



**JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE AND  
TECHNOLOGY**

**SCHOOL OF AGRICULTURAL AND FOOD SCIENCES**

**THIRD YEAR SECOND SEMESTER UNIVERSITY EXAMINATION FOR  
THE DEGREE OF BACHELOR OF SCIENCE IN SOIL SCIENCE  
2019/2020 ACADEMIC YEAR**

**REGULAR**

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**COURSE CODE: ALS 3327**

**COURSE TITLE: Soil-Water Nutrient Relationship**

**EXAM VENUE:**

**STREAM: BSc. (Soil Science)**

**DATE:**

**EXAM SESSION:**

**TIME: 2 HOURS**

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**Instructions:**

- 1. Answer ALL questions in section A and ANY other 2 Questions in section B.**
- 2. Candidates are advised not to write on question paper.**
- 3. Candidates must hand in their answer booklets to the invigilator while in the examination room.**

**SECTION A [30 MARKS]**

**Answer ALL questions from this Section.**

- 1. a) Define the following terms :**
  - i. Infiltration rate**
  - ii. Sorptivity**
  - iii. Field capacity**

**(2 Marks)**

**(2 Marks)**

**(2 Marks)**

- b) Outline the components of soil water potential (3 Marks)
2. Using illustrations, derive the equation relating bulk density, particle density and porosity (3 Marks)
3. Discuss the criteria for evaluating soil quality for irrigation (5 Marks)
- 4.
- a) Differentiate between hydraulic conductivity and intrinsic permeability (4 Marks)
- b) What are the factors influencing hydraulic conductivity of soil? (5 Marks)
5. Differentiate between gravimetric water content and volumetric water content using simple illustrations (4 Marks)

**SECTION B [40 MARKS]**

**Answer ANY TWO questions from this Section.**

6. a). Discuss the various approaches of reclaiming sodic and saline soils (10 Marks)
- b). Outline the various methods and devices used for monitoring soil water (10 Marks)
7. a). Discuss the factors that affect the availability of essential plant nutrients (10 Marks)
- b). Draw a typical infiltration curve. Discuss the factors influencing infiltration rate (10 Marks)
8. a). Discuss the changes of soil chemical and physical properties due to irrigation (10 Marks)
- b). Describe the fate and behavior of organic compounds in the soil (10 Marks)