

## CVG3120-FALL 2015 – Assignment 5

### Problem 1

The ordinates of a one-hour UH (due to 1 cm ER) are given. Construct an S-hydrograph. Derive a 3-hour UH.

Time(h)	UH(m <sup>3</sup> /s-cm)	Time(h)	UH(m <sup>3</sup> /s-cm)
0	0	6	1.42
0.75	16.42	6.75	1.13
1.5	31.15	7.5	0.85
2.25	27.18	8.25	0.57
3	15	9	0.5
3.75	7.36	9.75	0.42
4.5	3.96	10.5	0.14
5.25	2.27	11.25	0

### Problem 2

For a storm of 3-hour duration on a watershed of 312000 hectares, the following hydrograph has been observed:

Time (hour)	Discharge (m <sup>3</sup> /s)		
	Day 1	Day 2	Day 3
3 A.M.	17.2	132.0	48.5
6 A.M.	15.8	115.0	43.0
9 A.M.	175.0	100.0	37.0
Noon	270.0	88.0	32.0
3 P.M.	230.0	78.0	26.0
6 P.M.	200.0	68.0	23.0
9 P.M.	172.0	60.0	26.0
Midnight	150.0	54.0	17.0

Assume a constant base flow of  $17.00 \text{ m}^3/\text{s}$ . Derive the unit hydrograph for this storm.

**Problem 3**

A 2-hour unit hydrograph is given by a rectangle whose base is 4 hours and height is  $0.25 \text{ cm/hr}$ . Derive a 4-hour unit hydrograph using the given 2-hour unit hydrograph.

**Problem 4**

Given is a unit hydrograph of a watershed as a result of a 4-hour rainstorm. Find the peak flow resulting from four successive 4-hour periods of rainfall producing 3, 1, 7, and 0.5 cm of runoff, respectively. Ignore base flow.

Time(h)	UH ( $\text{m}^3/\text{s}\text{-cm}$ )	Time(hr)	UH( $\text{m}^3/\text{s}\text{-cm}$ )
0	0	8	6.09
1	0.45	9	4.67
2	1.64	10	3.45
3	4.9	11	2.54
4	9.54	12	1.7
5	12.46	13	1
6	11.33	14	0.45
7	8.07	15	0