

Question number	Answer	Notes	Marks
1(a)	1. protect from birds; 2. protect from seals; 3. keep out wild salmon / other fish to avoid competition; 4. keep out wild salmon / other fish to avoid disease;	Ignore reference to terms interspecific / intraspecific predation Protect from predators alone = 0 must be qualified Ignore stop salmon getting out / salmon eating salmon	3
(b)	1. decrease growth; 2. idea that bacteria / decomposers / microorganisms involved; 3. respiration; 4. less oxygen;	1 Ignore death 2. Ignore pathogens 4. Ignore disease / infection	3
(c)	1. remove / dispose / eq; 2. prevent spread of fungus/disease /pathogen/infection;		2
(d)	wrasse eat (sea)lice;	Wrasse alone = 0	1

Total 9 marks

Question number	Answer		Marks
2 (a)	temperature recorder / eq; cooling jacket / cooling water / water in if hot / eq;		2
(b)	respiration produces heat; enzymes; denatured / destroyed / eq; optimum; best growth / maximum growth / more product / eq; microorganisms killed / eq;		2
(c)	mixing / distributing oxygen / air; for respiration; mixing / distributing nutrients / microorganisms; for growth; mixing / distributing heat / temperature; for respiration / enzymes;	mix air and heat = 2	2
(d)	pH / acidity / alkalinity; <u>enzymes</u> ; oxygen; <u>respiration</u> ; (other) microorganisms / sterility; competition / contamination / less product / eq;	mark in discrete pairs ignore air	2
(e)	insulin / penicillin / antibiotic / <i>Fusarium</i> / mycoprotein / any named GM product / eq;	ignore bacteria / fungus / cheese / yoghurt / beer / ethanol / medicine	1
		Total	9

Question number	Answer	Notes	Marks
3 (a)	1 / stage 1 / pasteurise; 2 / stage 2 / sterilise;	Ignore order	2
(b)	1. prevent killing / prevent enzyme <u>denaturation</u> ; 2. bacteria / <i>Lactobacillus</i> / <i>Streptococcus</i> ;	Avoid denaturing bacteria = 1 Kill enzyme = 0 Ignore reference to suitable temperature for enzymes	2
(c)	1. less production / product contaminated / spoil taste / eq; 2. (other) bacteria present / bacteria not killed / bacteria would compete / bacteria use lactose / eq;	Contaminated with other bacteria = 2 Allow microorganisms / microbes / fungi	2

(d)	<p>1. less production / take longer / less lactic acid / affect the taste / eq;</p> <p>2. because bacteria stop growing / bacteria stop reproducing;</p> <p>3. less enzyme activity / below <u>optimum</u> / less (kinetic) energy / eq;</p>	3. Ignore denature	Max 2
(e)	<p>1. contains vitamin C;</p> <p>2. prevent scurvy;</p>	<p>Allow vitamin C if in list with other vitamins</p> <p>Allow vitamin A</p>	Max 1

Question number	Answer						Notes	Marks																		
4(a)	<table border="1"> <thead> <tr> <th>Food product</th> <th>Genus of organism used</th> <th>Group organism belongs to</th> <th>Substrate used</th> <th>Type of respiration</th> <th>Chemical product</th> </tr> </thead> <tbody> <tr> <td>beer / wine / bread / eq;</td> <td><i>Saccharomyces</i></td> <td>fungus</td> <td>glucose</td> <td>anaerobic</td> <td>ethanol</td> </tr> <tr> <td>yoghurt</td> <td><i>Lactobacillus</i> / <i>Streptococcus</i>;</td> <td>bacteria</td> <td>lactose;</td> <td>aerobic</td> <td>lactic acid / lactate;</td> </tr> </tbody> </table>						Food product	Genus of organism used	Group organism belongs to	Substrate used	Type of respiration	Chemical product	beer / wine / bread / eq;	<i>Saccharomyces</i>	fungus	glucose	anaerobic	ethanol	yoghurt	<i>Lactobacillus</i> / <i>Streptococcus</i>;	bacteria	lactose;	aerobic	lactic acid / lactate;	<p>Ignore alcohol as food product</p> <p>Ignore milk as substrate used</p>	5
Food product	Genus of organism used	Group organism belongs to	Substrate used	Type of respiration	Chemical product																					
beer / wine / bread / eq;	<i>Saccharomyces</i>	fungus	glucose	anaerobic	ethanol																					
yoghurt	<i>Lactobacillus</i> / <i>Streptococcus</i>;	bacteria	lactose;	aerobic	lactic acid / lactate;																					
(b)	<p>1. pasteurise / boil / sterilise / heat to high temperature / eq;</p> <p>2. kill / prevent growth of / remove bacteria / microorganisms / pathogens / eq;</p>						<p>Mp 1 ignore heat milk alone</p> <p>Mp 2 reject germs</p>	2 max																		

Total 7 marks

Question number	Answer	Notes	Marks
5 (a)	<p>A nitrogen fixation / nitrogen fixing;</p> <p>B decomposition / decomposing / decay;</p> <p>C <u>nitrification</u> / <u>nitrifying</u>;</p> <p>D <u>denitrification</u> / <u>denitrifying</u>;</p>	<p>No mark if list given</p> <p>A. allow nitrogen fixing bacteria</p> <p>B. ignore decomposers / rotting / breakdown</p> <p>C. allow nitrifying bacteria</p> <p>D. allow denitrifying bacteria</p>	4
(b)	<p>1. bacteria;</p> <p>2. fungi;</p>	<p>ignore nitrogen fixing / nitrifying bacteria / denitrifying bacteria / mushroom / toadstool / protoctists / detritivores / worms</p>	2
(c)	<p>1. absorption by roots / root hair cell;</p> <p>2. active transport / active uptake;</p> <p>3. (make) amino acids / (plant) protein;</p> <p>4. <u>assimilation</u> / <u>assimilate</u>; ONCE</p> <p>5. eaten / ingested by animal / herbivore;</p> <p>6. <u>digestion</u> / <u>digests</u> / <u>digested</u> / <u>eq</u>;</p> <p>7. protease / named protease;</p>	<p>1. ignore root nodules</p> <p>7. ignore enzyme</p>	4

Question number	Answer	Notes	Marks
5 (d)	1. cheaper / readily available / less transport needed / renewable / sustainable / recycles / eq; 2. ess <u>eutrophication</u> / leaching / run off / <u>pollution</u> / slow release of ions / less soluble / eq; 3. improves soil structure / holds water / stops erosion / eq;	allow converse ignore less harm to environment / damage to wildlife / more natural / idea that chemicals harm humans	2

(Total for Question = 12 marks)