

**MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY**

**P.O. Box 972-60200 – Meru-Kenya.**

**Tel: 020-2069349, 061-2309217. 064-30320 Cell phone: +254 712524293, +254 789151411**

**Fax: 064-30321**

**Website:** [**www.must.ac.ke**](http://www.must.ac.ke) **Email:** [**info@must.ac.ke**](mailto:info@must.ac.ke)

**University Examinations 2015/2016**

THIRD YEAR SECOND SEMESTER EXAMINATION FOR DIPLOMA IN CIVIL ENGINEERING

**ECV 2351: FOUNDATION ENGINEERING II**

**DATE: NOVEMBER 2015 TIME: 11/2 HOURS**

**INSTRUCTIONS:** *Answer question* ***one*** *and any other* ***two*** *questions*

**QUESTION ONE (30 MARKS)**

1. (i) What do you understand by site investigation? (3 Marks)

(ii) State five purposes for which site investigations are done. (5 Marks)

1. Mention three stages in sub-surface explorations. (3 Marks)
2. State two open excavation methods of exploration. (2 Marks)
3. State five methods of drilling holes in borings. (5 Marks)
4. State three limitations of seismic methods of sub-soil investigations. (3 Marks)
5. State four limitations of the electrical resistivity methods of exploration. (4 Marks)
6. State five design features that effect the sample disturbance. (5 Marks)

**QUESTION TWO (15 MARKS)**

1. What is reconnaissance? (2 Marks)
2. What type of information is obtained in reconnaissance? (10 Marks)
3. State three methods for determining the level of the ground water table. (3 Marks)

**QUESTION THREE (15 MARKS)**

1. What are the main differences between a drilled pier and a caisson? (3 Marks)
2. State six applications (uses) of piles. (3 Marks)
3. Determine the outside diameter of an open caisson to be sunk through 18 m of sand and water to bedrock if the allowable bearing capacity is 180t/m2. The caisson receives a load of 4414t from the superstructure. The mantle friction is 2.5t/m2. Test the feasibility of sinking and also calculate the thickness of the seal. Assume  and. (9 Marks)

**QUESTION FOUR (15 MARKS)**

1. A pile group consists of 49 piles arranged in 7 rows with a centre-to-centre spacing of 1.5 m in each direction. Each pile in 22 m long and 500 mm in diameter. Find out the group capacity of the piles using:
2. Converse-labarre formula. (5 Marks)
3. Los Angeles formula (4 Marks)

The load bearing capacity of each pile = 78t.

1. A reinforced concrete pile of 20 m overall length is driven into a deep stratum of soft clay having an unconfined compressive strength of 4t/m2. The diameter of the pile is 40 cm. Determine the safe load that can be carried by the pile with a factor of safety of 2.5. Assume  (6 Marks)