

國立嘉義大學 104 學年度

土木與水資源工程學系碩士班（乙組）招生考試試題

科目：流體力學(可使用工程計算機，如條件不足，請自行做合理假設。)

1. A layer of water flows down an inclined fixed surface with the velocity profile shown in Fig. 1. Determine the magnitude of shearing stress that water exerts on the fixed surface for $U = 4 \text{ m/s}$ and $h = 0.3\text{m}$. (20%).

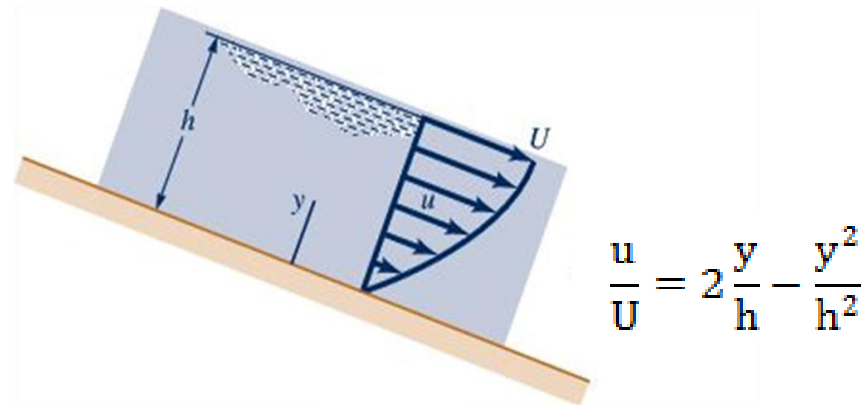


Fig. 1

2. A tank containing water to a depth of 2.5m is accelerated upward at 3.6m/s^2 . Calculate the pressure on the bottom of the tank. (20%).
3. Assuming ideal flow in a horizontal plane, calculate the magnitude and direction of the resultant force on the stationary blade in Fig. 2, knowing that $V_j=12\text{m/s}$ and $D_j=150\text{mm}$. Note that the jet is divided by the splitter so that one-third of the water is diverted toward A. (20%).

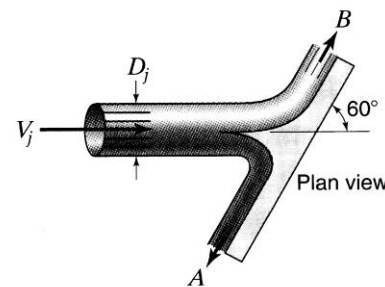


Fig. 2

4. (a) Please write the Navier-Stokes equations for the flow of a Newtonian incompressible fluid with constant viscosity, and explain the physical meaning of each term. (10%).
 (b) What's the Reynold number? Explain the meaning of Reynold number. (10%).
5. (a) What is form drag? How to reduce the form drag? (10%).
 (b) What is inviscid flow? Should the viscosity necessarily be zero for the inviscid flow? (10%).