1. Please try to use the concepts of both control volume and average wall shear stress, draw a figure and derive the following equations (20%)
   (1). Chézy Formula
   (2). Darcy-Weisbach Equation
   (3). Manning Formula.

2. (1). Please draw a figure of pipes in series, make reasonable assumptions and describe the steps for solving flow rate and average velocities of a fluid in each pipe. (10%)
   (2). Please draw the figure of branching pipe system with three reservoirs, make reasonable assumptions and describe the steps for solving flow rates, and average velocities of a fluid in each pipe. (10%)

3. Please draw the figures of both control volume and system for a fluid flow, make reasonable assumptions and derive the Continuity Equation ($A_1V_1 = A_2V_2$). (20%)

4. Please draw a figure, make reasonable assumptions of hydraulic jump and derive the following equations:
   (1). The equation of conjugate depths $y_1 = f(y_2)$; (10%)
   (2). The equation of head loss $h_f = f(y_1, y_2)$ (10%).

5. Please draw a figure, describe the parts in the figure and explain how to measure the viscosity of a fluid. (20%).