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

2017/2018 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 the FIVE circumstances under which the practice of Irrigation is considered necessary **(5 Marks)**

2. With the aid of a well lebelled sketch diagram, describe the general layout of a distribution system for Canal Irrigation water between a river water source to field application **(5 Marks)**

3. With the aid of a labelled sketch diagram, describe how change of water stored in soil root zone can be monitored by keeping track of incoming and outgoing water fluxes at its boundary **(5 Marks)**

4. Briefly illustrate any Five Factors governing 'Conjunctive Use' of ground water & surface water for agricultural purposes **(5 Marks)**

5. Drainage is the removal of excess water artificially from a farm land. Briefly explain any FIVE importance of drainage **(5 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. Describe in details the following components of an Irrigation Water Supply System: (i) Head water (Intake) facility, (ii) Pumping station (or gravity station), (iii) Conveyance system, (iv) Irrigation network system, and (v) Field application system **(20 Marks)**

8. Irrigation project planning & design is an important exercise that is always conducted with details and accuracy before a new irrigation system is implemented. Describe the various components (contents) of an irrigation project Planning & Design Report **(20 Marks)**

9. A stream of 130 liters per second was diverted from a canal and 100 liters per second were delivered to the field. An area of 1.6 hectares was irrigated in 8 hours. The effective depth of root zone was 1.7 m. The runoff loss in the field was 420 m3. The depth of water penetration varied linearly from 1.7 m at the head end of the field to 1.1 m at the tail end. Available moisture holding capacity of the soil is 20 cm per meter depth of soil. The irrigation was started at a moisture extraction level of 50% of the available moisture. Determine: (i) Water conveyance efficiency, (ii) the Water application efficiency, (iii) Water storage efficiency and (iv) Water distribution efficiency **(20 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)**

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