Problems

1-1. What are the dimensions of: pressure p; velocity V; acceleration a; specific weight γ; and mass density ρ? _for both L-T-F & L-T-M._

1-2. Verify that each of the following terms is dimensionally equivalent to length: velocity head $V^2/2g$, and pressure head p/γ.

1-3. Determine the physical dimensions of C in the Chezy equation $V = C\sqrt{RS}$, where, V is velocity, R is hydraulic radius and has the dimension L, and S is slope which is a ratio of lengths.

1-8. Calculate the physical dimensions of the following combinations of terms: the Reynolds number $\mathrm{Re} = VD/v$; the Froude number $\mathrm{Fr} = V/\sqrt{gy}$; and the Mach number, $\mathrm{Ma} = V/\sqrt{E/\rho}$.

1-11. Assuming C, f, and S are dimensionless terms, which of the following equations are not dimensionally homogeneous: **(a)** $F = Ma$; **(b)** $V = C\sqrt{RS}$; **(c)** $h_f = f\dfrac{L}{D}\dfrac{V^2}{2g}$; and **(d)** $\dfrac{V_1^2}{2g} + \dfrac{p_1}{\gamma} + z_1 = \dfrac{V_2^2}{2g} + \dfrac{p_2}{\gamma} + z_2.$

_h_f is L and D = Dia_

due Monday Jan. 9th