



**KENYATTA UNIVERSITY**

**UNIVERSITY EXAMINATIONS 2018/2019**

**FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF  
CONSTRUCTION MANAGEMENT**

**BCM 203: GEOLOGY AND HYDROLOGY**

**DATE: Thursday, 13<sup>th</sup> December 2018**

**TIME: 11.00 a.m. - 1.00 p.m.**

**INSTRUCTIONS:**

**Answer Question ONE and any other TWO**

**Question 1**

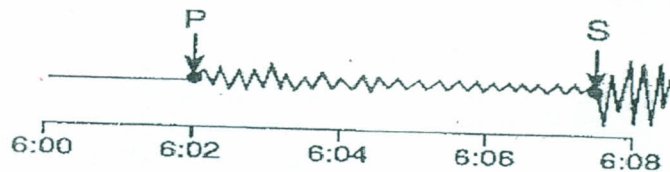
- (a) Differentiate between the following terms:
- i) Mineral and Rock (give two examples of each) [4 marks]
  - ii) Denudation and Deposition [4 marks]
  - iii) Porosity and Permeability [4 marks]
  - iv) Drainage basin and Flood plain [4 marks]
- (b) Describe of the rock cycle and state, with reasons, the preferred rocks for construction. [7 marks]
- (c) Give an account of the global water circulation and state the two largest reservoirs of water on the earth [7 marks]

**Question 2**

- (a) Using the theory of plate tectonics, describe the formation of the East African Rift Valley citing the type of faults formed [10 marks]
- (b) Apply the concept of forces acting on a slope to explain how landslides occur and describe how the stability of a slope is evaluated [10 marks]

### Question 3

- (a) Derive an equation for determining the distance to the epicenter from a recording station. Using the figure below, compute the distance, if P and S velocities are 6.0 and 3.5 km/s respectively [10 marks]



- (b) Discuss, giving examples, five factors that aggravate the intensity of earthquake damage [10 marks]

### Question 4

- (a) Describe the factors that control infiltration capacity and the classification of sub-surface water after infiltration [10 marks]
- (b) Explain the Darcy Law and compute the annual discharge from a pond, if the permeability of the embankment soil is  $1 \times 10^{-6}$  cm/s under a hydraulic gradient of 0.01 over an area of  $10\text{m}^2$ . [10 marks]

### Question 5

- (a) A drainage basin with an area of  $3,000\text{ km}^2$  has an annual precipitation of 1,500 mm of precipitation. The average flow rate measured in a river draining the catchment is  $20\text{m}^3/\text{s}$ .
- What is the total annual river run-off?
  - What is the runoff coefficient of the catchment?
  - How much water is lost due to the combined effects of evaporation, transpiration, and infiltration expressed in m? [12 marks]
- (c) Explain the water balance and discuss how urban development impacts on the water balance in a catchment [8 marks]