17. Water flows through a pipe and enters a section where the cross sectional area is larger. Viscosity, friction, and gravitational effects are negligible. Circle the letter of the correct statement about the change in pressure $p$ and average velocity $V$.

A  $P_2$ is less than $P_1$ and $V_2$ is less than $V_1$
B  $P_2$ is less than $P_1$ and $V_2$ is greater than $V_1$
C  $P_2$ is greater than $P_1$ and $V_2$ is less than $V_1$
D  $P_2$ is greater than $P_1$ and $V_2$ is greater than $V_1$
23. Water flows vertically down through a pipe and enters a section where the cross sectional area is larger. Viscosity and pipe friction effects are negligible but gravitational effects are not negligible. Circle the letter of the correct statement about the pressure $P_2$ and velocity $V_2$.

A. $P_2$ equals $P_1$ and $V_2$ equals $V_1$
B. $P_2$ is greater than $P_1$ and the $V_2$ is greater than $V_1$
C. $P_2$ is greater than $P_1$ and the $V_2$ is less than $V_1$
D. $P_2$ is less than $P_1$ and the $V_2$ is greater than $V_1$
E. $P_2$ is less than $P_1$ and the $V_2$ is less than $V_1$
10. Pitot tubes are placed in two ducts in which air flows as shown below. The density and temperature of the flows are equal. The dynamic (velocity) pressure and the static pressure taps are connected to two manometers. The pressure difference for duct A is 2” of water and that for Duct B is 4” of water. Circle the correct answer for the velocity $V_A$ in duct A relative to the velocity $V_B$ in duct B.

A. $V_B$ equals $2V_A$
B. $V_B$ equals $\sqrt{2}V_A$
C. $V_B$ equals $V_A$
D. $V_B$ equals $V_A/\sqrt{2}$
E. $V_B$ equals $V_A/2$
6. Two fluid jets are pointed at surfaces as shown in the figures below. The fluids are incompressible, and the effects of gravity can be neglected. The mass flow rate and the velocity of the jets are identical. The cross section area of the jets does not change significantly as the fluid flows. Circle the letter of the correct statement regarding the horizontal forces.

A. \( F_1 \) equals 2 \( F_2 \)
B. \( F_1 \) is greater than 0 and \( F_2 \) equals 0
C. \( F_1 \) equals \( F_2/2 \)
D. \( F_1 \) equals 0 and \( F_2 \) is greater than 0
E. \( F_1 \) equals \( F_2 \)
25. Two fluid jets are pointed at surfaces on the two carts as shown in the figures below. The fluids are incompressible, the effects of gravity can be neglected, the mass flow rate and the velocity of the jets are identical and the cross section area of the jets does not change as the fluid flows. The carts move with a steady velocity in the directions shown below. The jet velocity is greater than the cart speed. Circle the letter of the correct statement.

A  $F_1$ is greater than $F_2$
B  $F_1$ equals 0 and $F_2$ is greater than 0
C  $F_1$ is less than $F_2$
D  $F_1$ equals $F_2$ and both equal 0
E  $F_1$ equals $F_2$