Question number	Answer	Notes	Marks
1	C different temperatures / eq; O same species / size/ age/gender/eq; R repeat / eq; M1 mass / length / number / eq; M2 time period stated;(one day minimum) S1 and S2 same food type / same food mass / same oxygen / tank size / fish density stated / eq;;		6
		Total	6

Question number	Answer	Notes	Marks
2 (a) (i)	genes / alleles / eq; inherited / passed on / eq; parent/offspring height described; reduce growth; <u>compete</u>; light / minerals / water / carbon dioxide / eq;	 eg tall / short / big / small / high / low allow nutrients / moisture	max 2
(ii)	improve growth; decomposition / decomposers / eq; minerals / named mineral / nutrient / salts / ions / ammonium / nitrogen fixing / nitrifying; or reduce growth; infection / disease / attack / harm / eq; pathogen;	 ignore nitrogen ignore use nutrients	max 2

(b) (i)	unwanted plant / of no use / described reason for not wanted / eq;		1
(ii)	(less) <u>competition</u>; light; carbon dioxide; water; minerals / nutrients / salts / ions / eq;	ignore space	max 2
(iii)	herbicide / weedkiller / chemical that kills / pesticide / eq; pull them up / eq;		max 1

TOTAL 8 MARKS

Question number	Answer	Notes	Marks
3	control intraspecific predation / control overcrowding / separate sizes / separate ages / eq; control interspecific predation / killing predators; control disease / infection; antibiotics / remove dead fish; biological control of pests / eq; control oxygen; remove waste products; frequent feeding / feed small amounts; (high) protein diet; selective breeding / eq; hormones;	ignore clean water	max 6

TOTAL 6 MARKS

Question number	Answer	Notes	Marks
4 (a) (i)	1. beef increases; 2. fish slow/constant/steady/little change <u>and</u> then increase rapidly / eq; 3. more beef than fish at start; 4. more fish than beef at end / fish overtakes beef;	2. must have slow and then rapid	Max 3
(ii)	13 x 6 = 78 / range between 72 and 84;;	allow one mark for x 6 in working	2
(b)	1. <u>digestion</u> / <u>digested</u> / <u>digest</u>; 2. rotease / pepsin; 3. hydrochloric acid / HCl; 4. low pH / pH 2 / optimum pH; 5. amino acids / peptides;	1. gnore breakdown allow physical or chemical digestion 2. gnore enzyme digestive enzyme = 1 4. ignore best pH	Max 4

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>(c)</td><td>
<table>
<tr><th>Protein molecule</th><th>Function of protein molecule</th><th>Place where protein molecule is made</th></tr>
<tr><td>(haemoglobin)</td><td>transport oxygen / carries oxygen / bind to oxygen;</td><td>(red blood cells)</td></tr>
<tr><td>amylase / carbohydrase;</td><td>(digest starch)</td><td>(salivary gland)</td></tr>
<tr><td>(insulin)</td><td>lower <u>blood</u> glucose / glucose to glycogen / cells absorb glucose;</td><td>pancreas;</td></tr>
<tr><td>antibody;</td><td>(binds to antigens on pathogens)</td><td>white blood cell / lymphocyte;</td></tr>
</table>
</td><td>ignore control ideas

allow blood sugar</td><td>6</td></tr>
</table>

Total 15 marks

Question number	Answer	Notes	Marks
5 (a)	1. individual fish) can control size / age / mass / species / growth / faster production / grow faster / control health / control disease / control protein content / control feeding / control quality of fish; 2. can s ectively breed / genetically modify; 3. reduce overfishing / does not reduce wild stocks / sustainable / less risk to food chains / less chance of catching other species / less chance of catching rare fish / prevent extinction; 4. hig yield / large numbers of fish / guaranteed harvest / regular supply / available all year; 5. sa r / less risk for fishermen / eq;	ignore cheaper 4. ignore ess time consuming / easier to catch	Max 2

(b)	(i)	fewer pathogens / bacteria / algae / less eutrophication / less fertiliser / less sewage / less human waste / less faeces / less chance of disease / less chance of infection / eq;	ignore cleaner / less minerals / less waste / less pollutants / less contamination	1
	(ii)	1. humans do not want to eat antibiotics; 2. passes along food chain / bioaccumulation; 3. less chance of (bacteria) resistance;	ignore safer to eat / cost / rivers / environment	Max 2

Question number	Answer	Notes	Marks
5 (c) (i)	37.9 / 38 / 38.0 %;;	allow if in table allow one mark for 1.1 as numerator / 2.9 as denominator in working / 37.93;	2
(ii)	C traditional and new type of farm;		
	O (waste from) same species / same fish / same number / mass / age / size / same size of fish farm / eq;		
	R repeat experiment;		
	M1 (what is measured): mass of algae / mass of pondweed / oxygen level / CO_2 level / nitrate level / phosphate level / mineral level / turbidity / biodiversity / number of species / number of fish / number of organisms / eq;	allow amount	
	M2 same time of day / same time of year / each month / same length of sampling time / eq;		
	S1 same mass of food (in farm / tank) / same type of food / same diet / same antibiotics;		
	S2 same distance from farms / same depth in water / same light / temperature;		Max 6