

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. lasts longer / no need to reapply / eq; 2. specific / no harm to other species; 3. no bioaccumulation / no biomagnification / eq; 4. no resistance; ignore immunity 5. no harm/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

Question number	Answer	Notes	Marks								
2 (a) (i)	(-)10.62 / (-)10.6;; allow one mark for 9.76 or 1.16 in working however used	ignore minus sign ignore additional decimal places	2								
(ii)	idea of <u>less</u> oxygen /eq; (less) respiration / energy; low yield / less growth / smaller fish / eq;	ignore idea of high oxygen needed for growth ignore death ignore number	Max 2								
(b)	<table border="1"> <thead> <tr> <th>Method</th> <th>method increases fish production</th> </tr> </thead> <tbody> <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> </tbody> </table>	Method	method increases fish production	adding antibiotics to the water	control disease / kill bacteria / parasites / pathogens / eq;	using nets to cover tanks	protect fish being eaten by predators / named predator / prevent escape;	feeding small quantities of food frequently	all eaten / no waste / no decay / less eutrophication / less bacterial growth / eq;	ignore competition ignore ref to energy / nutrients ignore overfeeding ignore pollution	3
Method	method increases fish production										
adding antibiotics to the water	control disease / kill bacteria / parasites / pathogens / eq;										
using nets to cover tanks	protect fish being eaten by predators / named predator / prevent escape;										
feeding small quantities of food frequently	all eaten / no waste / no decay / less eutrophication / less bacterial growth / eq;										

(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; <u>optimum</u> pH (ONCE)	ignore pepsinogen / trypsinogen accept name of enzyme if in incorrect part of gut	Max 5
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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)	<ol style="list-style-type: none"> 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; 	<p>Allow converse for all Mps</p> <p>Mp2 ignore cheaper</p> <p>Mp3 ignore no allergy / harm to people / contamination of products</p> <p>Mp4 ignore pollution / environmentally friendly</p> <p>Mp5 ignore immune</p>	3 max
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Total 11 marks