



**NATIONAL OPEN UNIVERSITY OF NIGERIA  
UNIVERSITY VILLAGE, PLOT 91 CADASTRAL ZONE, NNAMDI AZIKIWE  
EXPRESS WAY, JABI - ABUJA.**

**FACULTY OF SCIENCES**

**DEPARTMENT OF PURE AND APPLIED SCIENCE<sub>18678</sub>**

**EXAMINATION 2021\_2**

**COURSE CODE: CHM314**

**COURSE TITLE: ENVIRONMENTAL CHEMISTRY**

**TIME: 2 HOURS**

**INSTRUCTION: Answer question one and any other three questions.**

### **QUESTION ONE**

1a. Enumerate and explain briefly possible major soil pollutants (10 marks)

1b. Using chemical equations only, show the mechanism of either tetraoxosulphate (vi) acid ( $\text{H}_2\text{SO}_4$ ) or trioxonitrate (v) acid ( $\text{HNO}_3$ ) formation in the atmosphere.

(5 marks)

1bii. What is the environmental consequence(s) of formation of tetraoxosulphate (vi) acid ( $\text{H}_2\text{SO}_4$ ) and trioxonitrate (v) acid ( $\text{HNO}_3$ ) in the atmosphere.

(5 marks)

1c. Unit operations and unit processes are terminologies used in wastewater treatment. Explain. (2 marks)

1d. State the different applications of chemical oxygen demand (COD) data. (3 marks)

## QUESTION TWO

- 2a. State the application (s) of Atomic Absorption Spectrometry (AAS) (3 marks)
- 2b. Describe briefly the principle of atomic absorption spectrometry (AAS) (6 marks)
- 2ci Why is formation of peroxyacetyl nitrate (PAN) of interest as a characteristics product of atmospheric photochemistry? (3marks)
- 2cii. Distinguish between proven and probable human carcinogens. (3 marks)

## QUESTION THREE

- 3ai. State the production of ozone in the atmosphere (3 marks)
- 3aii. What impact does ozone have on health? (2 marks)
- 3aiii. Why is ozone considered to have effects of ionizing radiation? (2 marks)
- 3b. Write short note on the significance of the stratosphere. (3 marks)
- 3c. Explain briefly using chemical equations destruction of the ozone layer by anthropogenic introduction of chlorine compounds into the atmosphere (5 marks)

## QUESTION FOUR

- 4a. In a tabular form list the physical, chemical and biochemical parameters that should be determined when analyzing a water sample (5 marks)
- 4bi. Outline two (2) source each of any of the physical and chemical parameter of water listed in 4a above (4 marks)
- 4bii. Explain briefly the significance of any of the physical parameter of water (6 marks)

### **QUESTION FIVE**

5ai. Mention any six (6) sources of hydrocarbon in the atmosphere (3 marks)

5aii. Explain briefly why hydrocarbons are of concern in any study of air pollution (5 marks)

5b. Mention and elaborate briefly on the types of hazards associated with contaminated soil  
(7 marks)