



TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

**UNIVERSITY EXAMINATION FOR BACHELOR OF SCIENCE IN CIVIL
ENGINEERING**

[Institutional Based Programmes]

ECE 2508: GEOTECHNICAL ENGINEERING

END OF SEMESTER EXAMINATION

SERIES: AUGUST 2017 TIME

ALLOWED: 2 HOURS

Instructions to Candidates:

You should have the following for this examination

- *Answer Booklet*
- *Pocket Calculator*

This paper consists of **FIVE** questions.

Answer question **ONE** any other **TWO** questions

Maximum marks for each part of a question are as shown

This paper consists of **TWO** printed pages

Question One (Compulsory)

- a) Explain how ground conditions and environmental aspects can influence choice of tunneling methods. **(6 marks)**
- b) Define a dam **(4 marks)**
- c) Briefly discuss the following types of dams:
- (i) Arch dam
 - (ii) Gravity dam
 - (iii) Rock fill dam
 - (iv) Earth fill dam **(12 marks)**
- d) Explain the following structural terms:
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- (i) Faults
- (ii) Folds
- (iii) Joints
- (iv) Bedding planes (8 marks)

Question Two

- a) Outline some of the important soil properties used by geotechnical engineers to analyze site conditions for design purposes. (8 marks)
- b) Explain the objectives of site investigation and outline the **THREE** phases of site investigation prior to the design of major works. (8 marks)
- c) Define geotechnical engineering and highlight its importance in civil engineering. (4 marks)

Question Three

- a) Briefly describe the **TWO** categories of geotechnical reports arising from site investigation. (4 marks)
- b) Outline the **THREE** field tests commonly used in sub-surface soil investigation for foundations. (6 marks)
- c) Explain the principal objectives of insitu field testing (6 marks)
- d) Briefly describe “frost action” in soils and how this problem can be solved. (4 marks)

Question Four

- a) What are geosynthetics (2 marks)
- b) Outline the main functions of Geosynthetics (10 marks)
- c) Explain **FOUR** functions of geotextiles (8 marks)

Question Five

- a) Define a pile (2 marks)
- b) Briefly describe types of piles according to their composition (8 marks)
- c) Explain **THREE** uses of piles. Give examples of where they are applied. (10 marks)