



SN: \_\_\_\_\_, Name: \_\_\_\_\_

Chapter 12-14, Serway; **ABSOLUTELY NO CHEATING!**

**Please write the answers on the blank space or on the back of this paper to save resources.**

- The Venturi tube discussed in Example 14.8 and shown in Figure P14.47 may be used as a fluid flowmeter. Suppose the device is used at a service station to measure the flow rate of gasoline ( $\rho = 7.00 \times 10^2 \text{ kg/m}^3$ ) through a hose having an outlet radius of 1.20 cm. If the difference in pressure is measured to be  $P_1 - P_2 = 1.20 \text{ kPa}$  and the radius of the inlet tube to the meter is 2.40 cm, find (a) the speed of the gasoline as it leaves the hose and (b) the fluid flow rate in cubic meters per second.

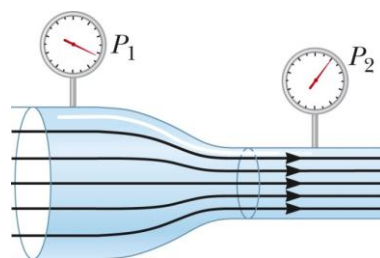


Figure P14.47

- The international Space Station operates at an altitude of 350 km. Plans for the final construction show that material of weight  $4.22 \times 10^6 \text{ N}$ , measured at the Earth's surface, will have been lifted off the surface by various spacecraft. What is the weight of the space station when in orbit?  
( $G = 6.67 \times 10^{-11} \text{ N} \cdot \text{m}^2/\text{kg}^2$ ;  $M_E = 5.97 \times 10^{24} \text{ kg}$ ;  $R_E = 6.37 \times 10^6 \text{ m}$ )
- A flexible chain weighing 40.0 N hangs between two hooks located at the same height (Fig. P12.17). At each hook, the tangent to the chain makes an angle  $\theta = 42.08^\circ$  with the horizontal. Find (a) the magnitude of the force each hook exerts on the chain and (b) the tension in the chain at its midpoint. *Suggestion:* For part (b), make a force diagram for half of the chain.

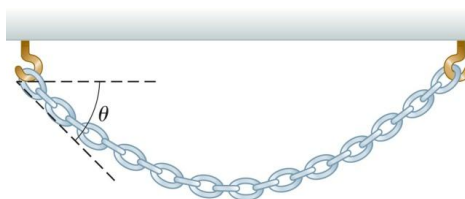


Figure P12.17