

科目：水文學 適用：土木所水利組

考生注意：

1. 依次序作答，只要標明題號，不必抄題。
2. 答案必須寫在答案卷上，否則不予計分。
3. 限用藍、黑色筆作答；試題須隨卷繳回。

本試題

共 1 頁

第 1 頁

編號：503

1. Discharge rates for a 2-hr unit hydrograph (
- $U(2,t)$
-) are:

Time(hr)	0	1	2	3	4	5	6
$U(2,t)(cfs)$	0	100	250	200	100	50	0

Please determine the direct runoff hydrograph for a 4-hr. storm having following excess rain amounts: (25%)

Time(hr)	0-1	1-2	2-3	3-4
Excess rain (in)	0.5	0.5	1.0	1.0

2. Please determine the hydraulic conductivity of a confined aquifer from which water is being pumped by a fully penetrating well. The aquifer is 100 ft thick, and the well is being pumped at a rate of 200 ft³/min. Water surfaces in two observation wells 700ft and 70 ft from the pumped well are 1 ft and 10ft, respectively, below the initial water level. ($\ln 10 \approx 2.3$) (25%)
3. What return period must a highway engineer use in designing a critical underpass drain to accept only a 10 percent risk that flooding will occur in the next 5 years? ($\ln 0.9 \approx -0.1054$, $e^{-0.021} \approx 0.979$) (20%)

4. Please show formula for determining the distribution parameters (mean
- $\bar{x} = 41.5$
- in, and standard deviation
- $s = 6.7$
- in) of the annual rainfall records (I) shown as follows. (10%)

Year	1906	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
I(in)	47	49	53	34	43	37	36	38	34	36	37	43	41	40	51	31	52	49	47	31	38	44	43

Assume that the annual rainfall follows Normal Distribution. Please find the rain depth that would have a recurrence interval of 100 years. (20%)

Cumulative distribution function, $F(z)$, of Normal distribution is shown as follows:

z	0.8416	1.2816	1.6449	2.33
$F(z)$	0.8	0.9	0.95	0.99