

所別：水文與海洋科學研究所碩士班不分組(一般生)

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科目：水文學 (含地表水, 地下水)

本科考試禁用計算器

*請在試卷答案卷(卡)內作答

1. (35%) Define and explain the following terms
 - (A) Residence Time (5%)
 - (B) Capillary Fringe (Hint: in subsurface) (5%)
 - (C) Throughfall (5%)
 - (D) Runoff Coefficient (Hint: in the Rational formula) (5%)
 - (E) Confined Aquifer (5%)
 - (F) Transpiration (5%)
 - (G) Percolation (5%)
2. (15%) Describe the temporal and spatial rainfall characteristics in Taiwan and how these features affect the water resources management in this island
3. (10%) Given a watershed having 4 rainfall stations, A, B, C, and D. On a particular day at station C, daily precipitation data is missing. By knowing annual-average precipitations at all 4 stations and observed daily precipitations at stations A, B, and D on that particular day, describe **at least two methods** to estimate the missing daily precipitation at station C.
4. (10%) Describe how logging (i.e., tree removal) might affect the following hydrological processes: (a) direct runoff (2%), (b) interception (2%), (c) evapotranspiration (2%), (d) peak discharge (2%), (e) lag time (2%).
5. (10%) Describe the Darcy's law and its limitation. Define variables with units.
6. (10%) Using the derived 2-hr unit hydrograph in the following table, determine the direct runoff hydrograph for a 4-hr storm having excess rainfall amounts in the table.

Excess rainfall

Time (hr)	1	2	3	4
Excess rain, in	1.0	1.0	2.0	2.0

2-hr unit hydrograph

Time (hr)	0	1	2	3	4	5
Q (cfs)	0	120	180	200	100	0

參考用

7. (10%) Given a soil sample with air volume, $V_a = 10 \text{ cm}^3$, water volume, $V_w = 30 \text{ cm}^3$, and particle volume, $V_m = 60 \text{ cm}^3$. Assuming the particle density is 2.5 g/cm^3 , air mass is negligible, and the water density is 1 g/cm^3 . Compute (a) porosity (2.5%), (b) volumetric water content (2.5%), (c) bulk density (2.5%), and (d) degree of saturation (2.5%).