

UNIVERSITY OF SWAZILAND

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FINAL EXAMINATION PAPER: MAY, 2005
BASS III.

TITLE OF PAPER : AGROCLIMATOLOGY

COURSE NUMBER : GEP 322

TIME ALLOWED : THREE (3) HOURS

INSTRUCTIONS : SECTION A IS COMPULSORY
ANSWER ANY TWO QUESTION S FROM
SECTION B
ILLUSTRATE YOUR ANSWERS WITH
APPROPRIATE DIAGRAMS AND EXAMPLES

MARKS ALLOCATED : QUESTION 1 CARRIES 40 MARKS
THE OTHER QUESTIONS CARRY 30 MARKS
EACH

THIS PAPER IS NOT TO BE OPENED UNTIL PERMISSION HAS BEEN
GRANTED BY THE INVIGILATOR

SECTION A: COMPULSORY QUESTION

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Question 1.

An experimental crop with a growth cycle of 120 days is planted under rainfed conditions. Based on the parameters given in the table 1, below:

- (a) Compute the crop water requirement and the available water for each phenological stage as well as total water requirement for the season, assuming a PET value of 1.5mm per day.
- (b) Discuss the extent to which the precipitation met the needs of the crop in each stage of growth as well the season overall.

(40 marks)

Table 1. Information pertaining to each crop growth stage

Phenological Stage	K_{cr}	Fraction of cycle (%)	Actual Precipitation
Vegetative	0.3	10	7
	0.8	25	40
Reproductive	1.2	50	101
Maturation	0.6	15	15

SECTION B: ANSWER ANY TWO QUESTIONS

Question 2.

- (a) Specify probable adverse weather conditions to crop growth and relate practical methods that may be effected to mitigate these and protect the crops. (15 marks)
- (b) Discuss the application of a raingauge and an evaporation pan in the determination of the water balance of a given field. (15 marks)

Question 3.

- (a) Describe the principles of the isohyetal and the weighting methods of estimating average rainfall of a given area, giving the advantages and disadvantages of each method. (15 marks)
- (b) Explain the main ingredients used by a typical plant for purposes of growth and how are these utilized by the plant. (15 marks)

Question 4.

- (a) Explain the main functions of a typical Agrometeorological service and how these can be applied in food production of the state. (20 marks)
- (b) Discuss two common methods of determining water content and its changes in a typical soil profile. (10 marks)

Question 5.

- (a) Describe the various microclimate conditions of a crop. (10 marks)
- (b) Describe how a combination of infiltration measurements and irrigation can be applied to enhance agricultural productivity. (15 marks)
- (c) Explain how climate conditions affect the incidences and development of crop pests and diseases. (5 marks)