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# **UNIVERSITY OF KABIANGA**

**UNIVERSITY EXAMINATIONS**

**2014/2015 ACADEMIC YEAR**

**THIRD YEAR SECOND SEMESTER EXAMINATION**

**FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRO-FORESTRY AND RURAL DEVELOPMENT**

**COURSE CODE: FOR 312**

**COURSE TITLE: FORESTRY HYDROLOGY**

***DATE: 23RD APRIL, 2015* *TIME: 2 P.M- 5 P.M***

**INSTRUCTIONS:**

***ANSWER ALL QUESTIONS IN SECTION A AND ANY OTHER TWO QUESTIONS IN SECTION B.***

**SECTION A (Compulsory)**

1. Define the following processes in the hydrological cycle.
2. Precipitation. (1 mark)
3. Infiltration. (1 mark)
4. Surface runoff. (1 mark)
5. Interception. (1 mark)
6. Forest influences. (1 mark)
7. Evapotranspiration. (1 mark)
8. a) Compute the daily evaporation loss from a Pan if the amounts of water added to bring the level to the fixed point are as follows. (3 marks)

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Day** | **1** | **2** | **3** | **4** | **5** | **6** | **7** |
| Rainfall (mm) | 14 | 6 | 12 | 8 | 0 | 5 | 6 |
| Water added (removed | -5 | 3 | 0 | 0 | 7 | 4 | 3 |

 b) What is the evaporation loss of water in this week from a lake (surface area=640 ha) in the vicinity of the Pan assuming a Pan coefficient of 0.75? (3 marks)

3. Explain the principle of the mechanism of the tipping-bucket rain gauge. What are the advantages of this type of instrument compared to the non-recording rain gauge? (6 marks)

4. Briefly explain the effect of the following forest components on rain water infiltration and surface runoff.

 a) Forest canopy. (3 marks)

 b) Forest floor litter. (3 marks)

5. Explain three measures to reduce evaporation from water surfaces in a reservoir. 6 marks)

**SECTION B (Answer any two questions)**

6. A report from a small watershed experiment concludes that “Flood Peaks increased by 50% by clear-cutting the forests on the basin.” Assuming that the percentage was correctly calculated from the data, explain the conclusion in terms of impact of forests on translation of precipitation into surface runoff. (20 marks)

7. With a well labelled diagram, explain the hydrological cycle indicating its major processes. (20 marks

8. Explain with the help of a well labelled diagram, the method of stream gauging by the velocity-area method. (20 marks)