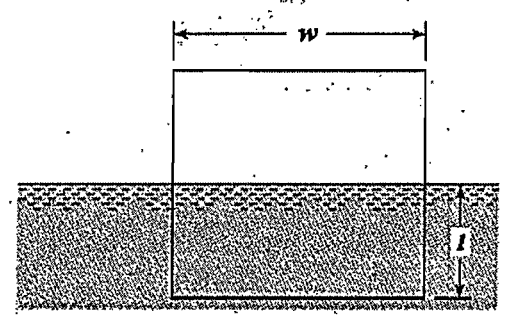
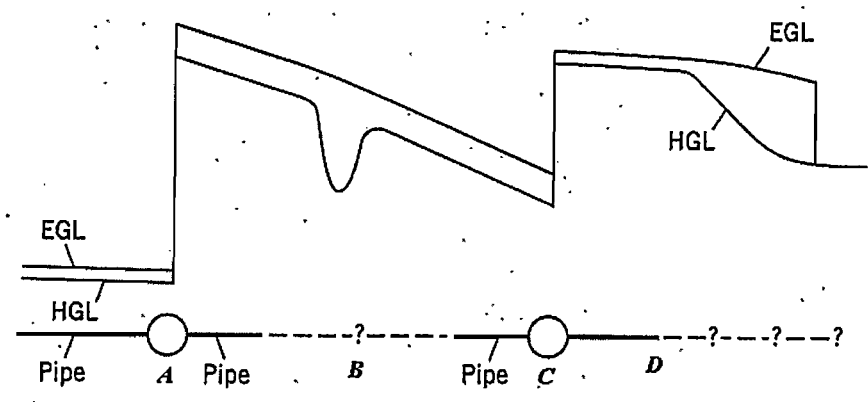




1. A floating cube with side w sinks l in the water as shown in the figure. (A) What is the weight of the floating cube? (10%), (B) If the cube has a specific gravity of 0.8, then what will be the depth l ? (10%), (C) Will l be different if the cube is solid or hollow inside? In which case l is larger? Solid or hollow?(5%) (The specific weight of water is γ_w)



2. Referring to the figure, (A) What do you think are at A and C? (B) What do you think is at B? (C) Beyond D, complete the physical setup that could yield the EGL and HGL shown. (D) What other information is revealed by the EGL and HGL? Specify two. (25%) (EGL: Energy Grade Line; HGL: Hydraulic Grade Line)





3. As shown in Fig. 3 at the entrance to a 3-ft-wide channel the velocity distribution is uniform with a velocity V . Further downstream the velocity profile is given by $u = 4y - 2y^2$, where u is in ft/s and y is in ft. Determine the value of V . (25%)

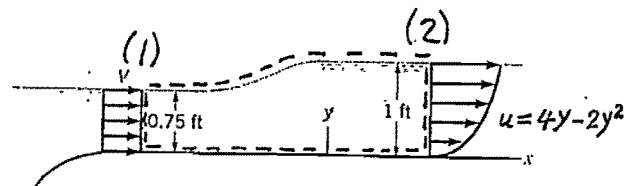


Figure 3

4. The velocity potential for a certain inviscid flow field is

$$\Phi = -(3x^2y - y^3)$$

Where Φ has the units of ft^2/s when x and y are in feet. Determine the pressure difference (in psi) between the points (1,2) and (4,4), where the coordinates are in feet, if the fluid is water and the elevation changes are negligible. (25%)