



**UNIVERSITY OF SWAZILAND  
FINAL EXAMINATION PAPER**

**PROGRAMME: DIP AGRIC III & DIP AGRIC ED. III**

**COURSE CODE: LUM 303 (Old Programme)**

**TITLE OF PAPER: IRRIGATION**

**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****QUESTION 1**

- (a) Describe how you would determine gross irrigation requirement of a given crop in a given area. (10 marks)
- (b) An undisturbed soil sample is taken from an irrigated field with soil particle density of  $2.65 \text{ g/cm}^3$ . The sampling ring has the following characteristics:
- |                   |          |
|-------------------|----------|
| external diameter | 52 mm    |
| thickness         | 2 mm     |
| height            | 50 mm    |
| weight            | 80 grams |

The gross weight of the wet sample is 200 grams. The sample is then placed in an oven and dried for 24 hours at  $105^\circ\text{C}$ . The resulting gross weight is 160 grams.

Calculate:

- mass water content
  - volume water content
  - total porosity
- (30 marks)

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

With the aid a clearly labelled diagram, describe the basic principles of a tensiometer for scheduling irrigation. (30 marks)

**QUESTION 3**

Briefly but concisely, describe the meaning of the following terms in irrigation

- effective rainfall; (6 marks)
- reference evapo-transpiration rate; (6 marks)
- deficit irrigation; (6 marks)
- total available water in the soil; (6 marks)
- permanent wilting point. (30 marks)

**(QUESTION 4**

Discuss any five (5) soil factors that must be considered when assessing the suitability of land for irrigation. (30 marks)