GCSE Chemistry B (Twenty First Century Science)

J258/01 Breadth in chemistry (Foundation Tier)

Question Set 21

Multiple Choice Questions

1 'Tumsoothe' is a medicine that cures indigestion. It is a solution of 'sodium bicarbonate', $NaHCO_3$.

(a) Layla puts some Tumsoothe in a beaker and places it on a balance.

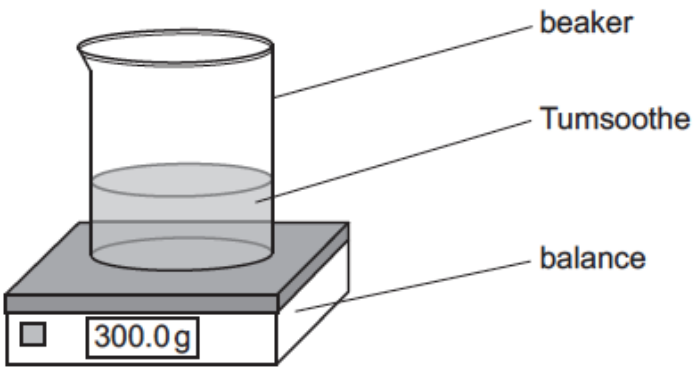


Fig. 1.1

She adds hydrochloric acid to the contents of the beaker and this reaction happens:

$NaHCO_3(aq) + HCl(aq) \rightarrow CO_2(g) + NaCl(aq) + H_2O(l)$

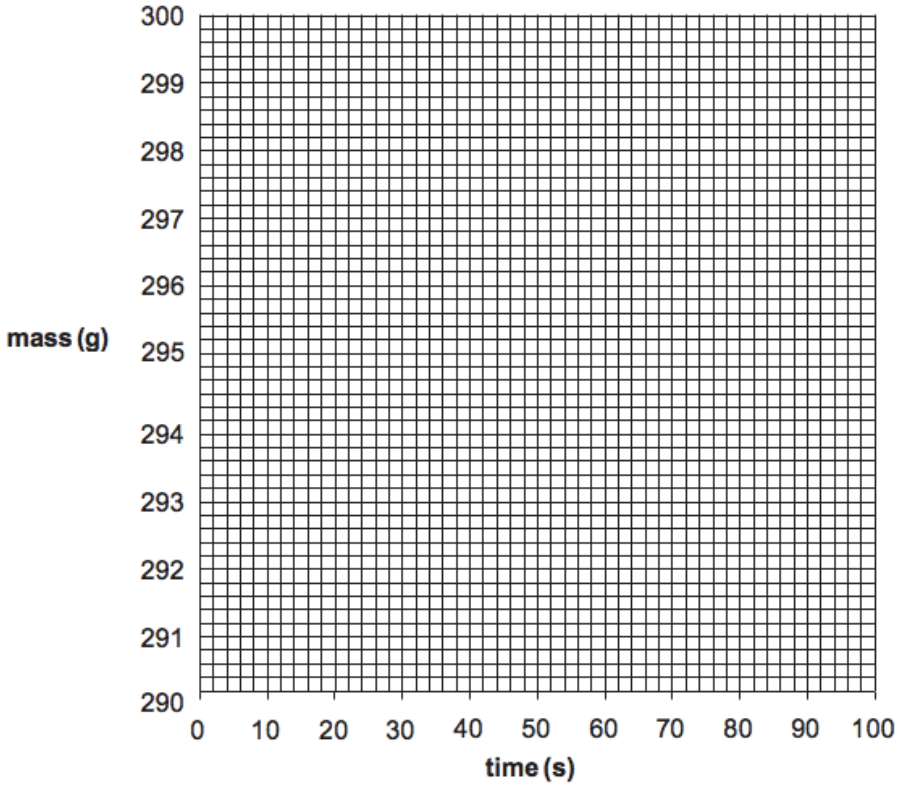
Layla writes down the mass every 10 seconds, as shown in **Table 1.1**.

Time (s)	Mass (g)
0	300.0
10	298.0
20	296.0
30	294.5
40	293.5
50	292.5
60	292.0

Table 1.1

(i) Plot a graph of mass against time on the axes below, using **Table 1.1**.

Add a curve of best fit to the graph.



[2]

(ii) Estimate the mass of the beaker at 100 seconds. Use the graph to help you.

Mass at 100 seconds =.....g **[1]**

(iii) Draw an **F** on your graph where the rate of reaction is the **fastest**.

[1]

(b) (i) Describe the rate of change of mass during the reaction.

[1]

(ii) Explain how you worked this out from the graph.

[1]

(iii) The law of conservation of mass says:

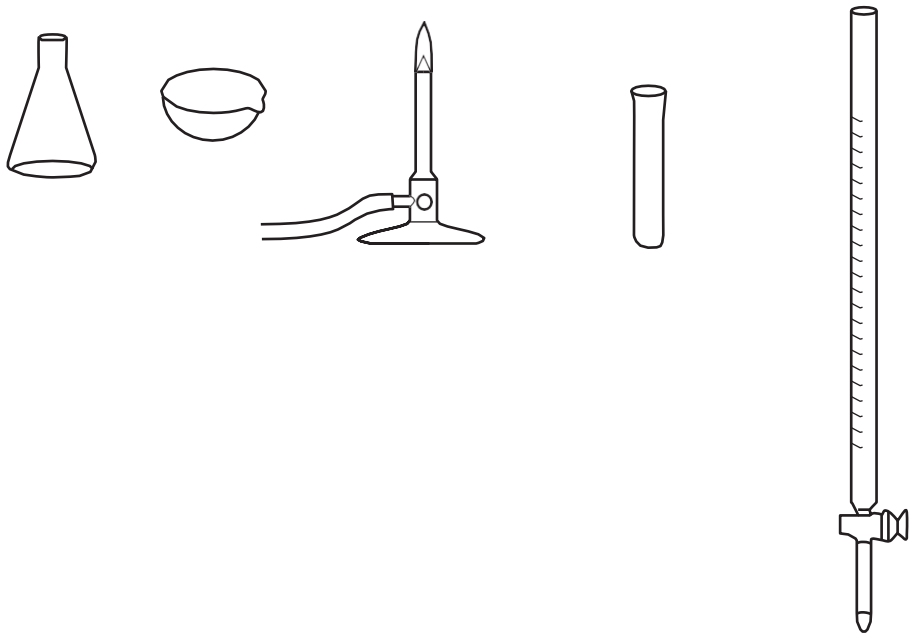
'The mass at the start and end of a reaction must be the same.'

Explain why the law is true for the reaction between $NaHCO_3$ and HCl, even though the reading on the balance changes.

[1]

(c) Layla now does a titration because she wants to measure the concentration of $NaHCO_3$ inTumsoothe.

Put a (ring) around **two** pieces of apparatus that she needs to carry out the titration.



[2]

(d) (i) Layla repeats her titration three times. Her results are shown.

Repeat	**1**	**2**	**3**
Volume of acid added to neutralise $NaHCO_3$ (cm^3)	20.10	20.15	20.05

Layla says, 'This is good quality data.'

Do you agree?

Explain your answer.

[1]

(ii) Calculate the mean value for the volume of acid added in the titration.

Mean value = ...cm^3 **[1]**

Total Marks for Question Set 21: 11