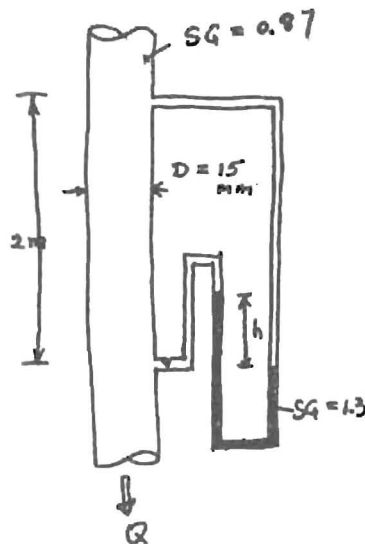
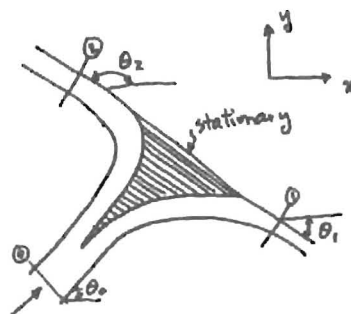


※ 考生請注意：本試題  可  不可 使用計算機

1. (20 pts) Oil of  $SG = 0.87$  and a kinematic viscosity  $\nu = 2.2 \times 10^{-4} \text{ m}^2/\text{s}$  flows through the vertical pipe at a rate of  $5 \times 10^{-4} \text{ m}^3/\text{s}$  with a major head loss. Determine the manometer reading  $h$ .



2. (20 pts) Glycerin at  $20^\circ\text{C}$  flows with a velocity of  $25 \text{ m/s}$  through a  $30\text{-mm}$ -diameter tube. A model of this system is to be developed using standard air as the model fluid. The air velocity is to be  $0.5 \text{ m/s}$ . What tube diameter is required for the model if dynamic similarity is to be maintained between model and prototype?
3. (20 pts) For the flow divider and three jets, please find the force components ( $F_x$  and  $F_y$ ) for the following conditions:  $Q_0 = 0.01 \text{ m}^3/\text{s}$ ,  $Q_1 = 0.003 \text{ m}^3/\text{s}$ ,  $\theta_0 = 45^\circ$ ,  $\theta_1 = 30^\circ$ ,  $\theta_2 = 120^\circ$ ,  $V_0 = 10 \text{ m/s}$ , density  $\rho = 830 \text{ kg/m}^3$ .



(背面仍有題目,請繼續作答)

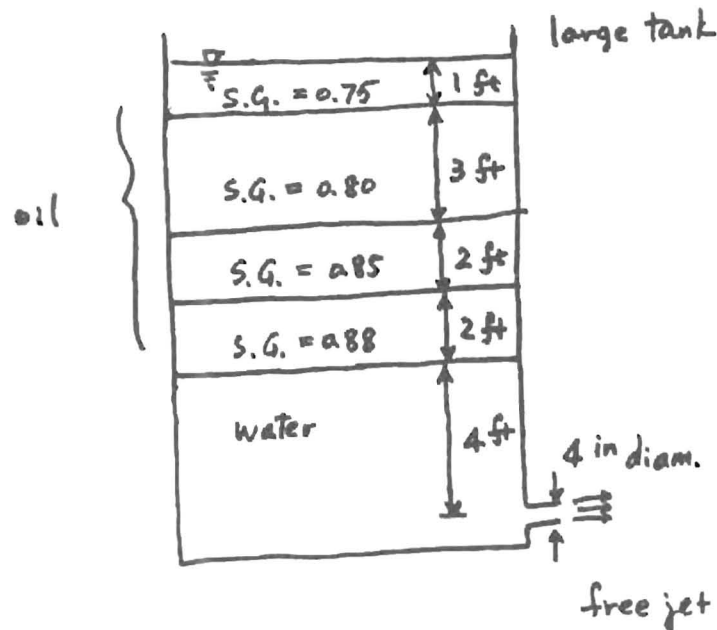
系所組別： 水利及海洋工程學系甲、乙組

考試科目： 流體力學

考試日期： 0219， 節次： 2

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4. (20 pts) Neglecting losses, determine the discharge.



5. (20 pts) For laminar flow of a fluid past a thin plate, develop an expression for the thickness  $\delta$  ( $= \sqrt{\frac{30\mu x}{\rho V}}$ ) of the boundary layer, assuming that the velocity distribution equation is  $v = V(\frac{2y}{\delta} - \frac{y^2}{\delta^2})$ . ( $\mu$  denotes dynamic viscosity)

