

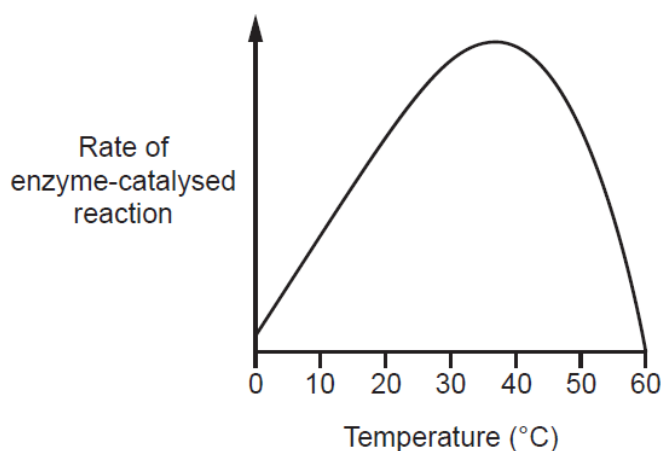
**GCSE Biology B (Twenty First Century Science)**  
**J257/04** Depth in biology (Higher Tier)

**Question Set 12**

1

Enzymes catalyse reactions in living organisms.

- (a) The graph shows how the activity of a human enzyme changes as the temperature changes.



- (i) Use the graph to explain why it is important for the human body to maintain a constant internal temperature of 37 °C.

[3]

- (ii) Scientists have found single-celled organisms called thermophiles living around hot vents on the sea floor.

Thermophiles cannot control their temperature. The cell and its contents are the same temperature as the seawater.

The temperature of the seawater around one hot vent is 50 °C.

Suggest **and** explain how you would expect the graph to look for an enzyme from a thermophile living around this vent.

[2]

- (iii) The seawater around the vent has a very high concentration of salt.

Describe **and** explain how this could affect the single-celled thermophiles.

[3]

- (b) Scientists have been studying two different enzymes in invertebrates.

- Both enzymes break down the same substrate.
- The shape of the active site of each enzyme is the same.
- Each enzyme is coded for by a different gene.
- There are some differences in the sequences of bases in the two genes because of mutations.

Explain how the two enzymes could have the same shaped active site when they are made from genes with differences in their base sequences.

[4]

**Total Marks for Question Set 12: 12**

---

# 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](http://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