Physics 231 - 27-Oct-99

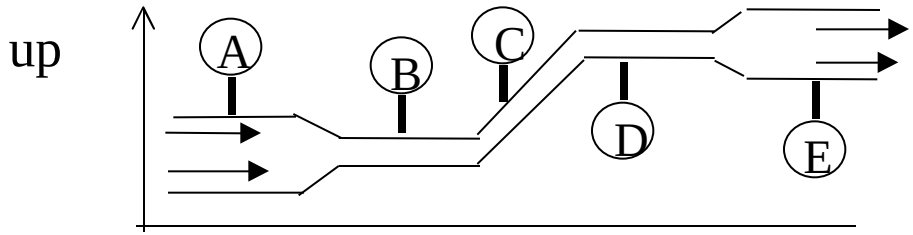
- Announcements
- Bernoulli's Theorem
- Viscous Flow
- Turbulent Flow
- Quiz

Bernoulli's Theorem

- Continuity Equation
- Energy Conservation
- Examples
  - Torricelli Result
  - Venturi Tubes
  - Airfoils

Problem from Spring Midterm

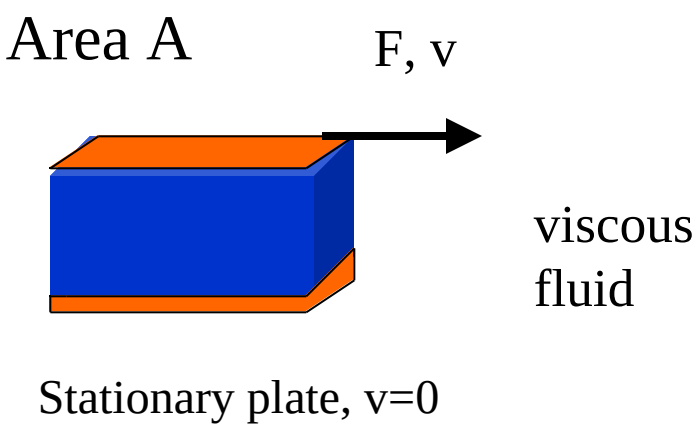
- An incompressible fluid flows through system below. Where is the pressure the lowest?
- $P + 1/2\ \rho v^2 + \rho g h = \text{constant}$



Turbulent Flow

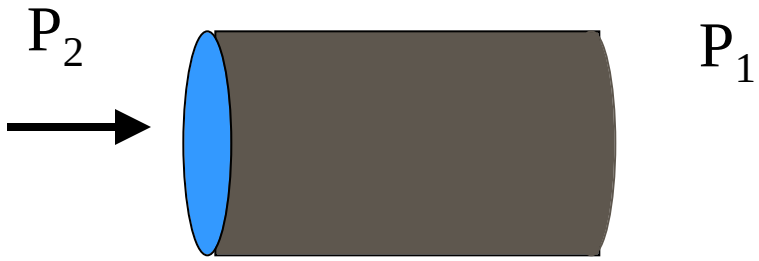
- Viscosity

$$F = (\eta A v)/y$$



Poiseuille's Equation

- Viscous flow in a pipe



- $Q = \pi R^4(P_2-P_1)/(8\eta L)\ m^3/s$

Q1 - Answer = c

Q2 - Problem A - Last name A-K

Water flows smoothly with speed v_1 from a tube with diameter d to a larger one with diameter D where its speed is v_2. Pressure in the tubes is measured by gauges P_1 and P_2. Which of the following statements is most nearly correct? (ρ is density of water)

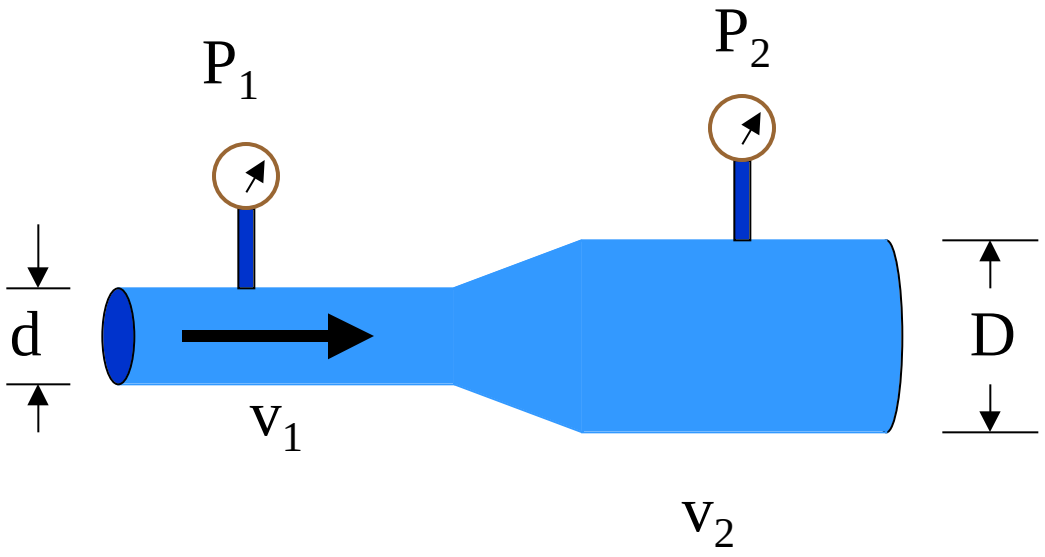
A. $P_1 < P_2$

B. $v_1 > v_2$

C. $P_1 v_1 = P_2 v_2$

D. $1/2\rho v_1^2 = 1/2\rho v_2^2$

E. none of the above is true



Q1 - Answer = c
Q2 - Problem B - Last Name L-Z

- Water flows smoothly with speed v_1 from a tube with diameter D to a smaller one with diameter d where its speed is v_2. Pressure in the tubes is measured by gauges P_1 and P_2. Which of the following statements is most nearly correct? (ρ is density of water)

A. $v_2 < v_1$

B. $P_2 < P_1$

C. $1/2\ \rho v_1^2 = 1/2\ \rho v_2^2$

D. $P_1/v_1 = P_2/v_2$

E. none of above is true