InkBiology

QUESTION WORKBOOK

Factors affecting enzyme rate: temperature, pH and concentration

Enzymes and metabolic control · Unit B03

AQA 3.1.4.2 · OCR A 2.1.4 (e)-(h) · Edexcel A Topic 1.8 · CAIE 3.2

6 questions · 19 marks

NAVY SCREEN EDITION

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SECTION A · Short, 1 to 2 marks

A1 Give the optimum pH of pepsin and the optimum pH of trypsin, naming where in the gut each of these enzymes works. [2]

SECTION B · Standard, 3 to 5 marks

B1 Explain why the rate of an enzyme-catalysed reaction climbs gradually as the temperature is raised towards the optimum, and then falls steeply above it. [4]

B2 A student collects the oxygen released by catalase every thirty seconds for ten minutes and finds that the rate falls steadily throughout the run. Suggest three reasons for the fall, and suggest what she should measure instead if she wants to compare different temperatures fairly. [4]

B3 Explain how a change in pH away from the optimum reduces the rate of an enzyme-catalysed reaction. [3]

B4 An enzyme has an initial rate of 0.8 μmol per minute at 10 °C and 1.8 μmol per minute at 20 °C. Calculate the Q10 for this enzyme, and calculate the rate you would predict for it at 30 °C. [3]

B5 Describe the shape of a graph of initial rate against substrate concentration, and describe what is limiting the rate in each part of that graph. [3]