

National University of Lesotho

BSc. and BSc. Ed Examination

PG 2412: Climatology

May, 2023

Marks: 100

3 Hours

Instructions:

- Answer any **four (4)** questions.
 - Where applicable illustrate your answer with equations and diagrams.
-

Question 1

- a) Outline how the relative depth of the thermocline in the Tropical Pacific Ocean relates to the strength of trade winds and the eventual occurrence of the ENSO events. (15)
- b) Explain the **two (2)** major differences between monsoon winds and the land- and sea-breezes. (10)
- [25]**

Question 2

- a) Outline the system used for classifying air masses. (10)
- b) Explain the **three (3)** major climate groups. (15)

[25]

Question 3

With reference to the global air circulation and pressure systems, account for the location of the world's arid regions. **[25]**

Question 4

- a) Discuss why, and how, the oceans are an important controlling factor of climate. (15)
- b) Explain how the oceans can affect the response of the atmosphere to global climate change. (10)

[25]

Question 5

Describe any **five (5)** synoptic-scale climate drivers. **[25]**

Question 6

a) Using the data in Table 1, determine the following categories:

- i) Below normal (5)
- ii) Normal (5)
- iii) Above normal (5)

Table 1. Monthly precipitation (mm), February, Maseru

Year	Precipitation (mm)
1	18
2	23
3	41
4	44
5	48
6	49
7	54
8	57
9	62
10	67
11	72
12	78
13	79
14	83
15	85
16	100
17	105
18	107
19	108
20	110
21	119
22	125
23	133
24	144
25	147
26	157
27	158
28	171
29	206
30	250

b) Through use of appropriate parameters summarise the following daily rainfall data for Moshoeshoe I during February 2006. (10)

Table 2. Daily rainfall for Moshoeshoe I, February 2006

Month	Day	Rainfall (mm)
2	01	0
2	02	9
2	03	5.3
2	04	9.4
2	05	6.5
2	06	5.6
2	07	6.1
2	08	78.9
2	09	23.6
2	10	0
2	11	3.6
2	12	24.2
2	13	0
2	14	0
2	15	1.4
2	16	0
2	17	10.4
2	18	11.5
2	19	16
2	20	0
2	21	3.8
2	22	0
2	23	28.7
2	24	20.2
2	25	17.5
2	26	0.4
2	27	0
2	28	0
2	29	-9999