Checking Film Overlap at a Leaking Seam

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

A workshop protects a flat panel by placing two impermeable patches over a permeable backing. Water can pass wherever the backing is uncovered. Where the patches overlap, the same region is blocked twice but counts only once as protected area. The panel's area is 20 cm^2. Each patch covers 8 cm^2.

Layout	**Area where the two patches overlap (cm^2)**
P	2
Q	5

1 Which layout leaves less uncovered backing?

(1) P only

(2) Q only

(3) Both leave the same amount.

(4) Neither covers any backing.

2 Calculate the uncovered backing area in each layout. [1]

Answer and work

3 A student says the two layouts must give the same leak rate because each uses the same amount of patch material. Evaluate the claim if the rate is proportional to uncovered area. [1]

Answer and work

The workshop adds a third patch with area 4 cm^2 to Q. It places two of those square centimeters on already covered backing.

4 Predict the new uncovered area and decide whether it is as small as in P. [1]

Answer and work

The workshop wants to check whether the uncovered area predicts the initial leak rate in the original layouts. The water can also run around the outside edge if that edge is unsealed.

5 Describe a test that isolates the effect of uncovered backing area. State which result would support the model. [1]

Answer and work