

淡江大學 97 學年度轉學生招生考試試題

系別：水資源及環境工程學系三年級

科目：流體力學

可否使用計算機		
可	✓	否

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1. The velocity distribution for a two-dimensional incompressible flow is given by

$$u = \frac{-x}{x^2+y^2}, \quad v = \frac{-y}{x^2+y^2}$$

show that it satisfies continuity (25%)

2. Oil through a 25 mm diameter pipe with a mean velocity of 0.3 m/s, Given that

$$\mu = 4.8 \times 10^{-2} \text{ kg/ms and } \rho = 800 \text{ kg/m}^3$$

calculate the pressure drop in a 45 m length.

(25%)

3. The two-dimensional stream function for a flow is $\psi = 9 + 6x - 4y + 7xy$. Find the velocity potential.

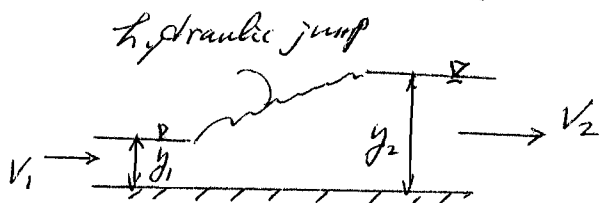
(25%)

4. Derive :

$$y_2 = \frac{-y_1}{2} + \sqrt{\left(\frac{y_1}{2}\right)^2 + \frac{2V_1^2 y_1}{g}}$$

$$h_j = \frac{(y_2 - y_1)^3}{4y_1 y_2}$$

where h_j is losses due to the hydraulic jump



(25%)