系所組別： 水利及海洋工程學系甲組

考試科目： 水文學

※ 考生請注意：本試題 ☑可 ☐不可 使用計算機

PROBLEM 1. Answer the following:

(1) What is a rating curve? [4 pts]

(2) What are the major controlling factors defining actual runoff? [4 pts]

(3) What is the hysteresis effect in soil and water characteristic? [4 pts]

(4) What is baseflow? What does baseflow represent? [4 pts]

(5) What is the stationarity? How does it apply to hydrological data? [4 pts]

PROBLEM 2. Given the following information for a watershed:

Rainfall from 1 May to 1 October	=	350 mm
Soil water content: 1 May	=	200 mm
Soil water content: 1 October	=	145 mm
Streamflow from 1 May to 1 October	=	85 mm
GW Leakage from the watershed	=	0 mm
GW Leakage into the watershed	=	0 mm

Please calculate a water budget for the period 1 May to 1 October to estimate evapotranspiration losses. [6 pts]

PROBLEM 3. The S-hydrograph tabulated below is for a watershed of area 59.4 km^2:

Time (h)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5
S Hydrograph (m^3/s/cm)	40	160	250	320	370	405	425	435	440	440	440

What is the direct runoff hydrograph (DRH) that would be observed from the following effective rainfall hyetograph (ERH)? [24 pts]

Time (h)	0~1.5	1.5~3.0	3.0~4.5
ERH (cm/h)	0.25	1.50	0.75
Rainfall (cm)	0.375	2.250	1.125

PROBLEM 4.

What are the differences between deterministic hydrologic models and stochastic hydrologic models? [10 pts]

(背面仍有題目,請繼續作答)

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PROBLEM 5. Cofferdam design:

A cofferdam has been built to protect a fruit farm area in Yu-Jing District, Tainan City until a major channel project can be completed. The cofferdam was built for the 20-yr flood event. The channel project will require 3 years to complete. Hence, what are the probabilities that

(1) the cofferdam will not be overtopped during the 3 years (the reliability)? [5 pts]

(2) the cofferdam will be overtopped exactly once in 3 years? [5 pts]

PROBLEM 6. A rainfall event tabulated below is for a watershed of area 50 km^2:

Time (h)	0~0.5	0.5~1.0	1.0~1.5	1.5~2.0	2.0~2.5	2.5~3.0
Intensity (mm/h)	60	30	90	70	50	20

(1) What is the total rainfall (mm)? [5 pts]

(2) If the net rainfall is 55 mm, please calculate the Φ index of the watershed. [5 pts]

PROBLEM 7. The inflow of a reservoir:

Time (min)	0	15	30	45	60	75
Inflow (m^3/s)	0	40	75	60	30	0

If $S_0 = 5$ (m^3/s-hr) at T_0 and $O = 0.8 * S$. (O: outflow (m^3/s); S: storage (m^3/s-hr))

What is the outflow in 2 hours? [20 pts]