



UNIVERSITY EXAMINATIONS

FIRST SEMESTER 2025/2026 ACADEMIC YEAR

**THIRD YEAR EXAMINATION FOR THE DEGREE OF
BACHELOR OF SCIENCE IN GEOGRAPHY**

GEOG 312: ADVANCED CLIMATOLOGY

STREAM: R

TIME: 2 HRS

DAY: FRIDAY [11.30 - 13.30 P.M]

DATE: 30/01/2026

THIS QUESTION PAPER CONSISTS OF TWO (2) PAGES

PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.

INSTRUCTIONS: Answer question ONE and any other TWO

QUESTION ONE (20 MARKS)

- (a) Distinguish between the Representative Concentration Pathways (RCPs) and Shared Socioeconomic Pathways (SSPs) in climate modeling. **(2 Marks)**
- (b) (i) Explain the concept of the Earth's energy budget. **(1 Mark)**
 (ii) Discuss the significance of the Earth's energy budget in understanding global climate dynamics. **(5 Marks)**
- (c) Outline **five** natural factors that drive climate change. **(4 Marks)**
- (d) Evaluate the strengths of the Thornthwaite climate classification system in guiding water resource management decisions. **(5 Marks)**
- (e) Explain the role of the Hadley cell in driving global atmospheric circulation. **(5 Marks)**
- (f) Climate change is supported by evidence from multiple scientific fields. Explain any four pieces of evidence of climate change. **(8 Marks)**

QUESTION TWO (20 MARKS)

- (a) Explain any four purposes of climate modeling. **(4 Marks)**
- (b) Describe the three main types of climate models. **(6 Marks)**
- (c) Outline any four climate scenarios. **(10 Marks)**

QUESTION THREE (20 MARKS)

- (a) Explain the concept of climate variability, highlighting its key characteristics **(4 Marks)**
- (b) Highlight the ways in which ENSO (El Niño–Southern Oscillation) contributes to climate variability. **(8 Marks)**
- (c) Compare and contrast the ENSO (El Niño–Southern Oscillation) and NAO (North Atlantic Oscillation) phenomena with respect to their formation. **(8 Marks)**

QUESTION FOUR (20 MARKS)

- (a) Describe the process of ocean acidification. **(10 Marks)**
- (b) Discuss the impacts of ocean acidification on marine ecosystems **(10 Marks)**

QUESTION FIVE (20 MARKS)

- (a) Outline **five** benefits of climate modeling. **(10 Marks)**
- (b) Discuss **five** limitations of climate models that affect the accuracy of climate projections. **(10 Marks)**