Checking Water Transfer Across a Model Membrane

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

A model membrane passes water but holds dissolved solute particles on their original side. Both sides initially have the same volume. At equal pressure, the model predicts net water transfer toward the side with more dissolved particles per unit volume. Each sugar molecule counts as one particle. Each dissolved salt unit separates into two particles.

Test	Left side	Right side
P	Eight sugar molecules	Four salt units
Q	Eight sugar molecules	Six salt units

1 Which test begins with equal dissolved particle counts on the two sides?

(1) P only

(2) Q only

(3) Both tests

(4) Neither test

2 Predict the initial net movement of water in Q. Use both particle counts. [1]

Answer and work

3 A student says water moves toward the sugar side in Q because eight is greater than six. Explain what the comparison counts incorrectly. [1]

Answer and work

The display can replace the right side of Q with a salt solution in twice the original volume. The left side keeps its original volume and eight dissolved sugar particles.

4 Find how many salt units the larger right side needs to match the starting dissolved particle concentration of the left side. [1]

Answer and work