AQA, OCR, Edexcel

A Level

A Level Biology

Enzymes Answers

Name:

M M E

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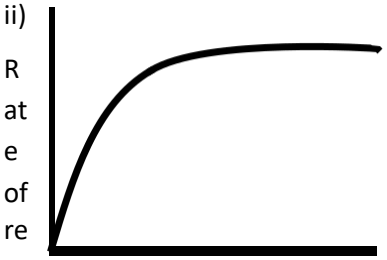
Total Marks: /45

Answer	Marks
1. a) i) A substance that speeds up a reaction/increases the rate of reaction without being used up in the reaction	2 marks
ii) -Activation energy is the minimum amount of energy required for a reaction to start. -Enzymes lower the activation energy.	2 marks
iii) – multiple polypeptide chains -coiled together to make a compact structure	2 marks
b) i) – Tertiary structure determines the specific shape of the active site -Active site is only complementary to a specific substrate -any change is shape will mean the enzyme cannot catalyse that reaction	3 marks
ii) Maltose 	2 marks
iii) – maltose is a complementary shape to the active site of maltase - an enzyme-substrate complex is formed - reaction occurs, breaking the glycosidic bond between the disaccharide -two glucose monosaccharides are released	4 marks
c) i) The substrate fits into the active site of the enzyme in the same way that a key fits in a lock. They are exactly complementary shapes.	2 marks

ii) Enzymes are not rigid structures The enzyme-substrate complex changes shape slightly Ensures tighter bonding in the active site.	3 marks
2. a) i) –change in conditions causes bonds to break in the structure of the enzyme, changing it shape, meaning it cannot function any longer	2 marks
ii) A) Change in temperature - rate of reaction increases as the temperature increases. - at a certain point, the temperature causes the enzyme to denature	6 marks
B) Change is pH - Each enzyme works at an optimum pH - Any pH either side of this will reduce the rate of reaction before denaturing the enzyme completely	
b) i) Glucose + Galactose	2 marks
ii) Hydrolysis reaction	1 mark
c) i) -The more enzymes present the more likely a successful collision will occur -Forming an enzyme-substrate complex - Thus increasing the rate of reaction	3 marks
ii)  Enzyme Concentration	2 marks

3. a) i) – Competitive - Non-competitive ii) Competitive inhibitor - **similar** shape to the substrate - occupies the active site/prevents the substrate from binding - No reaction can take place until the inhibitor becomes dislodged. b) i) – Cyanide binds to a separate site on the cytochrome C oxidase enzyme - Irreversible changes the shape of the active site - Enzyme can no longer function - Cells cannot respire, no energy is synthesised	2 marks 3 marks 4 marks