



**NATIONAL OPEN UNIVERSITY OF NIGERIA**

**FACULTY OF SCIENCES**

**DEPARTMENT OF ENVIRONMENTAL SCIENCE AND RESOURCE MANAGEMENT**

**Plot 91, Cadastral Zone, Nnamdi Azikwe Expressway, Jabi, Abuja**

**2025\_1 EXAMINATION...**

**COURSE CODE: ESM326**

**COURSE TITLE: OCEANOGRAPHY**

**CREDIT: 2 Units**

**TIME ALLOWED: 2:30 Hours**

**Instruction:** Attempt question number ONE (1) and any other THREE (3) questions. Question number one (1) carries 25 marks, while the other questions carry (15) marks each.

- 1a. Mention and describe four magnitudes of tides. (8 marks)
- b. Discuss the concept of water salinity. (10 marks)
- c. What is thermal initial? (2 marks)
- d. Describe Margalef's index. (5 marks)
  
- 2a. List three processes that are involved in ocean's heat loss. (3 marks)
- b. Enumerate five properties of low latitude tropical oceanic water (5 marks)
- c. Describe in detail cold ocean currents (7 marks)
  
- 3a. What is biological oceanography? (4 marks)
- b. Mention two primary factors that determine the density of seawater (2 marks)
- c. Differentiate between surface current and deep water current. (4 marks)
- d. Mention five characteristics of high latitude oceanic water. (5 marks)
  
- 4a. State and briefly explain five causes of ocean current. (10 marks)
- b. Differentiate between pack ice formation and fast ice formation. (5 marks)
  
- 5a. What is Geographic Information System (GIS)? (2 marks)
- b. List three factors that the quality of light that penetrates the ocean depends on. (3 marks)
- c. Citing relevant examples, describe renewable resources. (10 marks)