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**JOMO KENYATTA UNIVERSITY**

**OF**

**AGRICULTURE AND TECHNOLOGY**

# University Examinations 2012/2013

**THIRD YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN CIVIL ENGINEERING**

# ECE 2302: ENGINEERING GEOLOGY

**DATE: AUGUST, 2012**  **TIME: 2 HOURS**

**INSTRUCTIONS: Answer Question ONE and Any Other TWO Questions.**

**Question One**

a) Explain the relevance of geology in civil engineering. [3 marks]

b) Outline the selection, collection and storage of laboratory samples. [4 marks]

c) Describe the two stages or ways in which geological maps may be interpreted.

[6 marks]

d) Explain site investigation and state the steps involved in feasibility study. [7 marks]

**Question Two**

a) Outline how weathering affects the engineering structures. [4 marks]

b) Explain the objectives of surface and subsurface site investigation. [6 marks]

c) Define the terms “Dip” and “strike” and show how you would calculate the angle of true dip and the direction of the strike. [10 marks]

**Question Three**

a) State the four types of geological maps and write brief notes on each of them.

[8 marks]

b) Describe earthquakes, their causes, effects on structures and suggest ways of minimizing the effects. [12 marks]

**Question Four**

a) Explain four ways in which slope movement and failure may occur in on cuttings (eg a road or a quarry). [5 marks]

b) With help of a sketch, define the following geological terms:

1. Crest
2. Trough
3. Antiform
4. Synform
5. Limb
6. Core [7 marks]

c) What is quarrying? Describe rock blasting, stating its major purposes. [8 marks]

**Question Five**

a) Distinguish a Normal Fault from a Reverse Fault. [2 marks]

b) Explain cementation process in sedimentary rocks and differentiate “Rock bed” from “Bedding plane.” [4 marks]

c) With help of sketches (where necessary) discuss any three of the following chief properties of minerals:

1. Cleavage
2. Colour
3. Tenacity
4. Lustre
5. Hardness [6 marks]

d) Explain three ways in which rock failure may occur and suggest the steps you would take in order to minimize the rock failure. [8 marks]