GCSE Biology A (Gateway)

J247/03 B1-B3 and B7 Higher (Higher Tier)

Question Set 1

1

The fat in milk is broken down by the enzyme lipase.
A group of students investigate the effect of temperature on this breakdown of fat.

In their investigation they use an indicator called phenolphthalein.
Phenolphthalein is pink in alkali conditions but colourless in pH values below 8.

Step 1 One student puts 5 drops of phenolphthalein and 5 ml of full fat milk into a test tube.

Step 2 She adds 1 ml of lipase and stirs the mixture.

Step 3 She measures the time for the pink indicator colour to disappear. The other students repeat these three steps but at different temperatures.

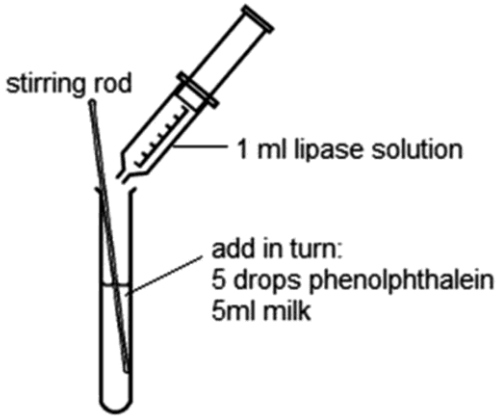


Table 1.1 shows the results of the group.

Temperature (°C)	Time for pink colour to disappear (s)
20	480
40	240
60	270
80	960

Table 1.1

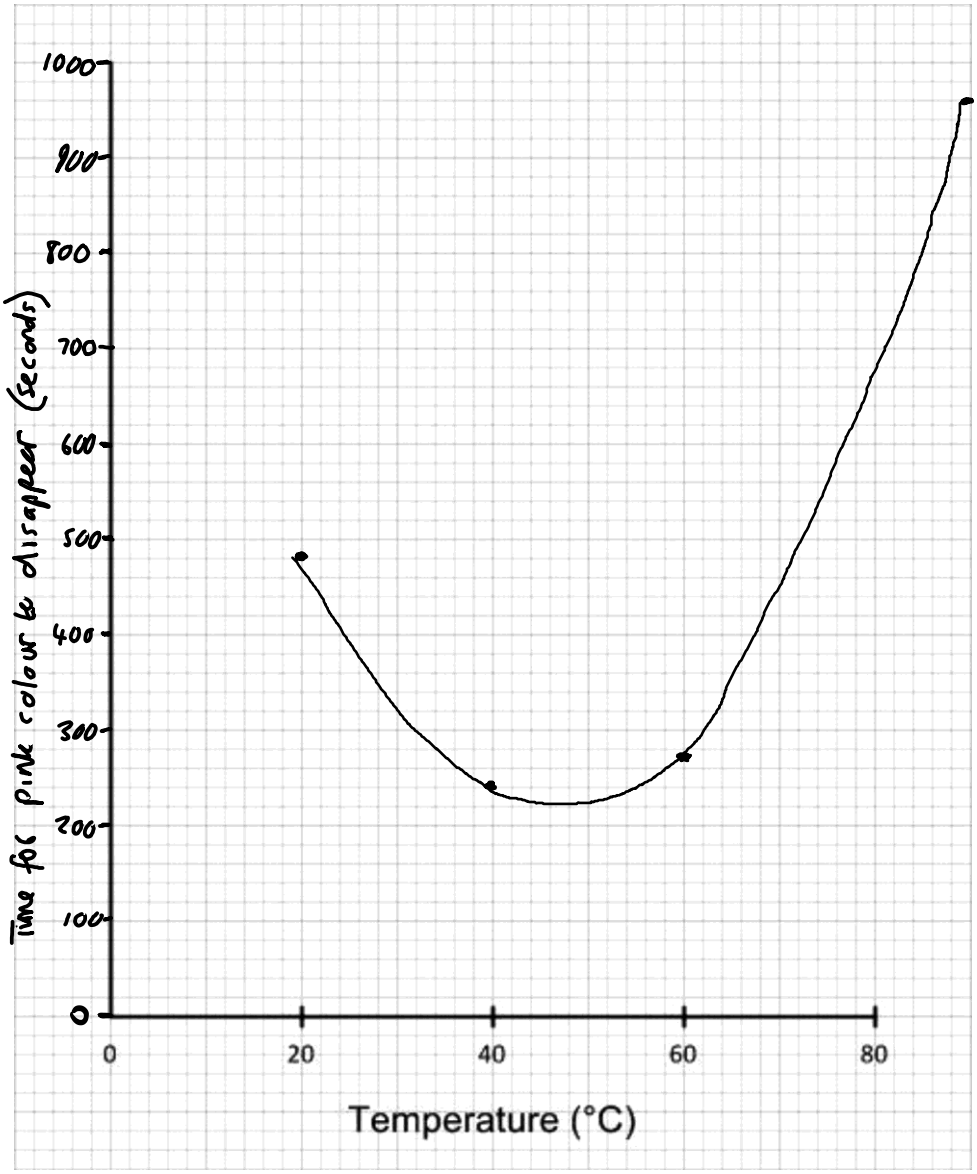
(a) The pH falls as the fat in milk breaks down.

Explain why.

It produces acids which are fatty acids. Acids take the PH down below neutral.

[2]

(b) Plot a graph of the results from **Table 1.1** and draw a line of best fit.



[5]

(c) Explain why the results at **20 °C** and **40 °C** are different.

At 20°C slower reaction because the particles are moving more slowly and there are less frequent collisions than at 40°C.

[3]

(d) Explain why the results at **40 °C** and **80 °C** are different.

At 80°C there is a slower reaction as the enzyme has denatured so shape of active site has changed and cannot bind to substrate.

[3]

(e) **(i)**

One student says that the results show that the optimum temperature for the lipase is 40°C.

The teacher says that she **cannot** say for certain that it is 40°C.

Explain why

Optimum can be anywhere between 40°C and 60°C

[1]

(ii)

Give **two** modifications that the students could make to their method to find a more accurate value for the optimum temperature.

Do more repeats and use narrower intervals between 30-50°C.

[2]

(f)

The students rounded each time they measured to the nearest 10 seconds.

They rounded the times because they found it difficult to judge exactly when the pink colour had disappeared.

Describe and explain **two** ways the method could be improved to give a more accurate measurement.

Repeat the experiment at each temperature and then take the mean result for each as your final result.

Same student should be doing all observations so there is consistent judgement.

[2]

Total Marks for Question Set 1: 18

OCR
Oxford Cambridge and RSA

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series.

If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact The OCR Copyright Team, The Triangle Building, Shaftesbury Road, Cambridge CB2 8EA.

OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge