



**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**

**OCTOBER/NOVEMBER, 2019 SECOND SEMESTER EXAMINATION**

**COURSE CODE: CHM 314**

**COURSE TITLE: ENVIRONMENTAL CHEMISTRY**

**CREDIT UNIT: 2**

**TIME: 2 HOURS**

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

### **QUESTION ONE**

1a.) Describe briefly each of the following layers of the Earth's atmosphere.

(i) Troposphere; 4 marks

(ii) Stratosphere. 4 marks

1b.) State four major reservoirs involved in the carbon cycle. 2 marks

1ci) Why is soil regarded as an essential component of terrestrial ecosystems? 1½ marks

1cii.) Highlight four factors that can lead to soil pollution. 4 marks

1ciii.) What is heavy metal and why are their bioaccumulation risky to the environment? 3 marks

1d.) List three common methods for the determination of chloride content in a water sample. 1½ marks

1e.) Discuss briefly the sources and effects of sewage in an aquatic environment. 5 marks

### **QUESTION TWO**

- 2ai.) What are biogeochemical cycles? 2 marks
- 2aii.) What is *Carbon Cycle*? 2 marks.
- b.) Explain with relevant equations any two processes by which CO<sub>2</sub> is released into the atmosphere. 5 marks
- c.) State three basic processes in the Nitrogen Cycle. 1½ marks
- d.) Give a reason for each in the following observations:
- (i) The colour of many sediments is black. 1½ marks
- (ii) Most ocean waters have a pH in the range 8 to 8.3. 1½ marks
- (iii) Nitrogen is abundant in the atmosphere and the main constituent of the air we breathe in is nitrogen, yet it is not readily available for cellular utilization. 1½ marks

### QUESTION THREE

3ai.) Define the term *Air Pollution* 1 mark

3aii.) Complete the following table:

Air pollutant	Source (one only) ½ mark each	Adverse health effect (one only) 1 mark each
Particulates		
Volatile Organic Compounds		
Oxides of Nitrogen		
Carbon monoxide		
Hydrocarbons		

- 3bi.) Discuss briefly the origin of colour in water. 5 marks
- bii.) How can negatively charge colloidal particles be removed from water. 1½ marks

### QUESTION FOUR

- 4a.) Write short note on the effect of crude oil spill in the aquatic environment. 9 marks
- 4bi.) Explain why water is essential to the survival of man. 3 marks
- 4bii.) What is the significance of temperature to natural water? 3 marks

### QUESTION FIVE

- 5ai.) Explain briefly the term *solid wastes*. 2 marks
- 5aii.) List the different classes of solid wastes that you know. 2 marks
- 5bi.) What is solid waste management? 2 marks
- 5bii.) What are the four most important properties that must be known if solid wastes are to be used as fuel? 2 marks
- 5ci.) Explain briefly the term *incineration* with respect to solid waste disposal. 2 marks
- 5cii.) State *three* advantages and *two* disadvantages of incineration. 5 marks