



**UNIVERSITY OF SWAZILAND
RESIT EXAMINATION PAPER**

PROGRAMME: BSC ABE. III

COURSE CODE: ABE201

TITLE OF PAPER: AGROCLIMATOLOGY

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO
OTHER QUESTIONS.**

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SECTION I COMPULSORY

QUESTION 1

- a) Explain the difference between;
- i) Temperature and heat
 - ii) Stable and unstable atmospheric conditions
 - iii) Thermal conductivity and thermal diffusivity
 - iv) Climate change and climate variability
 - v) Bulk surface resistance and aerodynamic resistance
- [25 marks]

- a) Describe the degree-day (heat unit) theory as it is used to estimate the growing period of a crop.

[15 marks]

SECTION II ANSWER ANY TWO QUESTIONS**QUESTION 2**

- a) Explain in detail how a rainfall type of precipitation is formed. [10 marks]
- b) Explain with the aid of a graph the relationship between sunlight and leaf conductance to carbon dioxide. [10 marks]
- c) The dominant wavelength radiated by an object is 8.0 μm . Estimate the temperature of the object. [5 marks]
- d) Wind speed was measured at 3 m height over 1.5 m tall maize and was found to be 5 m/s. Estimate the wind speed at 2 m height. [5 marks]

QUESTION 3

- b) Daily temperature ranges are often wider in continental locations than in marine locations. Explain why? [10 marks]
- e) Define the following terms as used to explain the interaction of radiation with earth:
- (i) Rayleigh scattering;
 - (ii) Terrestrial radiation;
 - (iii) Planetary albedo;
 - (iv) Insolation
 - (v) Ozone
- [20 marks]

QUESTION 4

a) Discuss the three types of drought.

[10 marks]

b) Explain what Dependable rainfall is, and discuss at least one method that is used to determine the dependable rainfall of a particular area.

[10 marks]

c) The surface energy balance is generally explained with the equation:

$$R_n = H + LE + G$$

Where R_n is the net radiation, H is the sensible heat flux, LE is the latent heat flux and G is the soil heat flux. Explain each of the components and the surface conditions that determine the proportion of each.

[10 marks]