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**TECHNICAL UNIVERSITY OF MOMBASA**  
FACULTY OF ENGINEERING AND TECHNOLOGY  
DEPARTMENT OF BUILDING & CIVIL ENGINEERING  
**UNIVERSITY EXAMINATION FOR:**  
BACHELOR OF SCIENCE IN CIVIL ENGINEERING  
**ECE 2405: IRRIGATION ENGINEERING I**  
END OF SEMESTER EXAMINATION  
**SERIES: SEPT. 2017**  
**TIME: 2 HOURS**

**Instructions to Candidates**

You should have the following for this examination

*-Answer Booklet, examination pass and student ID*

This paper consists of five questions.

Answer question ONE (COMPULSORY) and any other TWO questions

**Do not write on the question paper.**

**QUESTION ONE (COMPULSORY)**

- a) Discuss natural condition as criteria for choosing the type of irrigation a farmer should adopt (10 Marks)
- b) Outline the general rules of conducting irrigation (4 Marks)
- c) Discuss the main soil moisture sensing instruments commonly used in irrigation scheduling (9 Marks)
- d) Explain briefly the environmental factors that affect the rate of evapo-transpiration (7 Marks).

**ATTEMPT ANY TWO QUESTIONS**

**QUESTION TWO**

- a) Discuss general factors about planning of an irrigation system (12 Marks).
- b) Describe the main components of a sprinkler irrigation system (8 Marks).

**QUESTION THREE**

- a) Explain briefly types of Pressures applied in the calculating pressure heads of an irrigation system (8 Marks).
- b) What are the main advantages and disadvantages of furrow irrigation system (10 Marks).
- c) Define Irrigation (2 Marks).

**QUESTION FOUR**

- a) Explain how soil – water and lysimetry methods are applied in measuring evapotranspiration (12 Marks).
- b) Discuss the following terms that depict movement of water in the soil:

- i). Saturated flow of water
- ii). Unsaturated flow of water
- iii). Capillary rise of water in soil
- iv). Drainage of water in the soil

#### **QUESTION FIVE**

a) Discuss the following important terms used in the management of water in irrigation system.

- i). Reference crop evapotranspiration
- ii). Soil water content or moisture content.
- iii). Permanent wilting point
- iv). Maximum allowable depletion, or MAD
- v). Evapotranspiration, abbreviated as ET (10 Marks)

b) Outline the requirements for border irrigation system (10 Marks)

