CIVIL ENGINEERING FACULTY HYDRAULICS DIVISION
HYDROLOGY

Examples –3 Evapotranspiration

1. The reservoir surface area of a dam is given as 32 km^2. The daily heat energy absorbed by the reservoir is 500 kal/cm^2 and the albedo of the water surface is 10%. Calculate the daily evaporation volume in the shade (the heat variations due to the inflow and outflow will be neglected and the temperature of the reservoir will be assumed to be constant).

2. A 100 km^2 sized area near Diyarbakır is being used for the purposes given below. Considering there is no precipitation in summer months calculate how much irrigation water is needed in summer months using Blaney-Criddle formula.

Plant	Growth Area (km^2)	k (seasonal)	Month	Mean Temp. (°C)	p	U(mm)
Wheat	80	0.8	June	26	0.1008	
			July	31	0.1022	
Clover	20	0.4	August	30.2	0.0954	
			September	25	0.0839	

3. In Maden precipitation gage located in the Dicle Dam basin the precipitation values for the durations 1, 2, 3, 6, 12 and 24 hours, and for return periods 5, 10, 25, 50 and 100 years are given below. Draw the "*precipitation intensity — duration — frequency*" curve of Maden precipitation gage using this information.

Storm Duration (hour)	Return Period (year)	Total Precipitation P (mm)	Precipitation Intensity i (mm/hour)
1	5	32	
	10	38	
	25	47	
	50	51	
	100	56	
2	5	44	
	100	79	
3	5	53	
	100	96	
6	5	70	
	100	125	
12	5	82	
	100	146	
24	5	96	
	10	110	
	25	136	
	50	150	
	100	170	

4. Calculated potential evapotranspiration and measured precipitation values in Dicle Dam basin during 1971 are given in the following table. The maximum moisture that soil can hold corresponds to 100 mm precipitation and soil moisture will be assumed to be 0 at the beginning of October. Calculate the actual monthly evapotranspiration and flow depth values.

Months	O	N	D	J	F	Mr	Ap	My	Jn	Jy	Ag	S
U_p (mm) (Pot. Evapotranspiration)	100.5	24.4	3.2	19.4	13	34.6	90.5	118.4	198.3	217	200.5	160.3
P (mm) (Precipitation)	17.3	75.8	10.8	74	80.2	177.5	8.5	7.2	0	0	0	23.1
F (mm) (Change in the soil moisture)												
Z (mm) (Soil moisture at the end of month)												
U_g (mm) (Actual evapotranspiration)												
R (mm) (Flow depth)												

5. The computed potential evapotranspiration quantities and the measured monthly precipitation heights in a reservoir basin are presented in the table below. The maximum moisture which can be stored in the soil corresponds to 90 mm precipitation height and the soil moisture at the beginning of February will be taken as zero. Compute the monthly actual evapotranspiration and flow height values.

Months	February	March	April	May	June
U_p (mm) (Pot. Evapotranspiration)	20	45	80	150	200
P (mm) (Precipitation Height)	75	160	8	10	0
F (mm) (The Change in the Soil Moisture)					
Z (mm) (Soil moisture at the end of the month)					
U_g (mm) (Actual Evapotranspiration)					
R (mm) (Flow Depth)					