

Capítulo 1

38 - A power plant that separates carbon dioxide from the exhaust gases compresses it to a density of 110 kg/m^3 and stores it in an unminable coal seam with a porous volume of $100\,000 \text{ m}^3$. Find the mass that can be stored.

41 - A tank has two rooms separated by a membrane. Room A has 1 kg of air and a volume of 0.5 m^3 ; room B has 0.75 m^3 of air with density 0.8 kg/m^3 . The membrane is broken, and the air comes to a uniform state. Find the final density of the air.

44 - A valve in the cylinder shown in Fig. P1.44 has a cross-sectional area of 11 cm^2 with a pressure of 735 kPa inside the cylinder and 99 kPa outside. How large a force is needed to open the valve?

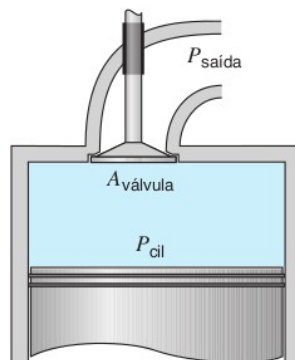


FIGURA P1.44

50 - A piston/cylinder with a cross-sectional area of 0.01 m^2 has a piston mass of 100 kg resting on the stops, as shown in Fig. P1.50. With an outside atmospheric pressure of 100 kPa , what should the water pressure be to lift the piston?

61 - Liquid water with density ρ is filled on top of a thin piston in a cylinder with cross-sectional area A and total height H , as shown in Fig. P1.61. Air is let in under the piston so that it pushes up, causing the water to spill over the edge. Derive the formula for the air pressure as a function of piston elevation from the bottom, h .

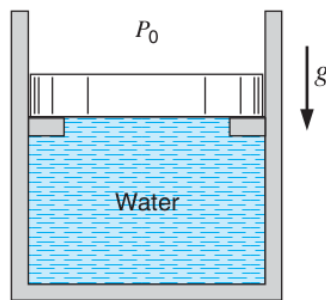


FIGURE P1.50

FROM THE BOTTOM, h .

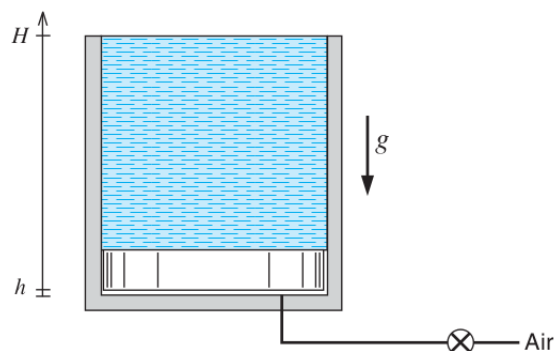


FIGURE P1.61

Respostas dos exercícios:

38 – $11 \cdot 10^6$ kg

41 – $1,28 \text{ kg/m}^3$

44 – 700N

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