



EASTERN UNIVERSITY, SRI LANKA

SECOND YEAR SECOND SEMESTER EXAMINATION IN AGRICULTURE - 2002/2003

AEN 2201 – Agricultural Hydrology and Hydraulics

Answer all questions.

Time: Two hours

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1. a) Briefly describe the methods used to estimate the rainfall.
- b) "The hydrological cycle has no beginning or end" – Discuss
- c) It is intended to install rain gauges to cover an area of 900 km<sup>2</sup> flat land. Give your recommendations for the following.
- i. Number of rain gauges to be installed
  - ii. Selection of site for each rain gauge.
2. a) Briefly discuss the hydrograph analysis to estimate the runoff.
- b) From the records of a catchment in a typical storm, the following data were observed as follows:

Time (hr)	Discharge (m <sup>3</sup> /sec)	Base flow (m <sup>3</sup> /sec)
0	150	150
3	190	170
6	600	220
9	1000	250
12	1800	400
15	1600	350
18	1500	320
21	1300	280
24	800	260
27	500	240
30	300	225

- i. If the area of catchment is 3150 km<sup>2</sup>, calculate the unit hydrograph ordinates.
- ii. Plot the hydrograph for a 3-hour storm.

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3. a) State Bernoulli's theorem for liquids flow.
- b) Briefly describe the principle involved in the velocity measurement of water flowing in a pipe by using Pitot tube.
- c) A Pitot tube is used to measure quantity of water flowing in a pipe of 30 cm in diameter. The water has risen to a height of 35 cm above central line of the pipe in the vertical limb of Pitot tube. If the mean velocity of water is 0.7 m/s at center and the coefficient of Pitot tube is 1, calculate discharge through the pipe in lit/sec.
4. a) Briefly discuss the agricultural importance of an open channel.
- b) Critically comment on the following statement:  
"Semi-Circular section of a channel is the most efficient of all other cross-sections"
- c) A section of an open channel is semi-circular invert of 0.6 m radius, with vertical tangential sides. Calculate discharge of water through the channel, when the depth of water in mid-channel is 0.9 m. Take  $C = 65$  in Chezy's formula and slope of bed as 1 in 1000.

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