



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

DIPL0MA IN CIVIL ENGINEERING

BCECD 316 HYDROLOGY

DATE: 23/10/2020

TIME: 8.30-10.30 AM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (30 MARKS) COMPULSORY

- a) Define the term hydrology (2 marks)
- b) Discuss Four measures that can be put in place to reduce flood damages (8 marks)
- c) Outline the process of run-off (8 marks)
- d) Explain 5 factors that affect evaporation (10 marks)
- e) State 2 methods of measuring precipitation (2 marks)

QUESTION TWO (20MARKS)

- a) With a neat sketch, explain the processes of hydrologic circle (15 marks)
- b) Discuss the following forms of precipitation: -
 - i. dew
 - ii. hail (5 marks)

QUESTION THREE (20MARKS)

- a) Using the table below, determine the mean rainfall using: -
 - i. Arithmetic method
 - ii. Thiessen polygon method (10 marks)

Station	Area m ²	Precipitation mm
A	20	17.00
B	40	40.2
C	280	50.3
D	324	76.5
E	54	40.5
F	283	85.7
G	210	130.2
H	185	115.3

Note station C and G are outside the region

- b) discuss the process of transpiration (5 marks)
- c) Using the data given in the table below, determine the missing precipitation for station p using normal ratio method (5 marks)

station	p	q	r	s	t
Average annual precipitation	2500	2432	2430	2208	2331
Precipitation for year 2016	2315	2213	?	2028	2100

QUESTION FOUR (20 MARKS)

- a) Define the term run-off (2 marks)
- b) Discuss 5 factors that affect run-off flow (10 marks)
- c) Explain 4 causes of flood (8 marks)

QUESTION FIVE (20 MARKS)

- a) Explain 5 classes of stream (10 marks)
- b) The following stage discharge observation were made at a particular river gauge station

Stage (m)	0.70	1.2	1.7	2.0	2.5	2.7	3.1	3.3	3.7
Discharge (m ³ /s)	2	2.4	3	4.5	5.4	6.2	8	9.0	10.3

- i. Establish rating curves
- ii. Prepare a simple rating table between 2m and 3m at interval of 0.1m (10 marks)