UNIVERSITY OF SWAZILAND

FINAL EXAMINATION PAPER

PROGRAMMES :   BSC AGRICULTURAL AND BIOSYSTEMS

ENGINNERING YEAR II

COURSE CODE   :   ABE 201

TITLE OF PAPER: AGRO-CLIMATOLOGY

TIME ALLOWED :   TWO (2) HOURS

INSTRUCTIONS :   ANSWER QUESTIONS ONE AND ANY TWO

OTHER QUESTIONS.

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AGRO – CLIMATOLOGY
FINAL EXAMINATION

Question 1: Compulsory

(a) Describe briefly two reasons why the maximum daily radiation is ahead of the maximum temperature. **[10 marks]**

(b) Crop evapotranspiration is the basis for calculating the size of a storage facility for irrigation projects. You are given the following data to make preliminary designs for a dam irrigation purposes;

- Area to be irrigated — 400 ha
- Evaporation per day (ETO) — 6.0 mm
- Crop to be grown — Maize
- Stage of Crop — Growing
- Crop Coeffient — 0.6
- Watershed area — 9.000 ha

  (i) Calculate water that should be stored in the dam in order to be capable of providing water to the crop for 1.5 months (assume a 30 day month for this purpose). Include 20 % for losses in the dam. **[10 marks]**

(c) Name and discuss four probable causes of climate change. **[20 marks]**

Question 2

(a) What are three weather and plant factors that influence evapotranspiration, and how do they achieve this? **[15 marks]**

(b) Describe three factors that influence effective rainfall. **[15 marks]**

Question 3

(a) In a form of a diagram show what happens to the sun radiation when it moves through the atmosphere and when it reaches the earth's surface. **[15 marks]**

(b) What is meant by the term "Dependable Rainfall" **[5 marks]**

(c) Describe three ways by which soil temperature can be modified. **[10 marks]**

Question 4

(a) A two hectare field grown with a cotton crop is irrigated by sprinklers. The sprinkler system applies 4.00 mm / hr water, and it irrigates 6 hours to fulfill the crop water requirements (CWR).

   (i) Calculate the amount of water applied in the field assuming the whole field is irrigated at once. **[15 marks]**

   (ii) If the available water holding capacity of the soil is 24 mm, how long will it take to apply and irrigate the field using he sprinkler specified above. **[15 marks]**

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