MASINDE MULIRO UNIVERSITY OF

SCIENCE AND TECHNOLOGY

(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2018/2019 ACADEMIC YEAR

THIRD YEAR FIRST SEMESTER EXAMINATIONS

FOR THE DIPLOMA

IN

CIVIL ENGINEERING

COURSE CODE: DCE 081

COURSE TITLE: IRRIGATION AND DRAINAGE ENGINEERING

DATE: Tuesday 29th January 2019 **Time:** 9.00am – 11.00am

INSTRUCTIONS:

a) Answer Question **ONE** and any other **TWO** Questions
b) Marks for each question are indicated in the parenthesis.
c) Examination duration is **2 Hours**
d) Use of Mobile phones is NOT ALLOWED in the examination room.

QUESTION ONE – COMPULSORY (40 MARKS)

a) Define the following terms used in irrigation.   (10 Marks)

   i.   Available moisture
   ii.   Field capacity
   iii.   Effective rainfall
   iv.   Duty
   v.   Base period

b) Briefly describe the following methods of irrigation giving two advantages of each method.

   i.   Sprinkler irrigation
   ii.   Furrow irrigation
   iii.   Border irrigation

                                                    (15 Marks)

c) Determine the depth and frequency of irrigation required for a certain crop with the following information.   (8 Marks)

       Root zone depth =100cm
       Field capacity = 22 %
       Wilting point = 12 %
       Unit weight of the soil = 1.5
       Consumptive use = 25mm/day
       Efficiency of irrigation = 50 %
       Take 50 % as readily available moisture

   d) State **five** advantages of irrigation over rain fed agriculture   (7 Marks)

QUESTION TWO (15 MARKS)

a) Briefly describe how the following factors influence the choice of water application method in irrigation   (10 Marks)

   i.   Soil type
   ii.   Crops
   iii.   Water supply
   iv.   Topography
   v.   Labour

b) State **five** benefits of drainage to an agricultural land under irrigation.   (5 Marks)

QUESTION THREE (15 MARKS)

a) Define the following terms   (6 Marks)

  i.   Hygroscopic water
  ii.   Capillary water
  iii.   Gravitational water

b) Explain how the following factors affect irrigation frequency   (9 Marks)

  i.   Crop characteristics
  ii.   Soil characteristics
  iii.   Climate and season

QUESTION FOUR (15 MARKS)

a) Describe how the Lysimeter is used in the estimation of evapotranspiration   (5 Marks)

b) Determine the capacity of a reservoir if   (10 Marks)

        Total area = 70000 Ha
        Canal losses = 5 %
        Reservoir losses = 10 %

Other information is provided in the table below

Crop	Base period	Duty	Intensity of irrigation (%)
Barley	300	2200	20
Maize	150	2000	25
Rice	120	1700	35