Accounting for Gas in a Two-Solid Model

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

A conservation display models two solids that release gas. Every formula unit of solid P that reacts produces one gas molecule. Every formula unit of solid Q that reacts produces two gas molecules. The display starts with 30 formula units of solid altogether. Both solids react completely.

Run	Total starting formula units	Gas molecules counted
P only	30	30
Q only	30	60
Mixture	30	42

1 Which statement must be true of the mixture in this model?

(1) It contains only P.

(2) It contains only Q.

(3) It contains some of each solid.

(4) It contains equal amounts of P and Q.

2 Calculate the number of P and Q formula units in the mixture. Show how the two measurements are used. [1]

Answer and work

A repeat uses the same number of units of each solid but interrupts the model before all units react. The display shows 37 gas molecules.

3 Explain why the 5 missing gas molecules do not by themselves identify how many formula units failed to react. [1]

Answer and work

4 Give one possible combination of unreacted P and Q that accounts for the result, and show its missing gas count. [1]

Answer and work