



*"Investing in Africa's Future"*

**COLLEGE OF HEALTH AGRICULTURE AND NATURAL SCIENCES**

**DEPARTMENT OF AGRICULTURAL SCIENCES**

**AAE 304 HYDROLOGY**

**END OF FIRST SEMESTER EXAMINATIONS**

**NOVEMBER 2019**

**LECTURER: MS M. C. KUREHWATIRA**

**DURATION: 3 HRS**

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***INSTRUCTIONS***

**Answer Question 1 and Question 2 and any other TWO questions**

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### Question 1

- a) Draw a diagram illustrating the hydrological cycle and describe it. [20 marks]  
b) Discuss the practical applications of hydrology. [5 marks]

### Question 2

- a) Describe any two methods used to determine the mean areal depth of precipitation over a basin covered with several rain-gauge stations, highlighting the pros and cons of each method. [12 marks]  
b) Using the data in table 2.1, compute the average precipitation over the basin using the methods described in question 4a). (show all your working) [13 marks]

Table 4.1

Station	Thiessen polygon area (km <sup>2</sup> )	Precipitation (cm)
A	170	9.3
B	164	10.5
C	156	10.9
D	150	12.2
E	116	13.5
F	36	14.0
G	124	14.2
H	42	12.8
Area of basin	958 km <sup>2</sup>	

### Question 3

- a) Write short notes on:  
i. Darcy's law [5 marks]  
ii. Class A evaporation pan [5 marks]  
iii. Water balance [5 marks]  
b) Draw a diagram illustrating the types of aquifers, and describe two types of aquifers. [10marks]

### Question 4

- a) Discuss, using relevant examples, the anthropogenic impacts on the hydrological cycle. [20 marks]  
b) What are the precautions that one needs to take when sitting a rain gauge? [5 marks]



### **Question 5**

- a) Describe the three conditions that are necessary for precipitation to occur. **[9 marks]**
- b) What are the main sources of errors associated with measuring rainfall using a rain gauge? **[6 marks]**

### **Question 6**

- a) Draw a single peaked hydrograph and indicate its various components. **[10 marks]**
- b) Discuss the factors that affect the shape of a storm hydrograph. **[10 marks]**

### **Question 7**

- a) Using relevant examples, describe the sources of ground water pollution. **[10 marks]**
- b) Describe the factors that affect the following;
- i. Infiltration, **[6 marks]**
  - ii. Evapotranspiration and **[6 marks]**
  - iii. Interception **[3 marks]**