

Biotechnology MS

QUESTION1

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	yeast		1
b)i)	<p>two sensible suggestions, each linked to correct explanation:</p> <p>does not release CO gas is toxic / harms living organisms</p> <p>does not release NOx / SO2 gas(es) cause acid rain / eq / harms organisms</p> <p>or</p> <p>does not cause acid rain (1)</p> <p>(acid rain) damages building (1)</p> <p>/ harms organisms</p> <p>made from crops / not a fossils (1)</p> <p>fuel</p> <p>crops can re-grow / source is (1)</p> <p>renewable / fossil fuels are non-renewable</p>	<p>allow ethanol only releases CO2 and H2O for 1 mark</p> <p>do not allow more pollution / more gases released</p>	4
b)ii)	<p>any one from</p> <ul style="list-style-type: none"> <input type="checkbox"/> releases less energy (per litre) <input type="checkbox"/> need to burn more to cover same distance / travel shorter distance <input type="checkbox"/> land not being used for food <input type="checkbox"/> crops / less food available <input type="checkbox"/> raises food prices 		1
Total marks			6

QUESTION 2

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)	<p>8 any four from: Points for Ethanol:</p> <ul style="list-style-type: none"> • renewable fuel or carbon neutral or uses plant waste • less CO / hydrocarbons / SO₂ / NO_x emissions • details of what emissions do eg CO is toxic / hydrocarbons cause smog / SO₂ / NO_x causes acid rain <p>Points against Ethanol:</p> <ul style="list-style-type: none"> • releases less energy • so need to burn more • more fuel loss due to evaporation • need to burn fuel to grow and process crop plants • reduces (land use for) food crops / causes deforestation <p>Debatable points:</p> <ul style="list-style-type: none"> • claimed to increase NO_x emissions - but this not observed by air quality monitoring • takes more energy to produce than it releases - but sugar cane yields 8:1 / maize yields 1.34:1 <p>Conclusion:</p> <p>sensible conclusion for or against ethanol</p>		

	substantiated by information from passage		
Total marks			5

QUESTION 3

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)		<p>all three correct = 3 marks</p> <p>two correct = 2 marks</p> <p>one correct = 1 mark</p> <p>extra line from a statement</p> <p>cancels the mark</p>	3
b)i)	<p>increased growth</p> <p>or</p> <p>increased (dry) mass</p> <p>correct use of numbers</p> <p>eg by 18 (grams) / by 46 times</p>		1 1
b)ii)	<p>glucose supplies energy / materials (for growth)</p> <p>or</p> <p>glucose can be used in respiration</p>	ignore glucose provides food	1
c)	magnesium		1
d)	mycoprotein		1
Total marks			8

QUESTION 4

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	<p>circulation / mixing / described</p> <p>or</p> <p>temperature maintenance</p> <p>supply oxygen</p> <p>for aerobic conditions</p>	<p>do not allow oxygen for anaerobic respiration</p>	1 1

	for faster respiration		
b)	any one from: <input type="checkbox"/> energy supply / fuel or use in respiration <input type="checkbox"/> material for growth or to make mycoprotein	do not allow just food / growth ignore reference to aerobic / anaerobic	1
c)	(heat / energy) from respiration	allow exothermic reactions allow description eg breakdown of glucose / catabolism ignore metabolism ignore aerobic / anaerobic	1
d)i)	any one from: <input type="checkbox"/> compete (with Fusarium) for food / oxygen or reduce yield of Fusarium <input type="checkbox"/> make toxic waste products or they might cause disease / pathogenic or harmful to people / Fusarium	do not allow harmful unqualified	1
d)ii)	any two from: <input type="checkbox"/> steam / heat treat / sterilise fermenter (before use) <input type="checkbox"/> steam / heat treat / sterilise glucose / minerals / nutrients / water (before use) <input type="checkbox"/> filter / sterilise air intake <input type="checkbox"/> check there are no leaks	not just clean allow sterilisation unqualified for 1 mark not just use pure glucose	2
e)	any three from: •beef is best or beef is better than mycoprotein •mycoprotein mainly		3

	<p>better than wheat</p> <ul style="list-style-type: none"> • more phenylalanine in wheat than in mycoprotein • but no information given on other amino acids / costs / foods <p>overall conclusion:</p> <p>statement is incorrect</p> <p>or</p> <p>it would be the best source for vegetarians</p> <p>or</p> <p>for given amino acids, beef is the best source</p> <p>or</p> <p>three foods provide insufficient data to draw a valid conclusion</p>		1
Total marks			11

QUESTION 5

QUESTION	ANSWER	EXTRA INFORMATION	MARKS
a)i)	bacteria		1
a)ii)	8		1
a)iii)	4 tonnes		1
b)i)	<p>mycoprotein contains less fat</p> <p>or</p> <p>less circulatory problems</p> <p>mycoprotein contains (more) fibre</p> <p>or</p> <p>reduces colon cancer</p>	<p>it = mycoprotein</p> <p>fat must be comparative</p>	1

