淡江大學 95 學年度碩士班招生考試試題

80

系別：航空太空工程學系　　科目：流　體　力　學

准帶項目請打「V」
V	簡單型計算機

本試題共 1 頁

1. What is Newtonian fluid? Name a fluid which is a Newtonian fluid. What is non-Newtonian fluid? Name a fluid which is a non-Newtonian fluid. 10%
2. What are static, stagnation, and dynamic pressures? Give examples where we can measure these pressures (舉例說明可以量測到這些壓力的實際例子). 10%
3. 測量流體速度的方法有許多種，說明一種你了解的方法，將這種速度量測工具的圖畫出來並解釋其工作原理。 10%
4. We often use the Bernoulli equation, $\frac{p}{\rho}+\frac{V^2}{2}+gz=\text{constant}$, to solve engineering problems. What are the assumptions used in deriving this equation. Give an example problem, which can be solved by this equation. 10%
5. 流體流過一個平板時其速度邊界層開始時是層流，後來逐漸演變成紊流邊界層，(1)請畫出一個在層流邊界層內與平板垂直的速度分布圖 (2) 請畫出一個在紊流邊界層內與平板垂直的速度分布圖 (3) 這兩個速度分布圖有何差異？解釋其原因。 15%
6. 流經飛機機翼上的流場在機翼攻角過高時會造成分離，流場分離會使得機翼升力下降阻力增加，解釋爲何攻角過高時會造成流場分離？ 15%
7. Determine the family of stream functions that will yield the velocity field $\vec{V}=(x^2-y^2)\vec{i}-2xy\vec{j}$. 15%
8. A shallow circular dish has a sharp-edged orifice at its center. A water jet of speed V, strikes the dish concentrically. Obtain an expression for the external force needed to hold the dish in place if the jet issuing from the orifice also has speed V. Evaluate the force for V=5 m/sec, D=100 mm, and d=20 mm. 15%