UNIVERSITY OF EMBU

2017/2018 ACADEMIC YEAR

SECOND SEMESTER EXAMINATIONS

SECOND YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN WATER RESOURCE MANAGEMENT & BACHELOR OF SCIENCE IN MANAGEMENT OF AGRO-ECOSYSTEM AND ENVIRONMENT

AWM 201/AEM 201: ENVIRONMENTAL HYDROLOGY

DATE: APRIL 9, 2018   TIME: 2:00 PM – 4:00 PM

INSTRUCTIONS:

Answer Question ONE and ANY Other TWO Questions.

QUESTION ONE (30 MARKS)

a) Describe the main uses of a unit hydrograph.   (4 marks)

b) Differentiate between a cyclone and an anticyclone.   (2 marks)

c) Explain why only part of precipitation in Africa reaches a stream.   (3 marks)

d) Explain the factors to consider when selecting a stream gauging site.   (4 marks)

e) Discuss the catchment factors that determine the amount of runoff that reaches Mwea Irrigation Scheme in Kirinyaga County   (5 marks)

f) Explain the term sediments as used in water resources management   (2 marks)

g) Explain the factors that affect erosion and sediment yield of River Tana in Kenya

(5 marks)

h) Explain FIVE types of environmental pollution experienced in Mombasa County.

(5 marks)

QUESTION TWO (20 MARKS)

a) Discuss the practical applications of hydrology   (16 marks)

b) An anemometer 10 m above the ground recorded a wind velocity of 1.5 m/s. What is the estimated wind velocity at 2 m above the surface? (4 marks)

QUESTION THREE (20 MARKS)

a) Discuss how one would measure the discharge of River Kapingazi using the Area-Velocity Method (8 marks)

b) The following data were collected at a gauging station on a stream.

Distance from one bank (m)	0	3	6	9	12	15	18	21	24	27
Water depth (m)	0	1.5	3.2	5.0	9.0	5.5	4.0	1.6	1.4	0
Mean Velocity(m/s)	0	0.12	0.24	0.25	0.26	0.24	0.23	0.16	0.14	0

Compute the discharge by:

i)   The midsection method (6 marks)

ii) The mean section method (6 marks)

QUESTION FOUR (20 MARKS)

a) Using a sketch diagram, explain the salient features of a typical hydrograph (8 marks)

b) The ordinates of a 3-hr unit hydrograph of a 6 hr interval are given as 0,3,5,9,11,7,5,4,2,1,0 m^3/s. Derive the storm hydrograph due to a 3-hr storm with a total rainfall of 15 cm. Assume an initial loss of 0.5 cm and a Φ-index of 1cm/hr. Take base flow as 4 m^3/s. (12 marks)

QUESTION FIVE (20 MARKS)

a) Discuss the physiographic factors that affect the runoff of a catchment (10 marks)

b) Discuss FOUR technologies used in environmental remediation (10 marks)

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