



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 2013**

**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

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**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:

- (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)**