

國立中興大學

110 學年度

碩士班考試入學招生

試 題

學系：土木工程學系 乙組

科目名稱：流體力學

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本科目可以使用計算機

本科目試題共 1 頁

1. Find the Mass-Length-time dimensions of the below quantities. (For example, the M-L-t dimension of "acceleration" is $[M^0 L^1 t^{-2}]$.) You must explain how the answers are obtained to get full credits. (20%)

(1) Kinematic viscosity (10%)

(2) Power (10%)

2. Write down the Bernoulli's equation for ideal-fluid flows in terms of heads. Explain the meanings of each term. Also, describe how this relationship is applied to two different locations in an irrotational and a rotational flow fields. (20%)

3. Explain physically/mathematically the following terms. (20%)

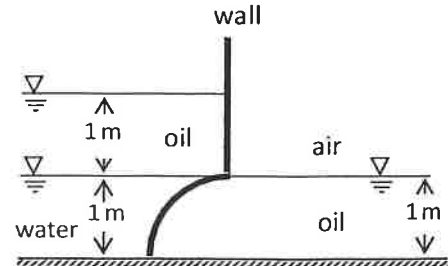
(1) Reynolds number (5%)

(2) Hydraulic jump (5%)

(3) Pathline (5%)

(4) Vorticity (5%)

4. Find the force on the wall (magnitude and direction) in N/m of the two-dimensional static problem. (20%)
 $(S.G.)_{oil} = 0.8$; $g = 9.81 \text{ m/sec}^2$; $\rho_{water} = 1000 \text{ kg/m}^3$.



5. Water ($\rho=1000 \text{ kg/m}^3$) flow steadily through a horizontal converging round duct. The manometer fluid is mercury (S.G.=13.6). Neglect friction and use 1-D analysis, (20%)

(1) Find the volumetric flow rate (in m^3/s). (10%)

(2) Evaluate the horizontal force on the contraction (the part between section ① and section ②) in *Newtons*. (10%)

