

**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 SCIENCES**

**APRIL/MAY, 2019 EXAMINATIONS**

**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)Why is the troposphere considered to be an atmospheric layer of greatest interest to environmental chemists?

 3 marks

1b Using chemical equations explain the formation of H2SO4 or HNO3 in the atmosphere.

 6 marks

1ci) Diffenriate between contamination and pollution. 2 marks

1cii) List three observable effects resulting from a given water body pollution 11/2 marks

1ciii) Why are alkenes more important in the study of air pollution than alkanes ? 3 marks

1d) What is the aim of primary, secondary and tertiary treatment of wastewater. 3 marks

1fi) In what forms does nitrogen normally occur in natural water ? 11/2 marks

1fii) What is the importance of nitrogen analysis in water pollution? 4 marks

1g) Mention one titrimetric method each for the analysis of chloride ion (Cl-) and sulphate ion (S04-). 1 mark

**QUESTION TWO**

2a) Name and characterize the three most significant components of municipal wastewater.

 41/2 marks

2bi) Differentiate between unit operations and unit processes. 2 marks

2bii) What are the major types and sources of grit in municipal wastewaters? Describe the treatment methods used to remove grit. 71/2 marks

2c) What hazards are posed by the polycyclic aromatic hydrocarbons (PAHS) 1 mark

**QUESTION THREE**

3a) In a tabular form list four pollutants of an aquatic ecosystem, their sources and effects.

 10 marks

3bi) Mention two situations that can lead to heightened levels of CO in the indoor. 2 marks

3bii) Describe the mechanism of toxic action of carbonmonoxide (CO) as an indoor pollutant.

 3 marks

**QUESTION FOUR**

4ai) What causes acidity in natural waters? 4 marks

4aii) Why are we concerned with acidity in water? 3 marks

4bi) Discuss briefly the causes of colour in water. 5 marks

4bii) Suggest one method by which colour can be removed from water. 1 mark

4biii) What problem(s) might be caused by organic colour – causing materials in water other than the colour itself? 2 marks

**QUESTION FIVE**

5ai) Distinguish between Dissolved oxygen (DO), biochemical oxygen demand (BOD) and chemical oxygen demand (COD). 3 marks

5aii) Why is the determination of DO, BOD and COD in water important? 5 marks

5b) Calculate the BOD of a water body, if, 5 ml of the water sample was transferred to a 300ml BOD bottle and diluted to 300 ml with organic free, oxygen saturated water. The initial dissolved oxygen determined and found to be 9.2 mg/L. The BOD bottled tightly stoppered and placed in the incubator at 200 C for five days after which the dissolved oxygen was again determined and found to be 6.9 mg/L.. If the WHO permissible limit of BOD in a sample of river water is 5 mg/L, what information can be derived from the calculated BOD?

 7 marks