淡江大學九十學年度日間部轉學生招生考試試題

系別：航空太空工程學系三年級

科目：流 體 力 學

1. 請寫出不可壓縮流的 Bernoulli equation，解釋每一項的物理意義，並說明在什麼條件下我們可使用這一條方程式。　　　10%

2. 什麼是 boundary-layer，說明它的重要性及應用。　　　10%

3. 寫出 Reynolds number 的定義，說明它的重要性及應用。　　　10%

4. 什麼是 dimensional analysis，舉例說明它的重要性及應用。　10%

5. A crude accelerometer (加速計) can be made from a liquid-filled U-tube as shown. Derive an expression for the acceleration $\vec{a}$, in terms of liquid level difference h, tube geometry, and fluid properties. 20%
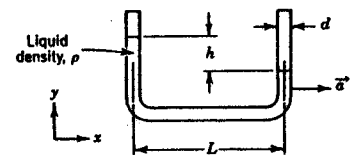
6. A large tank is fixed to a cart as shown. Water issues from the tank through a 600 mm^2 nozzle at a speed of 10 m/s. The water level in the tank is maintained constant by adding water through a vertical pipe. Determine the tension (張力) in the wire holding the cart stationary. 20%
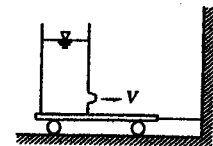
7. A U-tube acts as a water siphon (虹吸管). The bend on the tube is 1 m above the water surface; the tube outlet is 7 m below the water surface. The fluid issues from the bottom of the siphon as a free jet at atmospheric pressure (大氣壓力). Assuming the flow is frictionless and the tank is large compared with the pipe, determine the speed of the free jet (section 2) and the absolute pressure at section A. The magnitude of atmospheric pressure is $1.01\times10^5 \frac{N}{m^2}$. 20%