



SOUTH EASTERN KENYA UNIVERSITY

UNIVERSITY EXAMINATIONS 2016/2017

SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN DRYLAND AGRICULTURE & AGRICULTURAL EDUCATION AND EXTENSION

DAS 101: PRINCIPLES OF SOIL PHYSICS

DATE: 19TH APRIL, 2017

TIME: 10.30 -12.30 PM

INSTRUCTIONS:

- Answer **ALL** Questions in **Section A** and **ANY TWO** (2) questions in **Section B**.

SECTION A: Answer ALL Questions (30 MARKS)

QUESTION 1

- a) Using examples, explain how soil color can be used to tell the redox condition of the soil (3 marks)
- b) Describe mineral soils (3 marks)

QUESTION 2

Explain the following

- a) How to calculate soil bulk density (3 marks)
- b) How to determine soil porosity (3 marks)

QUESTION 3

Describe the following water potential terms

- a) Matric potential (3 marks)
- b) Osmotic potential (3 marks)

QUESTION 4

- a) Explain briefly how to determine soil class (3 marks)
- b) State the units used to measure
- i) Salinity (2 marks)
- ii) Cation exchange capacity (2 marks)

QUESTION 5

Distinguish between water infiltration and permeability (5 marks)

SECTION B: Answer any TWO questions (40 marks)

QUESTION 1

Discuss the following factors of soil formation

- a) Climate (5 marks)
- b) Organisms (5 marks)
- c) Relief (5 marks)
- d) Parent material (5 marks)

QUESTION 2

Discuss water movement in soils under the following headings

- a) Saturated flow (10 marks)
- b) Unsaturated flow (10 marks)

QUESTION 3

Discuss storage and flow of gases between soil and atmosphere under the following headings

- a) Mass flow (10 marks)
- b) Diffusion (10 marks)