

EASTERN UNIVERSITY, SRI LANKA

FACULTY OF AGRICULTURE

FOURTH YEAR FIRST SEMESTER EXAMINATION IN AGRICULTURE-2016/2017

(Nov/Dec-2018)

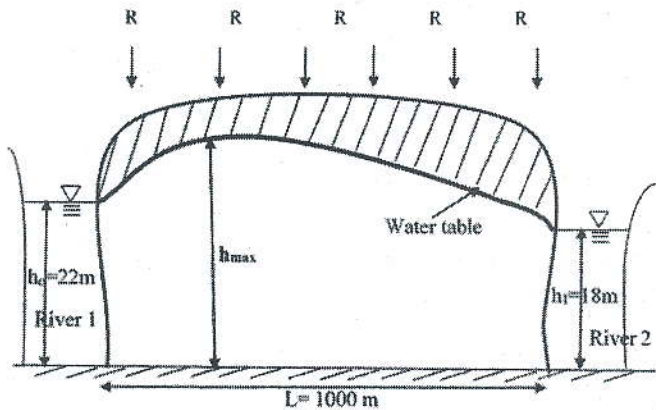
AE 4103: ADVANCED HYDROLOGY (2:15/30/45)

Answer all questions

Time: One hour

1. a. What are the limitations of using mathematical models in hydrology?

b. Two rivers located 1000 m apart fully penetrate an aquifer (see figure below). The aquifer has a hydraulic conductivity (K) value of 0.6 m/day. The region receives an average rainfall of 20 cm/year and evaporation is about 12 cm/year. Water elevation in River 1 and River 2 is 22 m and 18 m, respectively. Estimate the daily discharge per meter width into River 1 and River 2.



2. a. Write a brief account on hydrological data validation.

b. The inflow hydrograph for a reach of a stream is given below. The Muskingum coefficients, K and X are 12 hr and 0.2, respectively. Route the flood through the reach and determine the attenuation and lag time of outflow hydrograph. Outflow at the beginning of the flood may be taken as 10 m<sup>3</sup>/s.

Time (hr)	0	6	12	18	24	30	36	42	48	54
Inflow (m <sup>3</sup> /s)	10	20	50	60	55	45	35	27	20	15

The coefficients Co, C1 and C2 are given as follows:

$$C_0 = \frac{-Kx + 0.5\Delta t}{K - Kx + 0.5\Delta t}; \quad C_1 = \frac{Kx + 0.5\Delta t}{K - Kx + 0.5\Delta t}; \quad C_2 = \frac{K - Kx - 0.5\Delta t}{K - Kx + 0.5\Delta t}$$