on the carbon species fractions mentioned above. Given the pH scale of 5 to 12. (5 Marks)
- b. Why do you think Alkalinity is referred to us the “Buffer” for aquatic environment? (2 mark)
- c. State and explain how alkalinity is important to fish living in aqueous environment. (3 marks)
- d. What is the concentration range of alkalinity that is beneficial to water quality that supports biota life? (2 marks)
- e. How will you remediate Soil around your home is contaminated with leachate and make sure that soil texture, soil microbes and pH are again suitable for farming?. (4 Marks)
- f. What are the major roles played by Particles in the Atmosphere in chemical reactions? (4 marks)

Question Two (15 marks)

2. (a) List and explain the chemicals and waste multilateral environmental agreements (MEAs). (6 marks)
- (b) Name the KEY MEAs that Kenya is signatory to (6 marks)
- (c). Name the latest MEAS, and what it is all about (3 marks)

Question three (15 marks)

- 3.(a) i. Of the following heavy metals, which ones are essential? Cd, Pb, Ti, As, Cr, Cu, Fe, Mg, Mn, Se, Zn (3 marks)
- ii. For the heavy metals you choose in 3 (i) above, which ones are associated with the following Functions? (4 marks)
- Insulin,
 - Haemoglobin,
 - Enzymes,

(b). Give **four reasons** why open burning of waste should be discouraged in your country.

(4 Marks)

(c). Explain the Greenhouse effect

(4 marks)

Question Four (15 marks)

4. a. Explain what integrated solid waste management is?

(9 marks)

b. What treatment will you use for the following categories of wastes? Note that no recycling is required.

(4 Marks)

c. Explain the following Commonly Used Terms in environmental chemistry

(7 Marks)

- i. Pollutant:
- ii. Contaminant:
- iii. Receptor:
- iv. Sink:
- v. Dissolved Oxygen (DO):
- vi. Chemical Oxygen Demand (COD):
- vii. Biological Oxygen Demand (BOD):

-----70 Marks-----