

淡江大學九十二學年度轉學生招生考試試題

系別：航太工程學系三年級

科目：流體力學

准帶項目請打「○」否則打「×」	
○	簡單型計算機

本試題共 / 頁

一、解釋名詞及簡答題：

- (1) "Fluid"之定義為何(definition of Fluid)? 什麼是"continuum" flow? (8分)
- (2) 什麼是"Lagrangian method of description"? 什麼是"Eulerian method of description"? (8分)
- (3) 什麼是"boundary layer"? boundary layer 內速度分佈有何特性? (8分)
- (4) 什麼是"Reynolds number"? 為何在流體力學中 Reynolds number 是一重要參數? (8分)
- (5) 在 internal flow 中, 什麼是"entrance region"? 在 entrance region 之速度分佈有何特性? 什麼是"fully developed region"? 在 fully developed region 之速度分佈有何特性? (12分)

二、計算題：(16分)

For the velocity fields given below, determine:

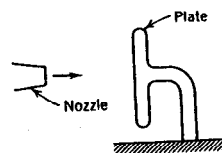
- (a) whether the flow is one-, two-, or three-dimensional, and why.
 - (b) whether the flow is steady or unsteady, and why.
- (The quantities a, b and c are constants)

(1) $\vec{v} = [ay^2e^{-bx}] \vec{j}$ (2) $\vec{v} = ax^2 \vec{i} + bxz \vec{j}$

(3) $\vec{v} = ax \vec{i} + by^2 \vec{j} + cxyz \vec{k}$ (4) $\vec{v} = ax \vec{i} + (t-by) \vec{j}$

三、計算題：(20分)

Water from a stationary nozzle strikes a flat plate as shown. The velocity of the water leaving the nozzle is 15 m/s; the nozzle area is 0.01 m². Assuming the water is directed normal to the plate, and flows along the plate, determine the horizontal force on the support.



四、計算題：(20分)

The pressure drop, Δp , for steady, incompressible viscous flow through a straight horizontal pipe depends on the pipe length, l , the average velocity, V , the fluid viscosity, μ , the pipe diameter, D , the fluid density, ρ , and the average "roughness" height, e . Determine a set of dimensionless groups can be used to correlate data.