



THE CATHOLIC UNIVERSITY OF EASTERN AFRICA

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MAIN EXAMINATION

JANUARY – APRIL 2019 TRIMESTER

FACULTY OF SCIENCE

DEPARTMENT OF NATURAL SCIENCE (CHEMISTRY)

REGULAR PROGRAMME

CHEM 310: ENVIRONMENTAL CHEMISTRY

Date: APRIL 2019

Duration: 2 Hours

INSTRUCTIONS: Answer Question ONE and ANY OTHER TWO Questions

- Q1. i) Define the following terms used in environmental chemistry
- a) Sink
 - b) Pathway of a pollutant
 - c) Speciation
 - d) Eutrophication
 - e) Bioamplification
- [8 marks] [10 marks]
- ii) Discuss the importance of the Atmosphere [10 marks]
[8 marks]
- iii) Distinguish among geosphere, lithosphere and crust of the earth
[6 marks]
[8 marks]
- iv) If the RfD (reference dose = maximum oral dose of toxic substance) for methylmercury is $0.1 \mu\text{g kg}^{-1}$ body weight/day, what mass of fish can 60 kg person safely eat each week if the average methyl mercury level in the fish is $0.3 \mu\text{g/g}$ [4 marks]
[8 marks]
- Q2. a) The COD of a water sample is 25 mg of O_2 per litre. What volume of $0.0010 \text{ mol L}^{-1} \text{Na}_2\text{Cr}_2\text{O}_7$ solution is required to titrate a 40 mL sample to end-point [8 marks]

b) Explain the major causes of water pollution [9 marks]

c) Explain measures that can be put in place to control water pollution

[3 marks]

Q3. a) Discuss the role of CO₂ in the atmosphere and in the Hydrosphere [12 marks]

[8 marks]

b) What are the implications of increasing the concentration of CO₂ in these environments? [8 marks]

[8 marks]

Q4. Discuss the consequences of green house effects and the abatement of the green house effects [20 marks]

[8 marks]

Q5. a) Differentiate between classical smog from photo chemical smog

[6 marks]

b) Using appropriate chemical equations to discuss the formation of photochemical smog [8 marks]

c) Explain the effects of photochemical smog and control measures used to reduce the photochemical smog. [6 marks]

END