



**NATIONAL OPEN UNIVERSITY OF NIGERIA**

14/16, Ahmadu Bello Way, Victoria Island

**SCHOOL OF SCIENCE AND TECHNOLOGY**

**October, 2013 Examination**

Course Code: ESM 423

Time: 2 Hours

Course Title: Hydrology and Water Resources Development

INSTRUCTION: Answer any four Questions

**Question 1A**

- i. Define Hydrology. (2 marks)
- ii. Differentiate between the following:
  - a) Chemical hydrology (2½ marks)
  - b) Surface hydrology (2½ marks)
  - c) Hydrogeology (2½ marks)

**Question 1B**

- i. Why does water dissolve so many molecules and elements? (6 marks)
- ii. Why is pure water rare in nature? (2 marks)

**Question 2A**

- i. Account for the existence of water as a liquid at normal surface temperatures. (4 marks)
- ii. Why does a change of state from solid to liquid, liquid to gas or solid to gas require the input of heat energy? (3½ marks)

**Question 2B**

- i. Describe how the evaporation of water, supply energy to the atmosphere. (4 marks)
- ii. What is the hydrologic cycle? (3 marks)
- iii. Why can the hydrologic cycle be considered a closed system? (3 marks)

**Question 3A**

- i. Briefly explain one of the following components of the hydrologic cycle (5½ marks)
  - a) Evaporation
  - b) Condensation
  - c) Precipitation in warm clouds
  - d) Infiltration
  - e) Runoff
- ii. State two applications of hydrology in the Society. (4 marks)

**Question 3B**

- I. Define a drainage basin. (3 marks)
- II. Describe the features of a drainage basin. (5 marks)

**Question 4A**

- I. During the summer, land areas near a large body of water may not heat up as

much as areas that are not close to water. Explain (3 marks)

- II. List the inputs into a drainage system. (3 marks)

Question 4B

- I. State how a drainage basin loses water and sediment. (3 marks)
- II. Briefly explain how the drainage system provides flow into streams. (4½ marks)

Question 4C

Briefly discuss the formation of groundwater. (4 marks)

Question 5A

- I. What is Interception? (3 marks)
- II. How can interception reduce runoff and erosion problems? (6 marks)

Question 5B

Differentiate between the following:

- a) Interception loss (4 marks)
- b) Net Rainfall (4½ marks)

Question 6A

- I. Describe how running water causes erosion. (3 marks)
- II. Explain how contour ploughing or contour farming control erosion. (4 marks)

Question 6B

- I. Briefly describe how flood occurs. (6½ marks)
- II. State any methods by which flood can be controlled. (4 marks)