1. Please explain and following items: (10%)
   (1). Ideal Fluid and Perfect Gas (2). Absolute Viscosity and Kinematic Viscosity   (3). Rapid Flow and Tranquil Flow
   (4). Laminar Boundary Layer and Turbulent Boundary layer
   (5). Internal Flow and External Flow

2. A Newtonian fluid is in the clearance between a shaft and a concentric sleeve. When a force of 890 N is applied to the sleeve parallel to the shaft, the sleeve attains a speed of 97 m/min. If a 1780-N force is applied, what speed will the sleeve attain? The temperature of the sleeve remain constant. (10%)

3. What is the bulk modulus of elasticity of a lquid that has a density increase of 0.015 percent for a pressure increase of 3,000 lb/ft? (10%)

4. Based on the Stokes' law, please draw a figure and derive the equation for the $U = D^2(\gamma_s - \gamma)/18\mu$ (10%)

5. For $q = i(2x+y) + j(y+3z) + k(3x^2+2y^2+z^2)$ find the components of rotation at (1,2,3)   (10%)

6. A velocity potential in two-dimensional flow is $\phi = 3x+3y+4x^2-5y^2$, Find the stream function for this flow.   (10%)

7. $F(\Delta H_f/L, V, D, \rho, \mu, g, \varepsilon, \varepsilon', m) = 0$.   Please derive the Darcy-Weisbach Equations by using the Dimensional Analysis. (10%)

8. Please draw a figure and derive the equations of flow rate for V-notch Weir (10%)

9. Please draw a figure and derive that the hydrostatic law of variation of pressure is frequently written in the form
   $$P = \gamma h \qquad (10\%)$$

10. Please draw the figures of both control volume and system for a fluid flow and derive the equation of continuity Equation
    $(A_1V_1 = A_2V_2)$. (10%)