

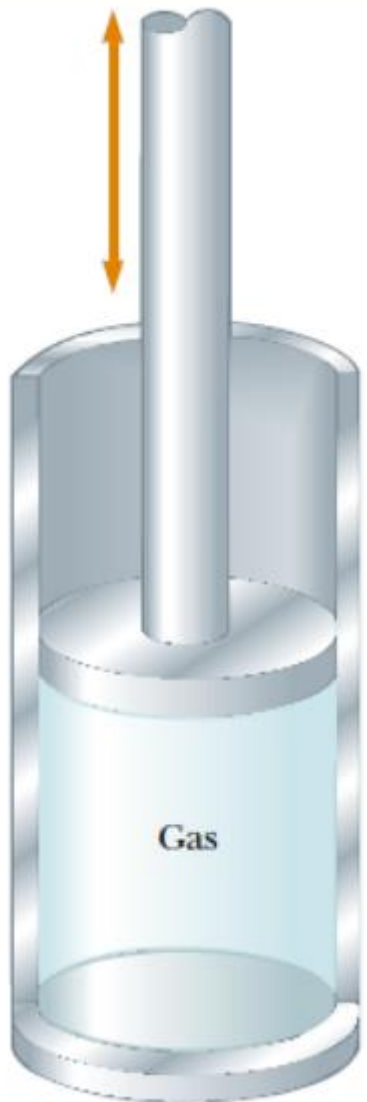


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Teorema Gas Ideal

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Perhatikan gas, di dalam silinder, dan piston digerakkan secara teratur.

- Apakah volume gas berubah / konstan?
- Apakah Tekanan gas berubah ataukah konstan?
- Apakah suhu gas berubah ataukah konstan?

$$PV = nRT$$

Persamaan keadaan untuk Gas Ideal

$$R = 8.314 \text{ J/mol} \cdot \text{K}$$

n = jumlah mol gas

$$R = 0.08214 \text{ L} \cdot \text{atm/mol} \cdot \text{K}$$





$$PV = nRT$$

$$PV = nRT = \frac{N}{N_A} RT$$
$$PV = Nk_B T$$

$$k_B = \frac{R}{N_A} = 1.38 \times 10^{-23} \text{ J/K}$$

N = jumlah molekul

N_A = bilangan Avogadro

k_B = konstanta Boltzman


Quick Quiz 19.5 A common material for cushioning objects in packages is made by trapping bubbles of air between sheets of plastic. This material is more effective at keeping the contents of the package from moving around inside the package on (a) a hot day (b) a cold day (c) either hot or cold days.

Quick Quiz 19.6 A helium-filled rubber balloon is left in a car on a cold winter night. Compared to its size when it was in the warm car the afternoon before, the size the next morning is (a) larger (b) smaller (c) unchanged.

Quick Quiz 19.7 On a winter day, you turn on your furnace and the temperature of the air inside your home increases. Assuming that your home has the normal amount of leakage between inside air and outside air, the number of moles of air in your room at the higher temperature is (a) larger than before (b) smaller than before (c) the same as before.





13.  The active element of a certain laser is made of a glass rod 30.0 cm long by 1.50 cm in diameter. If the temperature of the rod increases by 65.0°C , what is the increase in (a) its length, (b) its diameter, and (c) its volume? Assume that the average coefficient of linear expansion of the glass is $9.00 \times 10^{-6} (\text{C}^{\circ})^{-1}$.


15. A brass ring of diameter 10.00 cm at 20.0°C is heated and slipped over an aluminum rod of diameter 10.01 cm at 20.0°C . Assuming the average coefficients of linear expansion are constant, (a) to what temperature must this combination be cooled to separate them? Is this attainable? (b) What If? What if the aluminum rod were 10.02 cm in diameter?

16. A square hole 8.00 cm along each side is cut in a sheet of copper. (a) Calculate the change in the area of this hole if the temperature of the sheet is increased by 50.0 K. (b) Does this change represent an increase or a decrease in the area enclosed by the hole?

***Kerjakan secara berkelompok
Kumpulkan kertas hasil jawaban (kerja kelompok ini)***





53.  A vertical cylinder of cross-sectional area A is fitted with a tight-fitting, frictionless piston of mass m (Fig. P19.53). (a) If n moles of an ideal gas are in the cylinder at a temperature of T , what is the height h at which the piston is in equilibrium under its own weight? (b) What is the value for h if $n = 0.200$ mol, $T = 400$ K, $A = 0.00800$ m², and $m = 20.0$ kg?

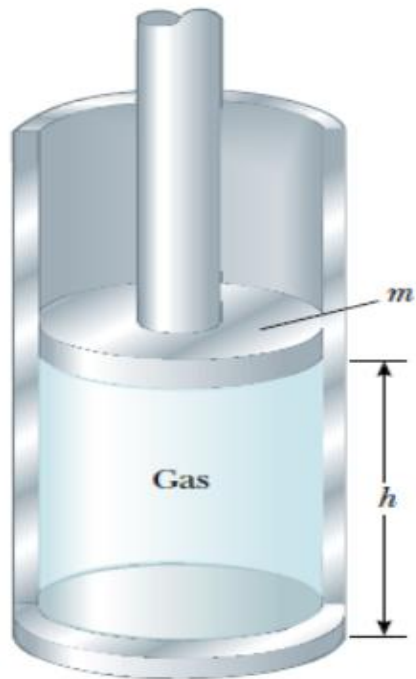


Figure P19.53



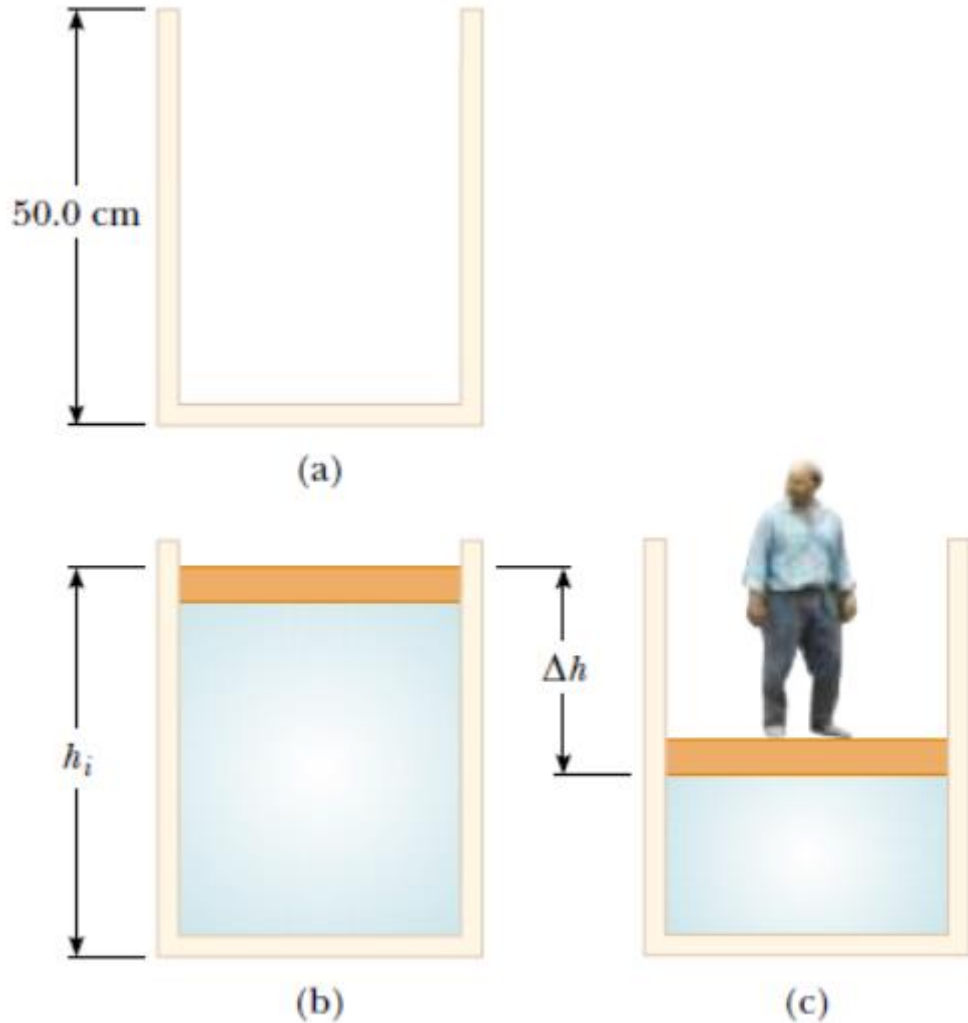


Figure P19.68

68. A cylinder that has a 40.0-cm radius and is 50.0 cm deep is filled with air at 20.0°C and 1.00 atm (Fig. P19.68a). A 20.0-kg piston is now lowered into the cylinder, compressing the air trapped inside (Fig. P19.68b). Finally, a 75.0-kg man stands on the piston, further compressing the air, which remains at 20°C (Fig. P19.68c). (a) How far down (Δh) does the piston move when the man steps onto it? (b) To what temperature should the gas be heated to raise the piston and man back to h_i ?





Pengantar

Materi

Contoh Soal

Ringkasan

Latihan

Asesmen

Terimakasih



Materi