編號： 105

國立成功大學 108 學年度碩士班招生考試試題

系　　所：水利及海洋工程學系

考試科目：水文學

考試日期：0223，節次：3

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

(1) Please explain following terms

(a) Probable maximum precipitation (PMP) (4 points)

(b) Intensity-duration-frequency curve (IDF curve) (4 points)

(c) Hysteresis of discharge rating curve (4 points)

(d) Suction head (4 points)

(e) Return period (4 points)

(2) A detention pond has a relationship between storage S and outflow Q as $S = KQ$. The inflow hydrography during a rainfall event is listed in the following table:

Time(hr)	0	1	2	3	4	5	6	7	8	9	10	11	12
Inflow (cms)	0	10	20	40	60	90	140	120	80	40	30	20	10

(a) If $K = 1.5\ hr$, please calculate the outflow hydrography using level pool routing (水庫演算) (10 points)

(b) If the peak outflow must be under $60\ cms$ to prevent flooding at downstream, please determine the minimum K required (10 points)

(3) A 15cm diameter pumping well penetrating vertically through a confined aquifer with 30m thickness and hydraulic conductivity 10m/day. If the well has a drawdown of 2 m and a radius of influence of 300m.

(a) Please determine the pumping discharge. (10 points)

(b) If the pumping discharge increases by 25%, please determine the well diameter required to maintain the same drawdown. (10 points)

(4) For a developing region, the runoff coefficients (C) and the areas before/after development under different land uses are listed in the following table. The rainfall intensity for this region is $i(\mathrm{mm/hr}) = 8606/[\mathrm{t(min)} + 49.14]$. If the concentration time is 15 min before development and reduces to 10 min after development, please determine the increase in peak discharge after development using rational method ($Q = CIA$). (20 points)

	Residential area $(C = 0.5)$	Commercial area $(C = 0.7)$	Green land $(C = 0.2)$
Before development	$2\ km^2$	$1\ km^2$	$7\ km^2$
After development	$4\ km^2$	$3\ km^2$	$3\ km^2$

(5) A village is protected by a dike system designed to defense flooding under 25 year return period. The dike system is built to last for 50 years and has been completed 10 years ago.

(a) Please determine the probability that this village experiences two years of flooding in the last 10 years. (10 points)

(b) Please determine the probability of flooding in the upcoming 40 years. (10 points)