

Temperature, Pressure, and Molecules—Internal Energy ¹¹⁸

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

A

$$\begin{aligned} P &= 2 \text{ atm} \\ T &= 200 \text{ K} \\ N &= 15,000 \end{aligned}$$

B

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

C

$$\begin{aligned} P &= 2 \text{ atm} \\ T &= 250 \text{ K} \\ N &= 20,000 \end{aligned}$$

D

$$\begin{aligned} P &= 2 \text{ atm} \\ T &= 300 \text{ K} \\ N &= 15,000 \end{aligned}$$

E

$$\begin{aligned} P &= 2 \text{ atm} \\ T &= 150 \text{ K} \\ N &= 12,500 \end{aligned}$$

F

$$\begin{aligned} P &= 1 \text{ atm} \\ T &= 150 \text{ K} \\ N &= 12,500 \end{aligned}$$

G

$$\begin{aligned} P &= 1 \text{ atm} \\ T &= 300 \text{ K} \\ N &= 15,000 \end{aligned}$$

H

$$\begin{aligned} P &= 3 \text{ atm} \\ T &= 200 \text{ K} \\ N &= 25,000 \end{aligned}$$

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

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

Or, it is not possible to rank the total 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

¹¹⁸ C. Hieggelke