Checking How Much Salt a Hydrate Delivers

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

A classroom solution model can use anhydrous copper(II) sulfate, $CuSO_4$, or its pentahydrate, $CuSO_4 \cdot 5H_2O$. One formula unit of the pentahydrate supplies one $CuSO_4$ unit when dissolved. In the drying model the pentahydrate loses all five waters and no $CuSO_4$.

Packet	Solid	Sample mass (g)	Model molar mass (g/mol)
P	$CuSO_4 \cdot 5H_2O$	5.00	250
Q	$CuSO_4$	5.00	160

1 Which packet supplies more moles of $CuSO_4$ when the entire packet is dissolved?

(1) P only

(2) Q only

(3) They supply equal amounts.

(4) The measurements cannot distinguish the amounts.

2 Calculate the mass of anhydrous $CuSO_4$ remaining after all water is removed from P. [1]

Answer and work

The class receives an 8.00 g sample labeled pure pentahydrate. It dries the sample fully and recovers 6.40 g of $CuSO_4$. No solid is lost.

3 Evaluate the label using the result expected for a pure pentahydrate sample. [1]

Answer and work

4 Find the amount of $CuSO_4$ the unknown sample actually delivers in solution. Use the dried mass rather than the label. [1]

Answer and work