

Internal Energy, Volume, and Molecules—Temperature ¹¹⁶

Rank the temperatures of the ideal gases below that contain various amounts of internal energy (U) and various numbers of molecules (N) in various volumes.

The diagram shows eight boxes, labeled A through H, arranged in two rows. Each box contains three lines of text representing the internal energy (U), the number of particles (N), and the volume (V) of a system.

- Box A:** $U=20 \text{ J}$, $N=10,000$, $V=2 \text{ L}$
- Box B:** $U=20 \text{ J}$, $N=5,000$, $V=2 \text{ L}$
- Box C:** $U=20 \text{ J}$, $N=20,000$, $V=2 \text{ L}$
- Box D:** $U=30 \text{ J}$, $N=10,000$, $V=2 \text{ L}$
- Box E:** $U=15 \text{ J}$, $N=10,000$, $V=2 \text{ L}$
- Box F:** $U=15 \text{ J}$, $N=10,000$, $V=1 \text{ L}$
- Box G:** $U=30 \text{ J}$, $N=10,000$, $V=1 \text{ L}$
- Box H:** $U=40 \text{ J}$, $N=60,000$, $V=4 \text{ L}$

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

Or, all these gases have the same temperature.

Or, it is not possible to rank the temperatures 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
1	2	3	4	5	6	7	8	9	10

116 C. Hieggelke