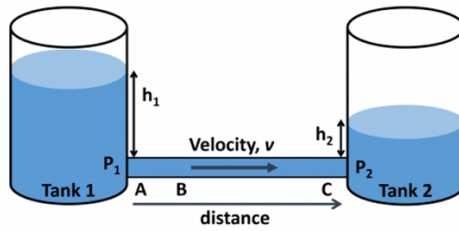# Fluid Mechanics Questions
Hydraulic Loss

Q1:

Water flows through a pipe from Tank 1 to Tank 2. The water level in each tank is indicated at an instance in time. Assuming steady-state flow, select the correct graph of velocity versus distance down the pipe.

a.

b.

c.

d.

e.

Because...
   a. The velocity increases near the pipe entrance because of the pressure gradient, but accelerates slowly at the pipe exit because of friction.
   b. The velocity increases down the pipe because of the pressure gradient.
   c. The force of friction reduces the velocity of the liquid.
   d. The cross sectional area is constant, thus the velocity is constant to conserve mass.
   e. The velocity decreases near the pipe entrance due to friction and then decelerates since friction is reduced when it moves slower.

Q2:

Excessive pressure (head) losses are observed in a section of piping with constant diameter. Select the option that could be explored to reduce the head losses in the piping section, assuming turbulent flow
   a. Increase the fluid velocity
   b. Decrease the pipe diameter
   c. Increase the pipe diameter
   d. Use a piping material with a higher relative roughness to decrease the friction factor

Q3:

Below is a steady state system where fluid is flowing from a tank with a constant liquid height, h, at some pressure, P, through a pipe to the atmosphere. What is the relationship between pressure and distance in the pipe?


a.

b.

c.

d.

e.
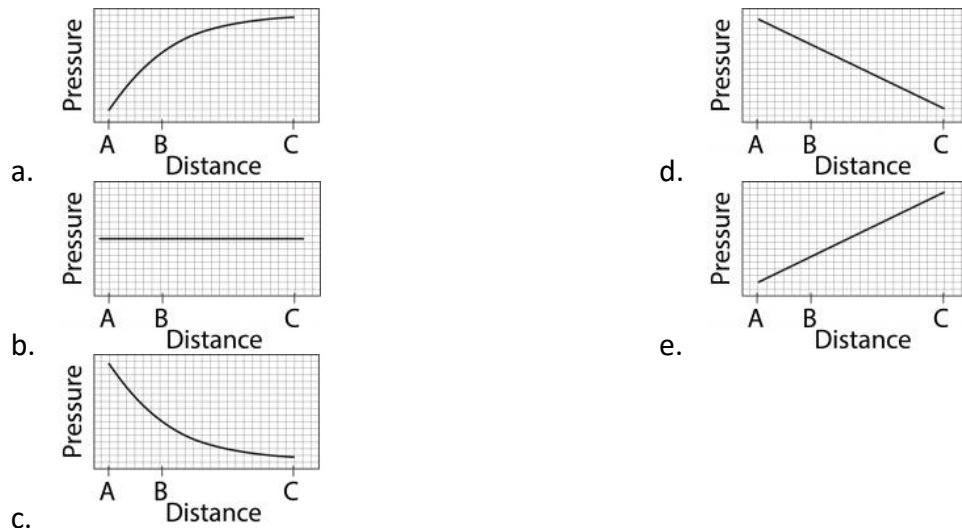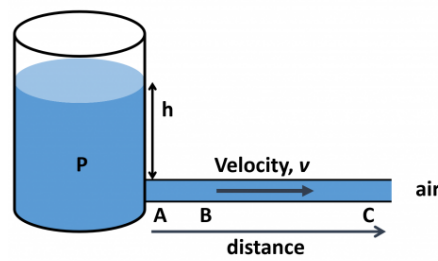
Because…
   a. Frictional losses within the pipe will decrease velocity nonlinearly, so pressure must also decrease nonlinearly.
   b. Frictional losses within the pipe will decrease pressure linearly.
   c. The fluid is not accelerating, so the pressure must be constant.
   d. Frictional losses within the pipe will increase pressure.
   e. The fluid speeds up through the pipe, so pressure must decrease.

Q4:
Imagine fluid flowing inside the coil shown below. Assuming the coil has a constant diameter, what would happen to the fluid velocity as the fluid flows from the top to the bottom of the coil?
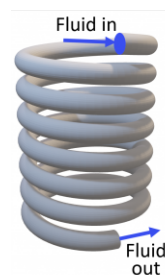
   a. The velocity will increase because the fluid is flowing downwards and is driven by gravity
   b. The velocity will remain constant because the pipe has a constant diameter and mass must be conserved

c. The velocity will decrease because of friction on the pipe walls
d. The velocity will remain constant because the increase in velocity due to gravitational forces is counterbalanced by the decrease due to friction