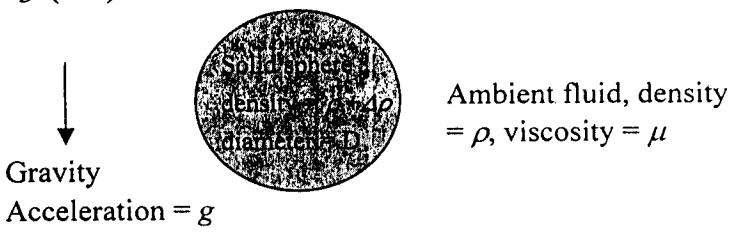
5. A solid sphere of diameter $D$ falls, under the effect of gravity with acceleration of $g$, in a fluid of density $\rho$ and viscosity $\mu$ (as shown in the attached figure). The density difference between the sphere and the fluid is $\Delta\rho$. Using dimensional analysis to find the possible nondimensional parameters that can determine:

   (a) the terminal velocity, $V$, of the sphere? **(8%)**

   (b) If this sphere is moving at its terminal velocity $V$ in the fluid, find possible nondimensional parameters that can determine the drag force, $F_D$. **(7%)**




6. Derive an expression which describes the velocity distribution across the two fixed parallel plates for a steady laminar flow of two layers of fluid under a pressure gradient $\partial p/\partial x = -k$. **(15%)**