

EASTERN UNIVERSITY, SRI LANKA

THIRD YEAR FIRST SEMESTER EXAMINATION IN AGRICULTURE – 2010 / 2011

(Dec / Jan 2012/13)

AEN 3101 HYDRAULICS AND HYDROLOGY

Time allowed: Two hours

Answer **all** questions



01. (a) Briefly describe the divisions of hydrograph.

(b) Using 3 hour Unit Hydrograph given below, find the peak flow, resulting from four successive 3 hour periods of rainfall producing 0.3, 0.6, 1.5, and 0.8 cm of runoff respectively, from a basin.

Time (hr)	0	1	2	3	4	5	6	7	8	9	10	11	12
Flow (m ³ /s)	0	4	7	11	13	18	16	13	12	9	7.5	4	0

02. (a) List out the factors affecting runoff rate.

(b) Find the proportions of a rectangular channel of depth D and width B which will make the discharge a maximum, for a given cross sectional area, use the Chezy's formula.

(c) A rectangular channel has a cross sectional area of 72 m^2 . Determine the discharge through the most economical section, if bed slope is 1 in 1000. (Chezy's constant, C is 60).

03. (a) What do you understand by the following terms;

- (i) Evaporation
- (ii) Throughfall
- (iii) Stem flow

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(b) Two reservoirs are connected by a pipeline which is 300 mm in diameter for the first 10 m and 450 mm in diameter for the remaining 30 m. The entrance and exit are sharp and the change of section is sudden. The water surface in the upper reservoir is 6 m above that in the lower. Friction coefficient, f is 0.01.

(i) Calculate the total head loss.

(ii) Find the flow rate in m^3/s .

04. (a) Briefly describe the factors affecting infiltration capacity of soil.

(b) An orifice meter consisting of 10 cm diameter orifice in a 30 cm diameter pipe has a coefficient of 0.63. The pipe delivers oil (Specific gravity = 0.8). The pressure difference on the two sides of the orifice plate is measured by a mercury oil differential manometer. If the differential gauge reads 70 cm of mercury, calculate the rate of flow in m^3/s .

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