Measuring Water Uptake in Setting Plaster

Scoring guide · one credit per question · review written work against each rubric

Measuring Water Uptake in Setting Plaster

Question 1

Choice (3)

Three moles of added water react with two moles of hemihydrate, so the ratio is 1.5 mol added water to 1 mol starting solid.

Question 2

The 29.0 g sample is 0.200 mol hemihydrate. It reacts with 0.300 mol H_2O by the 3:2 ratio. The added water in the crystals has mass (0.300 mol)(18.0 g/mol) = 5.40 g.

Question 3

The casting contains the 29.0 g of starting solid plus the 5.40 g of added water incorporated in crystals, giving 34.4 g. Accept another consistent conservation-of-mass calculation.

Question 4

No. The casting is 35.1 − 34.4 = 0.7 g heavier than the dry prediction. Under the model, water outside the crystals still remains. A consistent comparison based on the student’s previous result also shows the intended reasoning.