CE 3305 Fluid Mechanics
Spring 2014 Quiz 24

1. A paratrooper and parachute weigh 900N. What is their rate of descent if the deployed parachute is 7 meters in diameter and the density of air is 1.2 $\frac{kg}{m^3}$

ASSUME AT TERMINAL VELOCITY

$C_D = 1.2$ (TABLE 11.1)

$F_D = W$

$\therefore 900N = C_D A\left(\frac{\rho V_0^2}{2}\right)$

$A = \frac{\pi D^2}{4} = \frac{\pi (7)^2}{4}$

$\rho = 1.2\ kg/m^3$

$\frac{2(900N)}{C_D A \rho} = V_0^2$

$\frac{8(900)}{1.2(\pi \cdot 49)(1.2)} = 32.48 m^2/s^2$

$V_0 = \sqrt{32.48} = 5.69 m/s$ ← $V_{DESCENT}$