Following Carbon While the Gas Count Falls

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A classroom air model has a rigid chamber containing carbon monoxide, oxygen, and carbon dioxide. The model holds temperature fixed and counts gas molecules before and after a reaction. Only the reaction shown occurs, and no material enters or leaves.

$2CO + O_2 \rightarrow 2CO_2$

Record	**CO molecules**	**O_2 molecules**	**CO_2 molecules**
Before	12	10	8
After	4	Hidden	16

1 How many CO molecules reacted?

(1) 4

(2) 8

(3) 12

(4) 16

2 Calculate the missing final O_2 count. Show how the equation connects the two reactants. [1]

Answer and work

3 Use the two carbon-containing gases to show that the number of carbon atoms is the same before and after. [1]

Answer and work

The model pressure starts at 100 kPa. At fixed temperature and volume it is proportional to the total number of gas molecules.

4 Predict the final pressure to the nearest whole kilopascal. Explain how the pressure can change even though the number of carbon atoms stays fixed. [1]

Answer and work