



KENYATTA UNIVERSITY
UNIVERSITY EXAMINATIONS 2019/2020
FIRST SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF
CONSTRUCTION MANAGEMENT
BCM 203: GEOLOGY AND HYDROLOGY

DATE: WEDNESDAY, 11TH DECEMBER, 2019

TIME: 2.00 P.M. - 4.00 P.M.

INSTRUCTIONS:

Answer Question **ONE** in **Section 1** and any other **TWO** Questions from **Section 2**.

SECTION 1 (30 Marks)

Question 1

- (a) Differentiate between the following terms:
- i) Rock *and* Mineral [4 marks]
 - ii) Tectonism *and* Denudation [4 marks]
 - iii) Porosity *and* Permeability [4 marks]
 - iv) Watershed *and* Flood plain [4 marks]
- (b) Using an illustration, give a description of the rock cycle [7 marks]
- (c) Give an account of the global water circulation [7 marks]

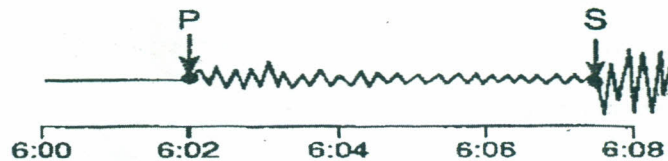
SECTION 2 (40 Marks)

Question 2

- (a) Describe the formation of the East African Rift Valley and explain the type of faults formed in the process [10 marks]
- (b) Explain how landslides occur and describe how the stability of a slope is determined [10 marks]

Question 3

- (a) Explain the major causes of earthquakes and differentiate between earthquake magnitude and earthquake intensity [10 marks]
- (b) (i) Derive an equation for determining the distance to the epicenter from a recording station [6 marks]
- (ii) Using the figure below, compute the distance, if P and S velocities are 6.0 and 3.5 km/s respectively [4 marks]



Question 4

- (a) Using an illustration, describe the classification of sub-surface water [8 marks]
- (b) (i) Explain the Darcy Law [6 marks]
- (ii) Compute the annual discharge from a small dam, if the permeability of the embankment soil is 1×10^{-6} cm/s under a hydraulic gradient of 0.01 over an area of 10m^2 . Is the loss significant? [6 marks]

Question 5

- (a) Differentiate between the rational method and the water balance method in the estimation of surface run-off [8 marks]
- (b) A water catchment has an area of $2,000 \text{ km}^2$. The annual precipitation is 1,500 mm. The average flow rate measured in a river draining the catchment is $10\text{m}^3/\text{s}$. Determine the following:
- i) Total annual run-off [3 marks]
 - ii) Run-off coefficient [3 marks]
 - iii) Annual evapotranspiration in mm (assume zero infiltration) [6 marks]