



**ITU**

**CIVIL ENGINEERING FACULTY HYDRAULICS DIVISION**

**HYDROLOGY**

**Homework - 1**

- The deadline for this HW is April 5th, 2019.
- The variable  $\alpha$  is referred as the last two digits of the student ID in question 1 and the last digit of the student ID in question 2.
- The assignments should be submitted in an appropriate engineering format. Inappropriate formats will lead to a 25% decrease in the grading.

1. The monthly water chart of a specific basin is given for a specific year. The area of the basin is  $(110+2\alpha)$  km<sup>2</sup> and the limit soil moisture is  $(165-\alpha)$  mm. Fill the blanks in the chart and calculate the monthly runoff volumes (The soil moisture at the beginning of the water year is assumed to be 0).

	<b>O</b>	<b>N</b>	<b>D</b>	<b>J</b>	<b>F</b>	<b>M</b>	<b>A</b>	<b>M</b>	<b>J</b>	<b>J</b>	<b>A</b>	<b>S</b>
<b>Up (mm)</b>	63	37	25	18	28	55	68	100	122	388	146	102
<b>P (mm)</b>	85	$75+\alpha$	$65+\alpha$	57	$62+\alpha$	78	$42+\alpha$	61	47	$34+\alpha$	$25+\alpha$	$12+\alpha$
<b>F (mm)</b>												
<b>Z (mm)</b>												
<b>Ua (mm)</b>												
<b>R (mm)</b>												
<b>V (m<sup>3</sup>)</b>												

2. The rain gauge measurements of an 8 hour storm is given below. The initial and limit infiltration capacity of soil is  $(\alpha+2)/2$  mm and  $(\alpha+4)/4$  mm, respectively. ( $k=0.4$ )
  - a. Draw the hyetograph of this storm.
  - b. Draw the standard infiltration curve (Using Horton's equation).
  - c. Obtain the infiltration rate curve.
  - d. Obtain  $\phi$  and  $w$  indices.

<b>t (hour)</b>	0	1	2	3	4	5	6	7	8
<b>P (mm)</b>									
<b>Cumulative precipitation</b>	0	5	9	18	27	35	38	40	41