

Enzymes and Digestion 2 QP

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	opaque / less transparent / blue	allow mixture becomes dark / black ignore thicker	1
b)i)	7 (minutes) or in range 6.7 to 7	award 2 marks for correct answer if answer is incorrect evidence of selection of 40(% light intensity) either in working or in graph 2 for 1 mark	2
b)ii)	any two from: ✗ slower / takes longer at lower temperatures ✗ (40oC is) optimum / best temperature ✗ enzyme denatured / destroyed / damaged at higher temperatures	allow near to 37oC / body temperature where enzymes work best allow description of denaturation	2
c)i)	isomerase	allow phonetic spelling	1
c)ii)	fructose is sweeter than glucose needed in smaller quantities or less is needed		1 1
Total marks			8

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	fatty acids glycerol		1 1
b)i)	any one from: • (same) amount / 1cm ³ fat • (same) amount / 10cm ³ lipase / enzyme • (kept for) 24 hours or (same length of) time		1
b)ii)	temperature	allow heat / warmth	1
c)i)	(carry out experiments) using more temperatures / smaller intervals between 20 and 60 °C / around 40 °C	ignore repeat unqualified do not accept longer time accept extra single temperature in range 20 °C – 60 °C but cannot be 20 °C, 40 °C or 60 °C	1 1
d)i)	strong' acid		1

d)ii)	enzyme works / not destroyed / not denatured / not damaged	do not accept enzyme not killed accept any indication that the fat is digested accept same as tube 3 / tube at 40 °C accept optimum temperature / at or near body temperature	1
Total marks			8

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	pancreas small intestine	either order	1 1
b)	any two from: <ul style="list-style-type: none"> to give them time to come to temperature of the water-bath at / near body temperature / best / optimum temperature otherwise reaction would take place at a series of different temperatures or sensible statement about control / fair test 	accept so (they / both) are at the same temperature	2
c)i)	0.42	allow in range 0.42 to 0.425	1
c)ii)	0.021	correct answer with or without working allow ecf from 6(c)(i) ie $6(c)(i) \div 20$ correctly calculated for 2 marks if answer incorrect $0.42 \div 20$ or $(c)(i) \div 20$ gains 1 mark	2
c)iii)	(all) starch digested / gone / used up / turned to sugar	allow the amount of sugar stays the same / maximum	1
c)iv)	any two from <ul style="list-style-type: none"> enzyme destroyed / denatured / damaged / shape changed unable to fit (starch molecule) starch can't be digested 	allow reference to active site once only as alternative to first or second bullet point do not accept killed enzymes don't work is insufficient	2
Total marks			10

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	any two from: ✗ fibres not damaged ✗ machines last longer / machines not damaged by stones ✗ shorter time or quicker ✗ lower temperature	allow cheaper / uses less energy as an alternative to shorter time / lower temperature, if these not given	2
a)ii)	any two from: ✗ different enzymes (for different dyes) ✗ enzymes expensive ✗ enzymes have to be removed (from denim material) (afterwashing / treatment)	no mark for expensive alone	2
b)	protease		1
Total marks			5

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	shape changed / destroyed (above 45 °C) (shape) doesn't fit (other molecules / stain)	accept denatured accept active site changed do not accept enzyme killed	1 1
b)i)	any two from: ✗ can wash the clothes at higher temperature ✗ so wash / enzyme action will be quicker ✗ enzyme not destroyed at high temperature / 80 °C	do not accept idea of bacteria working faster accept denaturation or description	2
b)ii)	high(er) temperature / 80 °C uses more energy / fuel more pollution / named (eg carbon dioxide / global warming) (from electricity production) or increased release of hot water (into the environment)		1 1
Total marks			6

QUESTION 6

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	directly proportional or 0.1 rise in rate for 1% rise in concentration	gains full marks accept increased concentration: increased rate or positive correlation or proportional for 1 mark	1 1
a)ii)	0.6	allow + 0.01	1
b)	(0.5 % trypsin) cheaper (35 °C) faster reaction so takes less time to make product extra heating cost outweighed by savings on enzyme cost	ignore more profit allow (35 °C) optimum / best temperature	1 1 1 1
c)i)	any two from: • breaks down / digests food • from protein into amino acids / peptides • makes soft(er) / runni(er)	allow pre-digests protein / food allow easier for baby to digest allow description of texture change allow make (more) soluble	2
c)ii)	correct named enzyme correct function Eg Carbohydrase starch → sugar or lactose → glucose or making sugar syrup or isomerase glucose → fructose or making slimming foods or lipase fats / oils → fatty acids or removal of grease stains	to gain 2 marks function must relate to correctly named enzyme accept amylase / maltase / lactase accept other correct example	1 1
Total marks			11