(*University of Choice*)

MASINDE MULIRO UNIVERSITY OF SCIENCE AND TECHNOLOGY

(MMUST)

MAIN CAMPUS

UNIVERSITY EXAMINATIONS

2021/2022 ACADEMIC YEAR

SECOND YEAR SECOND SEMESTER EXAMINATIONS

FOR THE DIPLOMA

IN

CIVIL ENGINEERING AND BUILDING CONSTRUCTION

COURSE CODE: DCE / DBC 068

COURSE TITLE: FOUNDATION ENGINEERING

DATE: THURSDAY 21ST APRIL 2022 TIME: 8.00AM – 10.00AM

INSTRUCTIONS:

- ✓ Answer question **ONE** and any other **TWO** questions
- ✓ Marks for each question are indicated in the parenthesis.
- ✓ Candidates are advised not to **write** on question paper.
- ✓ Examination duration is **2 Hours**

MMUST observes ZERO tolerance to examination cheating

This Paper Consists of 2 Printed Pages. Please Turn Over.

QUESTION ONE – COMPULSORY (30 MARKS)

a) Define the term foundation as used in engineering (2 Marks)
b) What is the main functions (2 Marks)
c) Foundations are broadly classified into two categories; discuss using well labeled diagrams (4 Marks)
d) Name five types of shallow foundations (5 Marks)
e) Design of loads play an important part in selection of types of foundations. List five types of loads likely to be considered (5 Marks)
f) Name two important design consideration for foundations (2 Marks)
g) What are the four assumptions considered when using the Terzaghi's ultimate bearing capacity equations (4 Marks)
h) Briefly describe any THREE factors that affect engineering Properties of Soil (6 Marks)

QUESTION TWO (20 MARKS)

Describe in details the steps required for designing a foundation (20 Marks)

QUESTION THREE (20 MARKS)

a) Name types of deep foundations
b) Explain THREE (3) types of piles as classified based on the following
   i) Classification based on materials and composition
   ii) Classification based on the method of installation

QUESTION FOUR (20 MARKS)

Define DEWATERING, and additionally, with the aid of sketch diagrams, describe the methods of carrying out the following dewatering methods (20 Marks)

a) Open excavation by ditch and sump
b) Well points
c) Deep wells with submersible pumps

QUESTION FIVE (20 MARKS)

A strip footing of width 3m is founded at the depth of 2m below the ground surface with soil strata having cohesion $c = 30kN/m^2$, an angle of shearing resistance $\phi = 35°$. The water table is at a depth 5m below the ground level. The moist weight of soil above the water table is 17.25 kN/m^2. Determine;

a) The ultimate bearing capacity of the soil
b) The net ultimate bearing capacity
c) The net safe bearing capacity for a factor of safety of 3
d) The safe bearing capacity
   Use general shear failure criterion by Terzaghi