

Enzymes and Digestion MS

QUESTION 1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	to mix in oxygen / air or to allow aerobic respiration / prevent anaerobic	allow stops olive oil separating out	1
a)ii)	so Fusarium not limiting or so can see effect of protein / oil (concentration)		1
b)i)	300	correct answer with or without working = 2 marks (8000 - 800)/24 or 7200/24 if one error only eg or 8000 - 1000/24 allow 1 mark	2
b)ii)	cannot tell how accurate / precise /reliable the values are or there may be a wide range results may overlap with values for other conditions or may not be significantly different from other conditions	do not allow - to make it more accurate / precise / reliable allow suitable reference to anomalies	1 1
c)i	description: Fusarium grows (mainly) before lipase production starts as Fusarium growth slows lipase production speeds up	each point made must compare Fusarium growth and lipase production allow correct use of figures	1 1
c)ii)	explanation: any two from: <ul style="list-style-type: none"> • need sufficient growth of Fusarium before it can release / make / produces (detectable) lipase • initial Fusarium growth uses protein (from reaction mixture) or 	allow no lipase production until 'nutrients' used up / limiting	2

	protein more important than lipid for Fusarium growth <ul style="list-style-type: none"> • later Fusarium growth uses lipid / oil (from reaction mixture) 		
Total marks			10

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	sucrose → smaller (molecules) or it gives simple sugars / glucose /fructose (products) can be absorbed / taken in	if answer refers to digestion, assume reference is to products	1 1
b)i	only small increase in yield at 25% or not much difference in yield at 25% extra cost / less economic if using 25% fungus		1 1
b)ii)	any sensible suggestion plus explanation eg <ul style="list-style-type: none"> •increased oxygen → increased respiration rate •less substrate available for making enzyme / toxic product or made •more respiration occurs which releases heat (1) •(increase in temperature) reduces or amount of enzyme(1) •anomalous result(1) •suggestion why eg zero error on Or instrument (1) •initial aeration limiting factor (1) •later something else is limiting Or (1) •1.0 optimum fungus growth •(1)higher concentrations oxygen becomes toxic / inhibits growth or of fungus (1) •aeration at 2.0 too vigorous / damages fungus (1) •less fungus remains to make 	suggestion explanation must mention heat or temperature	1 1

	or enzyme (1) •higher aeration causes cooling (1) •less growth / enzyme production Or if cooler (1) •air contaminated with microorganisms (1) •microorganism compete or make toxin (1)		
Total marks			6

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	A carbohydrase B isomerase		1 1
b)	less needed (to get same effect)		1
c)i)	they all work at atmospheric pressures they work well at 25 - 45 °C	accept any clear indication of correct statement(s) identified	1 1
c)ii)	any two from: ✘ they are easily broken down by high temperature or the wrong pH ✘ they are soluble in water, so it may be difficult to separate them from products ✘ they are expensive to buy	accept any clear indication of correct statement(s) identified accept for 2 marks if written as two separate disadvantages	2
Total marks			7

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	any two from: ✘ neutralises acid / makes conditions alkaline / raises pH ✘ enzymes (in small intestine) work (more/most effectively) or stop/prevents enzymes being denatured ✘ emulsifies fats/lipids or description of	do not accept breakdown unqualified	2

	emulsification ∧ larger surface area		
b)i	bile / bilirubin / pigment / broken down haemoglobin / substance / cholesterol linked to movement or effect does not get to the intestine / food / faeces or cannot leave liver or effect not happening (in intestine)		1 1
b)ii)	bilirubin / pigment / broken down haemoglobin (deposited) in skin	not 'bile' alone only award if bilirubin / pigment / broken down haemoglobin given allow carried in the blood	1 1
Total marks			6

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	microorganisms		1
b)i)	proteases	clear indications of correct answer	1
b)ii)	amino acids (both words)	clear indications of correct answer	1
c)i	14		1
c)ii)	enzyme Z takes least time (to pre-digest protein) / works fastest	mark independently clear indication of correct answer allow only 7 minutes / less time / faster do not allow works best	1 1
c)iii)	temperature pH		1 1
Total marks			8