Checking Salt Identity With a Flame and Ion Test

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

A salt exhibit uses model flame and anion tests. In the flame test, excited atoms give a characteristic line as they lose energy. The exhibit uses a 589 nm line as a sodium marker and a 671 nm line as a lithium marker. The anion test separately reports chloride or bromide.

Sample	Flame line (nm)	Anion result
P	589	Chloride
Q	589	Bromide
R	671	Chloride

1 Which two samples show evidence of the same positive ion before the flame test?

(1) P and Q

(2) P and R

(3) Q and R

(4) All three

2 Use the electron model to explain why a sodium line can appear even when the original salt has a different anion. [1]

Answer and work

3 A student says P and Q must be identical compounds because they give the same flame line. Use both tests to evaluate the claim. [1]

Answer and work

An unknown gives only the 589 nm line. It also gives both anion results. Assume the unknown contains only some of the three model salts.

4 Identify which two samples could be mixed to fit the unknown. Explain why including R would conflict with the observed flame line. [1]

Answer and work