

NAME \_\_\_\_\_

Fluids-ID \_\_\_\_\_

Quiz 14. A smooth 0.10-m-diameter cork ball (SG = 0.21) is tied to an object on the bottom of a river as is shown in Figure 2. The flow speed  $U$  is 1.12 m/s. Neglect the string drag. Determine (a) buoyancy force  $B$ , (b) weight  $W$ , and (c) drag force on cork ball  $D_f$  (Hint:  $D_f = \frac{1}{2} \rho U^2 A C_D$ ). (d) Calculate angle  $\theta$  (Hint: Use  $\sum F_x = 0$  and  $\sum F_y = 0$ ).

( $\rho_{water} = 998 \text{ kg/m}^3$ ,  $\nu_{water} = 1.12 \times 10^{-6} \text{ m}^2/\text{s}$ ,  $V_{sphere} = \frac{4}{3} \pi R^3$ )

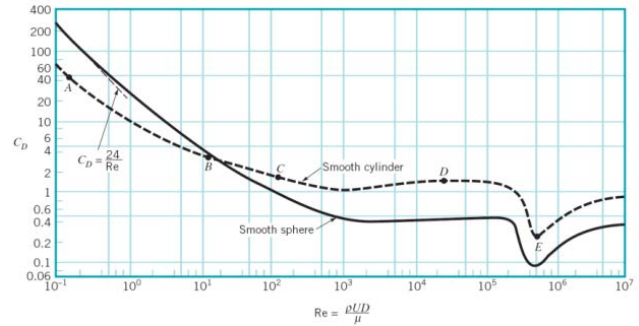


Figure 1 - Drag coefficient  $C_D$  as a function of Reynolds number  $Re$

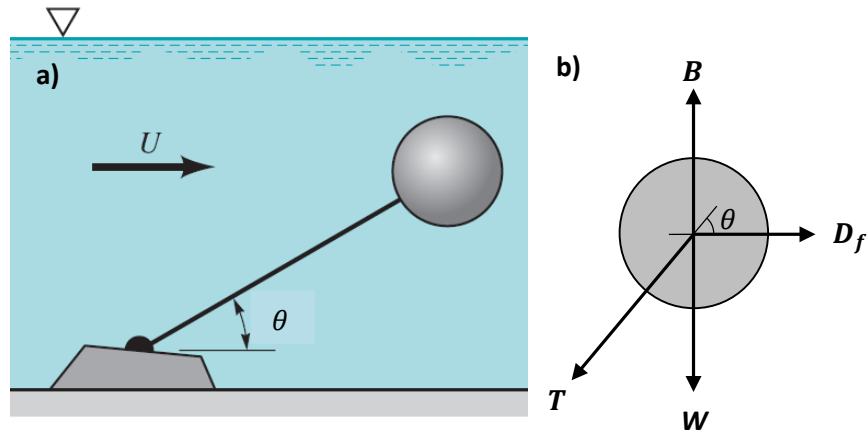


Figure 2 - (a) Schematic and (b) free body diagram for cork ball

Note: Attendance (+2 points), format (+1 point)