

Cycles within the Ecosystems

Mark Scheme 2

Level	IGCSE(9-1)
Subject	Biology
Exam Board	Edexcel IGCSE
Module	Single Award (Paper 2B)
Topic	Ecology and the Environment
Sub-Topic	Cycles within the Ecosystems
Booklet	Mark Scheme 2

Time Allowed: 76 minutes

Score: /63

Percentage: /100

Grade Boundaries:

9	8	7	6	5	4	3	2	1
>90%	80%	70%	60%	50%	40%	30%	20%	10%

Question number	Answer	Notes	Marks
1(a) (i)	amino acids / protein / DNA / RNA / nucleic acid;		1
(ii)	nitrogen-fixing;	Allow <i>Rhizobium</i>	1
(b)	1. nitrifying (bacteria) / nitrification; 2. nitrite (to nitrate);		2
(c) (i)	1. more movement / more (kinetic) energy / eq; 2. more collisions / more enzyme substrate complexes / eq;		2
(ii)	1. <u>denatured</u> ; 2. <u>active site</u> ; 3. shape altered / bonds broken / eq; 4. substrate no longer fits / eq;	1. Ignore inactive / destroyed 1. Reject death	3

Total 9 marks

Question number	Answer	Notes	Marks
2 (a)	cell membrane; cytoplasm; plasmid; nucleoid / chromosome / DNA once;	reject nucleus / nucleolus ignore vacuole / ribosomes / mitochondria	3
(b) (i)	enzymes; <u>optimum</u> ; denatured / destroyed / eq;	ignore references to low pH and high pH	2
(ii)	amino acids; protein / DNA;		2
(iii)	active transport / active uptake; low to high conc. / against conc. gradient / eq; respiration / energy / ATP; root <u>hair</u> (cells); large surface area / eq;		3
(c) (i)	X at 100;	allow any indication at 100	1
(ii)	11.1%; ; allow one mark for 8000 or 7200 or 800 in working		2
(iii)	nitrate (already) in soil / <u>nitrogen fixing</u> bacteria / nitrification / organic material in soil / eq;		1
		Total	14

Question number	Answer	Notes	Marks
3 (a)	different diet / different species / eq;	Ignore nitrogen Eg. eat different food / eat more food / different amounts of protein / different amounts of nitrogenous food / different amounts of nitrogen compounds in food / one is carnivorous Eg. type of fish / breed of fish / strains of fish / genes in fish / metabolism of fish	1
(b)	28.9 / 28.92;	Allow one for 0.4 / 0.0723 / 2.5 in working Allow 28.9 / 28.92 in working for 2 marks if 29 on answer line	2

(c)	<ol style="list-style-type: none">1. plant / algae growth / algal bloom / eq;2. algae block light;3. less photosynthesis;4. decomposers / decomposition / bacteria / microbes / <u>micro</u>organisms / fungi;5. respiration; ONCE6. oxygen depletion / anoxic; ONCE7. death of plants / fish / organisms;		Max 5
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(d)	<ol style="list-style-type: none">1. dead / attenuated / harmless / inactive / weakened / modified / pathogen / bacteria / microbe / microorganism / virus / eq;2. antigens;3. memory cells;4. secondary immune response / <u>faster immune response / antibody produced faster / sooner / quicker / more ;</u>	Dead form of the disease = 0 Dead strain = 0 Ignore dead virus Ignore antibody production in primary immune response	4
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Question number	Answer	Notes	Marks
4	(a) A evaporation; B transpiration; C precipitation / rain / snow / eq;		3
	(b)(i) 1. less transpiration / less water loss from plants / eq; 2. less cloud formation / condensation; 3. less precipitation / rain / less water falls on the ground / eq;	1. Ignore water remains in soil 2. Ignore humidity	Max 2
	(ii) 1. (less) photosynthesis; <u>more carbon dioxide</u> in air / <u>less carbon dioxide</u> absorbed; 2. less consumption of plants / eq; 3. less <u>decomposition</u> / <u>decay</u> ; 4. burning of trees produces <u>carbon dioxide</u> ;		Max 4

Question number	Answer	Notes	Marks												
5 (a)	<table border="1"> <thead> <tr> <th>Stage</th> <th>Number</th> </tr> </thead> <tbody> <tr> <td>absorption</td> <td>8</td> </tr> <tr> <td>denitrification</td> <td>6 / 7;</td> </tr> <tr> <td>nitrogen fixation</td> <td>1;</td> </tr> <tr> <td>excretion</td> <td>3;</td> </tr> <tr> <td>decomposition</td> <td>2;</td> </tr> </tbody> </table>	Stage	Number	absorption	8	denitrification	6 / 7;	nitrogen fixation	1;	excretion	3;	decomposition	2;		4
Stage	Number														
absorption	8														
denitrification	6 / 7;														
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(b)	<p>1 active transport / active uptake;</p> <p>2 low concentration to high concentration / against concentration gradient / eq;</p> <p>3 energy / ATP;</p> <p>4 root <u>hair</u> (cell);</p>	ignore diffusion ignore along concentration gradient	3 max												
		Total	7												

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

Question number	Answer	Notes	Marks
6 (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)