

Pressure, Temperature, and Molecules—Internal Energy ¹¹⁴

Rank the total internal energies of the ideal gases below that contain a different number (N) of molecules at various temperatures (T) and pressures (P). Note: The volumes are not given; they may or may not be the same.

A

$$\begin{array}{l} P = 2 \text{ atm} \\ T = 200 \text{ K} \\ N = 10,000 \end{array}$$

B

$$\begin{array}{l} P = 2 \text{ atm} \\ T = 200 \text{ K} \\ N = 5,000 \end{array}$$

C

$$\begin{array}{l} P = 2 \text{ atm} \\ T = 200 \text{ K} \\ N = 20,000 \end{array}$$

D

$$\begin{array}{l} P = 2 \text{ atm} \\ T = 300 \text{ K} \\ N = 10,000 \end{array}$$

E

$$\begin{array}{l} P = 2 \text{ atm} \\ T = 150 \text{ K} \\ N = 10,000 \end{array}$$

F

$$\begin{array}{l} P = 1 \text{ atm} \\ T = 150 \text{ K} \\ N = 10,000 \end{array}$$

G

$$\begin{array}{l} P = 1 \text{ atm} \\ T = 300 \text{ K} \\ N = 10,000 \end{array}$$

H

$$\begin{array}{l} P = 3 \text{ atm} \\ T = 200 \text{ K} \\ N = 20,000 \end{array}$$

Greatest 1____ 2____ 3____ 4____ 5____ 6____ 7____ 8____ Least
t

Or, all these gases have the same internal energy. _____

Or, it is not possible to rank the internal energies for these gases. _____

Please carefully explain your reasoning.

How sure were you of your ranking? (circle one)

Basically guessed

Sure

Very Sure

1 2 3 4 5 6 7 8 9 10

¹¹⁴ C. Hieggelke