



**KISII UNIVERSITY**  
**UNIVERSITY EXAMINATIONS**

**SPECIAL/SUPPLEMENTARY EXAMINATIONS**  
**SECOND YEAR EXAMINATION FOR THE AWARD OF THE DEGREE OF BACHELOR**  
**OF SCIENCE IN PUBLIC HEALTH**  
**SECOND SEMESTER 2024/2025**  
**[AUGUST, 2025]**

**PHES 204: ENVIRONMENTAL CHEMISTRY**

**STREAM: Y2 S2**

**TIME: 2 HOURS**

**DAY: FRIDAY, 3:00 - 5:00 P.M.**

**DATE: 15/08/2025**

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**INSTRUCTIONS:**

- 1. Do not write anything on this question paper.***
- 2. Answer question ONE in section A (Compulsory) and any other TWO questions from section B.***

**SECTION A (40 MARKS)**

- 1a. State what environmental chemistry is, and explain why people in the public health profession have to study environmental chemistry? (3 marks)
- b. Explain actions most clearly representing biological monitoring used to determine environmental quality (3 marks)
- c. State three important characteristics of carbon dioxide gas that makes it qualify as an environmental pollutant. (3 marks)
- 2a. Give by two harmful effects of oxides of nitrogen? (2 marks)
- b. What do you mean by ozone hole? What are its consequences (3 marks)
- c. Explain why rapid increase in environmental pollution was witnessed after the 19th century. (3 Marks)
- 3a. State two functions of the atmosphere (2 marks)
- b. List any two properties of heavy metals that make them serious environmental hazards. (2 Marks)

c. Explain the relationship between global warming and climate change. (3 Marks)

4a. Briefly explain the number of trophic levels and energy availability for each level (4 marks)

b. 5a. Distinguish between climate change and global warming (2 marks)

b. Discuss the process of acid rain formation (4 marks)  
Explain the sources of CO<sub>2</sub> and give two examples of its harmful effect? (3 marks)

c. State what you understand by the term climate change, giving some examples of the its manifestation (3 marks)

### **SECTION B (30 MARKS)**

6. The fish in a dam located downstream of a big town were found dead and floating on the surface a few days after a heavy rainfall episode. Explain what may have happened to the fish. [5 Marks]

b. Briefly discuss five sources of pollutants in soil (10 marks)

7a. Describe five measures that can be undertaken to minimize eutrophication process in a fresh water lake. (5 marks)

b. Using equations explain how atmospheric reactions lead to formation of the following (10 marks)

a. Acid rain

b. Tropospheric ozone

8a. Explain the term Photochemistry and how it can influence initiation and reaction chemical species within the atmosphere (5 marks)

b. Suppose your stream water analysis shows low dissolved oxygen, explain the recommendations you would give to remedy this. (5 marks)

c. Briefly discuss the 3 geographical conditions that may result into deserts (5 marks)