



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

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

**THIRD YEAR SECOND SEMESTER UNIVERSITY EXAMINATION FOR
BSC. AGRICULTURAL EXTENSION EDUCATION/
BSC. HORTICULTURE AND /
BSC SOIL SCIENCE**

2016/2017 ACADEMIC YEAR

REGULAR

COURSE CODE: ALS 3326

COURSE TITLE: PRINCIPLES OF IRRIGATION AND DRAINAGE

EXAM VENUE:

STREAM:

DATE:

EXAM SESSION: REGULAR

TIME: 2 HOURS

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. Briefly describe any FIVE problems associated with irrigation (5 Marks)
2. Illustrate the circumstance that may occasion application of each of the following two forms of irrigation:
 - a) Gravitation form of irrigation (3 Marks)
 - b) Pressurized form of irrigation (3 Marks)
3. Describe conditions under which Canals (open channel flow) and Pipelines (pipe flow) can be respectively employed to convey irrigation water from source to farms (4 Marks)
4. With the aid of a labelled sketch diagram, describe how change the of water stored in soil root zone can be monitored by keeping track of incoming and outgoing water fluxes at its boundary (6 Marks)
5. Distinguish between (i) Surface Drainage and (ii) Underground Drainage (4 Marks)
6. State any FIVE Functions of National Irrigation Board in Kenya (5 Marks)

SECTION B [40 MARKS]

Answer ANY TWO questions from this Section.

7. The principal function of irrigation system is to supply crops with irrigation water in the quantity and at the time it's needed. Describe in details any FIVE components of a typical irrigation system (20 Marks)
8. Surface irrigation is the application of water to farm fields at ground level, in which either the entire field is flooded or water is directed into furrows/borders. Discuss the performance and design aspects of (i) furrow and (ii) basin irrigation systems (20 Marks)
9. (i) Discuss sprinkler irrigation method in a typical field application, in view of its technical feasibility, economic viability, and eminent constraints (15 marks)
b) In a sprinkler irrigation system, the required total capacity of the system is $0.5 \text{ m}^3/\text{s}$. Determine the pump capacity, assume that head loss in pipe and bends, and velocity head required = 3m of water. Take $P = Q_{ST} \times 9.81 \times H_T$ (5 marks)
10. Briefly describe the principles (or policies) guiding efficient irrigation water use at the Kenyan national irrigation schemes; and state the license conditions set against irrigation farming in Kenya. (20 Marks)

- END -