Reading Water Rise in Two Model Tubes

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

A class models water rising above a reservoir in narrow glass tubes. For two tubes with the same surface, the model predicts that the final rise is inversely proportional to the inside radius. A coating can change the attraction between water and the wall. The reservoir level is the zero mark.

Tube	Radius (mm)	Inside surface	Height at 2 s (mm)	Final height (mm)
A	0.50	Bare	8	24
B	1.00	Bare	9	12
C	0.50	Coated	9	10

1 Which pair isolates the effect of changing the surface?

(1) A and B

(2) A and C

(3) B and C

(4) All three tubes together

2 Use the bare-tube model to predict the final rise in a bare tube of radius 0.75 mm. Show your work. [1]

Answer and work

3 A student looks only at the 2 s data and says B and C have identical water–wall attractions. Explain how the table and model limit that inference. [1]

Answer and work

A fourth tube has the coating used in C and a radius of 1.00 mm. Its final rise is 5 mm.

4 Use C and the fourth tube to evaluate whether the inverse-radius pattern also fits the coated tubes. [1]

Answer and work