



TECHNICAL UNIVERSITY OF MOMBASA  
**Faculty of Engineering &  
Technology**

DEPARTMENT OF BUILDING & CIVIL ENGINEERING

UNIVERSITY EXAMINATION FOR:  
**BACHELOR OF SCIENCE IN CIVIL ENGINEERING**  
(BSCE12J/12M, BCE 12JA/12MA 13M 13JA))

ECE 2302: ENGINEERING GEOLOGY

**END OF SEMESTER EXAMINATION**

SERIES: APRIL 2014

**TIME ALLOWED: 2 HOURS**

**Instructions to Candidates:**

You should have the following for this examination

- Answer booklet
- Scientific Calculator

This paper consists of **FIVE** questions.

Answer question **ONE (COMPULSORY)** and any other **TWO** questions

All questions carry equal marks

Maximum marks for each part of a question are as shown

This paper consists of **THREE** printed pages

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**Question One (COMPULSORY)**

a) Distinguish the following giving ONE example for each:

- (i) Cleavage from fracture
- (ii) Colour from streak

**(4 marks)**

b) Explain the following:

- (i) Mineral hardness and its significance to selection of building rock materials required for external finishing.

- (ii) Rounding as applied to silica rich sedimentary rocks
  - (iii) Causes of colour variation in minerals **(6 marks)**
- c) Outline:
- (i) FOUR factors that contribute to thermal metamorphism
  - (ii) FOUR geological considerations necessary for selecting a site for construction of an each dam. **(8 marks)**
- d) Briefly explain geological considerations that apply to rock tunnels. **(6 marks)**
- e) A quarry for lateritic soil required for road work is to be selected. Outline engineering geological considerations to be addressed. **(6 marks)**

### Question Two

- a) Explain formation of the following features:
- (i) Cross-bedding
  - (ii) Graded bed
  - (iii) Ripple marks **(6 marks)**
- b) Outline characteristics for the following:
- (i) Tuff
  - (ii) Mica schist **(8 marks)**
- c) Briefly explain THREE major influences of geology of a site to quarrying of “soft rocks” **(6 marks)**

### Question Three

- a) Explain the following:
- (i) Recognition of folds in the field
  - (ii) Influence of folds to stability of tunnels **(4 marks)**
- b) A basaltic lava good for aggregates is known to occur in an area. Outline THREE prospecting methods to be used. **(6 marks)**
- c) Outline criteria used to recognize faults in the field. **(5 marks)**
- d) Outline geological problems associated with soft rock quarries. **(4 marks)**

### Question Four

- a) Explain the term “mineral cleavage” and its significance to rock blasting **(4 marks)**
- b) Outline diagenetic changes that transform mud sediments to mudstone. **(6 marks)**
- c) Describe a dyke as an igneous structure. **(5 marks)**
- d) Outline characteristics of a limestone **(5 marks)**

### Question Five

- a) Explain the following:
- (i) “Cement” as applied to mineralogy and its significance
  - (ii) Anticipated response to stress by quartz compared to mica if either minerals is dominant in a selected igneous rock. **(6 marks)**
- b) Outline disadvantages for occurrence of faults on a tunnel/route. **(4 marks)**
- c) Use figure 1 provided to answer the following:
- (i) Determine direction of dip for the beds
  - (ii) Calculate angle of dip for the beds
  - (iii) Identify an outlier in the area covered by the map
  - (iv) State sequence of geological processes that led to formation of the area covered by the map. **(10 marks)**