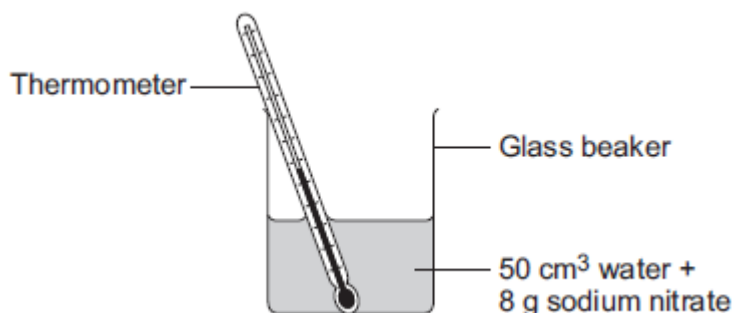


Q1.

This question is about temperature changes.

- (a) A student investigated the temperature change when 8 g of sodium nitrate dissolves in 50 cm³ of water.

The diagram below shows the apparatus the student used.



The student did the experiment five times.

Table 1 shows the results.

Table 1

Experiment	Decrease in temperature of water in °C
1	5.9
2	5.7
3	7.2
4	5.6
5	5.8

- (i) Calculate the mean decrease in temperature.
Do not use the anomalous result in your calculation.

Mean decrease in temperature = _____ °C

(2)

- (ii) Suggest **one** change in the apparatus in the diagram above which would improve the accuracy of the results.
Give a reason for your answer.

- (b) The student investigated the temperature change when different masses of sodium carbonate were added to 50 cm³ of water at 20 °C.

Table 2 below shows the results.

Table 2

Mass of sodium carbonate in g	Final temperature of solution in °C
2.0	21.5
4.0	23.0
6.0	24.5
8.0	26.0
10.0	26.6
12.0	26.6
14.0	26.6

Describe the relationship between the mass of sodium carbonate added and the final temperature of the solution.

Use values from **Table 2** in your answer.

(3)
(Total 7 marks)

Mark schemes

Q1.

- (a) (i) 5.75 **or** 5.8

correct answer with or without working gains 2 marks
correct working showing addition of any four results and
division by 4 gains 1 mark

OR

6(.04) for 1 mark

2

- (ii) use a polystyrene cup **or** lid
accept insulate the beaker

1

to prevent energy/heat gain
accept to prevent energy/heat transfer
*do **not** accept energy/heat loss*

OR

use a digital thermometer
allow use a data logger

easier to read (to 0.1°C)

1

- (b) (as mass increases) the final temperature increases

1

then stays constant

1

correct reference to a value above 8 g up to and including 10 g as mass when the trend changes

1

[7]