



**UNIVERSITY OF SWAZILAND
FINAL EXAMINATION PAPER**

PROGRAMME: AGRIC V (L&WM)

COURSE CODE: LUM 402 (OLD PROGRAMME)

TITLE OF PAPER: IRRIGATION MANAGEMENT

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

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

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GRANTED BY THE CHIEF INVIGILATOR**

SECTION I: COMPULSORY QUESTION**QUESTION 1**

- (a) Briefly describe five (5) ways of increasing water use efficiency in an irrigated field (10 marks)
- (b) A stream of 85 litres per second was delivered to a field for two hours. Runoff averaged 45 litres per hour for one hour. Measurement showed that the depths of penetration of water along a 200-m strip, which runs from top to bottom of the field, were:

Distance from upper end (m)	Depth of water penetration (m)
0	1.60
50	1.45
100	1.40
150	1.30
200	1.10

The depth of the root zone was 1.5 m. Determine

- i. Application efficiency (15 marks)
- ii. Distribution efficiency (15 mark)

SECTION II: ANSWER TWO QUESTIONS FROM THIS SECTION**QUESTION 2**

Briefly, but concisely, discuss:

- (a) Three ways in which the problem of salinity may develop in an irrigated field (7 marks)
- (b) Three adverse effects of salinity to crop production in irrigated fields (8 marks).
- (c) The main components of the water balance of the root zone in a typical irrigated field (15 marks).

QUESTION 3

In the Lowveld region of Swaziland, most farmers schedule their irrigation applications by using the strategy of applying water until the moisture content in the soil has reached field capacity during years of normal rainfall conditions. During years of low rainfall, a number of farmers consider deficit irrigation as a viable option. Briefly but concisely, discuss the plausible merits of these strategies under the different rainfall conditions. (30 marks)

QUESTION 4

As an employee of Simunye Sugar Company, you are responsible for the management of the sprinkler irrigation system installed on a large sugar cane (root depth of 1.5 m)

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field with deep permeable soils. You are requested to choose between the following two scheduling scenarios which take into account crop water demand in the area: the 1st scenario is to apply 36 mm net irrigation every 6 days and the 2nd scenario is to apply 12 mm net irrigation every 2 days. You are told that your choice should not be influenced by the availability of resources as the company has enough human and financial resources to cater for any level of irrigation frequency. However, the company is very concerned about levels of water management within its irrigation industry.

You are, therefore, required to make the choice between the two scenarios and submit brief but concise and technically convincing arguments for your choice to the company's management. (30 marks)