UNIVERSITY OF SWAZILAND
SUPPLEMENTARY EXAMINATION PAPER

PROGRAMME: DIP AGRIC III & DIP AGRIC ED. III

COURSE CODE: LUM 303

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 field capacity moisture content of an irrigated soil   (10 marks)

(b)   An undisturbed soil sample is taken from an irrigated field with soil particle density of 2.65 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 °C. The resulting gross weight is 160 grams.

Calculate:

(a)   mass water content   (8 marks)
(b)   soil bulk density   (7 marks)
(c)   volume water content   (7 marks)
(d)   total porosity   (8 marks)

SECTION II: ANSWER TWO QUESTIONS FROM THIS SECTION

QUESTION 2

With the aid of a clearly labelled diagram, describe how a neutron probe operates.

(30 marks)

QUESTION 3

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

a) irrigation interval;   (6 marks)
b) Irrigation set time;   (6 marks)
c) Gross irrigation;   (6 marks)
d) Gravimetric method of measuring soil water;   (6 marks)
e) Particle density of a field soil.   (6 marks)

(QUESTION 4

Describe the procedure for measuring soil water at field capacity.   (30 marks)