國立中興大學

109 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

109學年度碩士班招生考試試題

科目：流體力學　　系所：土木工程學系 乙組

本科目可以使用計算機　　本科目試題共 1 頁

In all the problems, use **(gravity)** $g=9.81\ m/sec^2$ and **(density of water)** $\rho_{water}=1000\ kg/m^3$.

1. Use **M** (Mass), **L** (Length) and **t** (time) to represent the following physical quantities. For example, the answer for "**velocity**" is [$\mathbf{L\,t^{-1}}$]. (Note: ***You must explain how the results are obtained to get full credits.*** (10%)
   (1) Power (5%)
   (2) Surface tension (5%)

2. Explain the following terms physically and/or mathematically. (40%)
   (1) Bernoulli's equation (in terms of pressures) (8%)
   (2) Reynolds number and Froude number (8%)
   (3) Incompressible flows and Irrotational flows (8%)
   (4) Path line and Streamline (8%)
   (5) Two-dimensional flows and Steady flows (8%)

3. In a two-dimensional static problem as shown in Figure P3. The specific gravity of oil is 0.8 . Calculate the force on the circular cylinder in *N/m* (including ***magnitude*** and ***direction***). (25%)

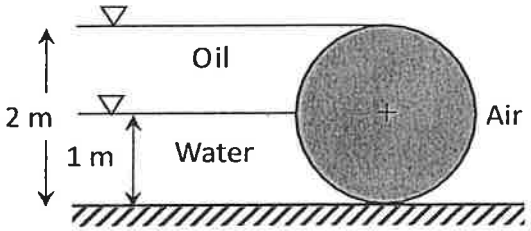

Figure P3

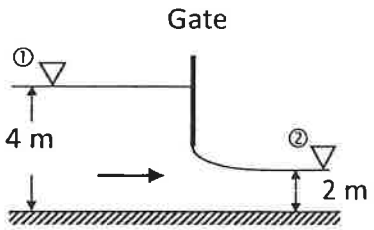

Figure P4

4. In a two-dimensional steady water flow as shown in Figure P4, sections ① and ② are far away from the gate. Neglect friction, evaluate the volumetric flow rate (in $m^3/sec/m$) and the force on the gate (in *N/m*). (25%)