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

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 km² 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 (m³/sec)	Base flow (m³/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 km². calculate the unit hydrograph ordinates.

   ii. Plot the hydrograph for a 3-hour storm.

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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