Question number	Answer	Notes	Marks
1 (a) (i)	enzymes; kinetic energy / more collisions / molecules move faster / eq; (more) photosynthesis; (more) carbohydrate / glucose / eq; energy / respiration;	ignore reactions alone ignore ref to transpiration / diffusion ignore food	Max 3
(ii)	minerals / ions / salts / nutrients / eq; named mineral 1; function of named mineral 1; named mineral 2; function of named mineral 2;	eg. nitrate (ignore nitrogen) /ammonium for; amino acids / protein; if nitrogen ignored still allow function mark magnesium; for chlorophyll/chloroplast; phosphate for; ATP / DNA / eq; ignore NPK	Max 3

(b)	(i)	ladybird / eq; aphid / eq;	accept any predator prey eg birds eating caterpillars ignore 'predator' eats a 'pest'	2
	(ii)	1. sts longer / no need to reapply / eq; 2. ecific / no harm to other species; 3. n bioaccumulation / no biomagnification / eq; 4. no resistance; ignore immunity 5. no arm/affect to food chain(s) / eq;	accept converse answers that refer to chemical pesticide ignore ref to eutrophication ignore pollution / harm to habitat / eq ignore cost ignore ref to not harming crops/safer for humans	3

Total 11 marks

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>2 (a) (i)</td><td>(-)10.62 / (-)10.6;;
allow one mark for 9.76 or 1.16 in working however used</td><td>ignore minus sign
ignore additional decimal places</td><td>2</td></tr>
<tr><td>(ii)</td><td>idea of <u>less</u> oxygen /eq;
(less) respiration / energy;
low yield / less growth / smaller fish / eq;</td><td>ignore idea of high oxygen needed for growth
ignore death
ignore number</td><td>Max 2</td></tr>
<tr><td>(b)</td><td><table><tr><th>Method</th><th>method increases fish production</th></tr><tr><td>adding antibiotics to the water</td><td>control disease / kill bacteria / parasites / pathogens / eq;</td></tr><tr><td>using nets to cover tanks</td><td>protect fish being eaten by predators / named predator / prevent escape;</td></tr><tr><td>feeding small quantities of food frequently</td><td>all eaten / no waste / no decay / less eutrophication / less bacterial growth / eq;</td></tr></table></td><td>ignore competition
ignore ref to energy / nutrients ignore overfeeding
ignore pollution</td><td>3</td></tr>
</table>

(c)	digested / broken down; amino acids / (poly)peptides; stomach; protease / named protease enzyme (ONCE); HCl / acid / low pH / eq; small intestine / duodenum / ileum; bile / neutralise /alkaline / eq; optimum pH (ONCE)	ignore pepsinogen / trypsinogen accept name of enzyme if in incorrect part of gut	Max 5

Total 12 marks

Question number	Answer	Notes	Marks
3(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