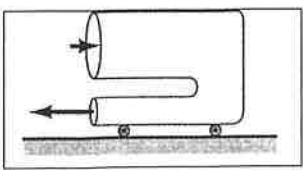
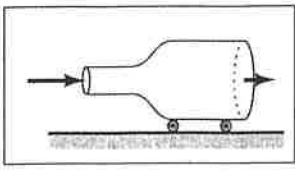


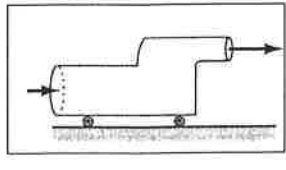
1. For each pair of terms, **explain** and/or **relate** them. (每小題 5%，計 50%)
 - (1) Bernoulli equation and Energy line
 - (2) Path line and Lagrangian view
 - (3) Reynolds number and Turbulent flows
 - (4) Absolute viscosity and Newtonian fluids
 - (5) Steady flows and Two-dimensional flows
 - (6) Weir and Dam
 - (7) Stagnation point and Pitot tube
 - (8) Froude Number and Hydraulic jump
 - (9) Vapor pressure and Cavitation
 - (10) Incompressible flows and Continuity equation
2. A velocity field is given by $\vec{V} = (V_o / L)(-x\vec{i} + y\vec{j})$, where V_o and L are constants. (每小題 5%，計 20%)
 - (1) Determine the equation of the streamlines for this flow.
 - (2) Plot the streamlines for $x \geq 0$, and draw some velocity vectors at representative locations.
 - (3) Determine the acceleration at $(x, y) = (1, 1)$.
 - (4) Determine the dynamic pressure at $(x, y) = (1, 1)$.
3. The following three devices rest on frictionless wheels are restricted to move in the *horizontal* direction only, and are initially held stationary. The content of each device is water. The pressure at the inlets and outlets of each device is atmospheric. The arrows shown in figure represent the velocity vectors. When released, determine each device will move to the right or to the left? You have to explain your answers. (每小題 5%，計 15%)



(1)



(2)



(3)
4. A model of a spillway is to be built at 1/64 scale. (每小題 5%，計 15%)
 - (1) If the prototype has a discharge of $800 \text{ m}^3/\text{s}$, what must be the water discharge in the model to ensure dynamic similarity?
 - (2) The total force on part of the model per unit width is found to be 5 N/m . To what prototype force does this correspond?
 - (3) What operating time for the model corresponds to a 24-hour period in the prototype?