



**CIVIL ENGINEERING FACULTY HYDRAULICS DIVISION
HYDROLOGY**

Examples –4 Infiltration

- 1) The Horton's infiltration equation is given below:
 $f = f_c + (f_0 - f_c)e^{-kt}$ where $f_0 = 82 \text{ mm/hr}$, $f_c = 10 \text{ mm/hr}$, $k = 0,3 \text{ 1/hr}$ for a certain area.
 The two hourly rainfall data are
 0-2 hr 30mm/hr
 2-4 hr 70mm/hr
 4-6 hr 15mm/hr
- a) Plot the rainfall data as a histogram and the loss curve on the same graph
 b) Compute the effective precipitation depth from the plotted diagram by integration.
 c) For the same effective depth, determine the ϕ index.
- 2) The precipitation values measured at the end of each hour during a 8-hour storm are given in the below table. The initial and limit infiltration capacities are 5 mm/hour and 2 mm/hour, respectively. The standard infiltration curve of the basin fits the Horton equation (S surface catchment will be neglected and $k = 0.4$).

Hour	0	1	2	3	4	5	6	7	8
Precipitation (mm)	0	6	10	15	18	24.5	26.5	28	29

- a) Draw the hyetograph.
 b) Draw the standard infiltration curve.
 c) Draw the infiltration rate curve.
 d) Calculate the infiltration in 8 hours.
 e) Calculate the flow depth.
 f) Calculate the infiltration indices ϕ and w .

- 3) Draw the infiltration rate curve on the given graph and show the parts of runoff and infiltration by dashing areas.

