

UNIVERSITY OF RUHUNA

Bachelor of Science in Fisheries and Marine Sciences Degree, January 2017

Level III, Semester II Examination

LIM 3212 (Basic Hydrology)

Time: 1 ½ hours

Answer all questions

Part I (15 marks)

Select the correct answer

1. Stable isotopes of water are a very powerful means to study the global water cycle. Stable isotopes are:

- i. atoms which take different positions in the periodic table, but have a different number of neutrons
- ii. atoms which take the same position in the periodic table, but have a different number of neutrons
- iii. atoms which take different positions in the periodic table, but have a different number of neutrons
- iv. atoms which take the same position in the periodic table, but have a different number of protons
- v. atoms which take the same position in the periodic table, but have a different number of electrons

2. The ratio of the actual rainfall in a year at a particular place to the normal annual rainfall is called:

- i. the rainfall coefficient
- ii. the index of rainfall
- iii. the index of wetness
- iv. the rainfall variability index
- v. the rainfall variability coefficient

3. The term 'unit' in a unit hydrograph refers to:-

- i. unit area of the basin
- ii. unit precipitation
- iii. unit discharge
- iv. unit duration of precipitation
- v. unit discharge of precipitation

4. Normally, an aquitard consists of:
- i. sand or porous rock with high hydraulic conductivity
 - ii. lime or porous rock with high hydraulic conductivity
 - iii. clay or non-porous rock with low hydraulic conductivity
 - iv. sand or porous rock with low hydraulic conductivity
 - v. clay or non-porous rock with high hydraulic conductivity
5. The ratio of the volume of water drained divided by the volume of a soil sample is:
- i. the storage coefficient
 - ii. the porosity
 - iii. the specific yield
 - iv. the specific retention
 - v. the hydraulic conductivity

Part II (35 marks)

Write your answer only within the space provided

1. Define the term "Hydrology".

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2. Explain the term "anomalous properties of water?"

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3. What do you mean by "isotopic fractionation of water?"

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4. Write two natural phenomena where stable isotope fractionation occurs.

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5. Using basic terms write an equation to describe water budget of a catchment.

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6. What are the three main characteristics that can be used to describe a rainfall?

- i.
- ii.
- iii.

7. Distribution of rainfall can be influenced by dynamic and static factors.

- i. What is meant by dynamic factors?.....
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ii. Name three static factors that influence the distribution of rainfall.

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8. Once rain falls on a vegetation canopy it effectively partitions the water into separate modes of movement. In relation to rainfall partition, define following terms:

i. Throughfall:.....

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ii. Stemflow:.....

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iii. Interception loss:.....

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9. Define the following terms used to describe characteristics of the drainage net of a basin.

i. Stream Density

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ii. Drainage Density

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iii. Form Factor

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iv. Compactness Coefficient

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10. Infiltration is the process by which water on the ground surface enters the soil. Write three environmental factors that depend on infiltration.

i.
ii.
iii.

Part III (50 marks)

Write your answer only within the space provided

1. Describe the physical process of formation and condensation of clouds

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2. Describe the movement and dispersion of organic liquid contaminants in groundwater.

A series of 25 horizontal dotted lines for writing the answer.