※ 考生請注意：本試題不可使用計算機。　請於答案卷(卡)作答，於本試題紙上作答者，不予計分。

1. Short answers (please explain what they are):
   (a). Rational Method. (4 %)
   (b). Confined aquifer. (4 %)
   (c). Field capacity. (4 %)
   (d). Flow duration curve (4 %)
   (e). Extreme value distribution (4 %)

2. What are the basic assumptions of the Unit Hydrograph? (10 %)

3. The direct runoff hydrograph (DRH) of a watershed tabulated below is from the effective rainfall hyetograph (ERH) tabulated below:

Time (hr)	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0
DRH (m^3/s)	75	270	435	480	650	615	590	575	460	320	200	170	40	20

Time (hr)	0~2	2~4
ERH (cm)	3.0	2.0

   (a). What is the unit hydrograph (1cm, 2hr)? (8 %)
   (b). What is the area of the watershed? (5 %)
   (c). The next day, if another ERH tabulated below happens in the same watershed, what is the new DRH?(12 %)

Time (hr)	0~1.5	1.5~3
ERH (cm)	3.0	6.0

4. Assume the annual one-day maximum rainfall data (1965-2014) of Tainan Station fits the normal distribution. The mean and standard deviation of the annual one-day maximum rainfall are 385 mm and 125 mm, respectively. What is the designed rainfall of a 2-year event? (10 %)

5. The inflow hydrograph of a reservoir is tabulated below:

Time (mins) t	0	15	30	45	60	75
Inflow (m^3/s)	0	30	60	40	20	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 1.5 hours? (15 %)

6. The rainfall and direct runoff data of a watershed (area: 18 Km^2) tabulated below. Please estimate the Φ-index. (10 %)

Time (hr)	1	2	3	4	5	6	7
Rainfall (mm)	8	32	23	15	5	0	0
Direct runoff (m^3/s)	0	40	70	40	30	20	0

7. Please explain the difference between Hortonian overland flow and saturated overland flow. (10 %)