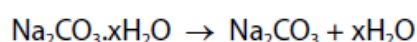


Unit 3 - activity

- 4 A class of students carried out experiments to determine the value of x in the formula of hydrated sodium carbonate, $\text{Na}_2\text{CO}_3 \cdot x\text{H}_2\text{O}$.

Hydrated sodium carbonate was heated until no more water of crystallisation remained. Anhydrous sodium carbonate, Na_2CO_3 , was formed.



The students were given the following instructions:

- weigh a sample of the hydrated sodium carbonate in a pre-weighed crucible
- heat the crucible containing the sample to remove the water of crystallisation
- allow the crucible to cool and then reweigh the crucible.

(d) The Data Book value for x is 10.

One student obtained a value for x of 8.63 and another student obtained a value for x of 10.79.

Explain the practical errors that could have led to each of these values.

(4)

Question number	Answer	Additional guidance	Mark
4(d)	An explanation that makes reference to: <ul style="list-style-type: none">• 8.63 is too low because not enough water has been removed• because it's not been heated long/strongly enough• 10.79 is too high because apparently too much water has been removed/some extra material has been lost• because solid has been lost from the crucible.	<ul style="list-style-type: none">(1) Accept hydrated sodium carbonate has lost water in storage(1)(1) Ignore reference to impurities in the sodium carbonate(1) Do not award measurement errors	4