Question number	Answer	Notes	Marks
1(a) (i)	nitrate;		1
(ii)	1. am o acids; 2. p tein;		2
(b)	rye;		1
(c)	different species / different soil contents in lowland and upland / soil erosion / leaching / eq;	Allow different minerals as eg soil contents	1
(d) (i)	fresh mass includes water / dry mass excludes water / water content may vary / eq;	Allow moisture	1
(ii)	1. wei sample (before or after) /use a balance ; 2. heat oven / warm place / eq; 3. un l mass stays same / eq;		2
(e)	1. allows for comparison; 2. different sized plants / of different (starting) masses / weights / of different yield / eq;		2

(f)	42 / 41.7 / 41.67 / 41.6 recurring;;	Allow 5 ÷ 12 = 1 for working 41.667 = 1 41.6 alone with no working =0	2

Total 12 marks

Question number	Answer	Notes	Marks
2(a) (i)	insects eat the crop / prevent insects eating rice / rice not eaten by insects / / biological control / eq;		1
(ii)	1. (less) <u>competition</u> / (more) <u>photosynthesis</u>; 2. mineral ions / named mineral ion / nutrients / light;	Ignore water / carbon dioxide / space	2
(b)	1. decomposed / broken down / digested; 2. bacteria / microorganisms / fungi / eq; 3. mineral ions / named mineral ion / ions / nutrients / fertiliser;	Ignore decomposers in Mp2 Mp3 Ignore nitrogen	2 max
(c)	1. respiration / energy / ATP; 2. active transport / active uptake; 3. of mineral ions / named mineral ions / nutrients;		2 max
(d))	kills weeds / kills unwanted plants / kills unwanted herbs / prevent growth of weeds;	Ignore kills herbs / kills plants / kills pests	1

(ii)	1. lasts longer / eq; 2. no reapplication / no need to keep buying pesticide / eq; 3. specific / eq; 4. avoids bioaccumulation / builds up in food chains / eq; 5. no development of resistance;	Allow converse for all Mps Mp2 ignore cheaper Mp3 ignore no allergy / harm to people / contamination of products Mp4 ignore pollution / environmentally friendly Mp5 ignore immune	3 max

Total 11 marks

Question number	Answer	Notes	Marks
3 (a) (i)	1. (attracted by) fish / food / prey / eq; 2. use nets / use cage / shoot predators / scarecrows / cover tanks / eq;	 ignore fence	 2
(ii)	Two from: 1. fish waste / faeces / urine / urea / sewage / uneaten food; 2. fertiliser / leaching / run off; 3. nitrate / ammonia / minerals / nutrients / eq; Two from: 5. remove waste / faeces / clean water / filter water / pump water / remove algae / use organisms that eat algae / eq; 6. reduce use of fertiliser; 7. feed little / do not overfeed;	ignore light ignore remove nitrates ignore regular feeding	4

Question number	Answer	Notes	Marks
4 (a)	(more) oxygen / prevent stagnation / eq ; bubbling / paddles / pump / eq; add water plants; remove waste / remove faeces / remove dead fish / remove leaves / eq; prevent eutrophication / don't fertilise nearby fields / prevent algal growth / eq:	ignore ref to temperature / killing bacteria / adding pesticides / adding antibiotics ignore monitoring ignore cleaning	Max 2
(b)	separate species / type / sizes / ages / eq; cover / net / fence / cage / eq; scarecrow / shoot predators / shoot birds / eq;	ignore ref to lice and biological control	Max 2
(c)	antibiotics; fungicide; (kill) bacteria / fungi; remove dead fish / remove diseased fish / eq; reduce numbers / do not overcrowd / eq; use resistant strains / eq; keep out wild fish / eq;	ignore uv radiation ignore pesticide ignore ref to lice and biological control	Max 2
(d)	small quantities / eq; frequently / often / several times a day / eq; high protein; remove waste food; less bacterial growth;	ignore regular	Max 2
		Total	**8**

Question number	Answer	Notes	Marks
5 (a)	faeces / stool / urine / urea / ammonia / carbon dioxide / eq;	ignore excretion / poo	1
(b) (i)	(maintain) oxygen; (less) decomposition / respiration; bacteria / fungi / microbes / eq;	allow respiration for fish or bacteria ignore disease	2
(ii)	less nutrients / algal growth / eutrophication / eq; kill/less bacteria / pathogens / microbes / eq; (less) disease / infection;	reject kill viruses ignore healthy	2
(c)	bacteria / fungi / microbes / eq; decompose(rs) / decay / rot / breakdown / eq; mineral ions / nutrients / named mineral ion / nitrate / eq; amino acids / proteins; respiration (by bacteria); carbon dioxide; photosynthesis;	ignore fertiliser	Max 4
(d)	separate species / nets / cages / fences / shooting / eq;	ignore intraspecific ignore feed lots separate = 0	1
		Total	**10**