

Human Influences on Ecosystems

Mark Scheme 11

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Human Influences on Ecosystems
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 11

Time Allowed: — 66 minutes —

Score: /55

Percentage: /100

	Answers	Marks	Guidance for Examiners																														
1 (a)	<table><tr><td>group of vertebrates</td><td>scaly skin</td><td>external ear (pinna)</td><td>feathers</td><td>glands</td></tr><tr><td>birds</td><td>✓</td><td>x</td><td>✓</td><td>x</td></tr><tr><td>bony fish</td><td>✓</td><td>x</td><td>x</td><td>x ;</td></tr><tr><td>amphibians</td><td>x</td><td>x</td><td>x</td><td>x ;</td></tr><tr><td>reptiles</td><td>✓</td><td>x</td><td>x</td><td>x ;</td></tr><tr><td>mammals</td><td>x</td><td>✓</td><td>x</td><td>✓ ;</td></tr></table>	group of vertebrates	scaly skin	external ear (pinna)	feathers	glands	birds	✓	x	✓	x	bony fish	✓	x	x	x ;	amphibians	x	x	x	x ;	reptiles	✓	x	x	x ;	mammals	x	✓	x	✓ ;	[4]	
	group of vertebrates	scaly skin	external ear (pinna)	feathers	glands																												
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(b)	<ul style="list-style-type: none">• either fruit is soft or seeds, are hard / thick / have a hard / thick / protective covering or testa ;• no enzymes to digest, testa / seed coat / seed ;	[2]	I refs to teeth																														

1	Answers		Marks	Guidance for Examiners
(c)	1 wind (dispersal) ; 2 'hairs' / wing(s), on seed / fruit, to aid dispersal ; 3 self- (dispersal) ; 4 explosive, pods / fruits ; 5 water (dispersal) ; 6 float / buoyant ;		[max 2]	A parachute / light I fur I pollination
(d)	oxygen ; warmth / warm temperature ; water ;		[max 2]	A suitable quoted warm temp, 15–30°C I humidity
(e)	1 (cassowaries are large birds) so need large, territory / habitat / feeding area / lots of space ; 2 cannot fly so cannot move easily from one area to another ; 3 need many trees to produce enough fruit ; 4 cassowaries are dependent on many (tree) species ; 5 need suitable nesting areas ;		[max 3]	
			[Total: 13]	

Question	answers	Mark	Additional Guidance
2 (a)	A – excretion / egestion / defaecation ; B – nitrification / oxidation ;	[2]	R death A 'nitrify' / ignore bacteria
(b) 1 2 3 4 5 6 7 8	root nodules contain, bacteria / <i>Rhizobium</i> ; (bacteria) fix nitrogen / nitrogen fixation / nitrogen fixing ; form, ammonia / ammonium (ions) ; provide, fixed nitrogen / ammonia / amino acids, to rest of, plant ; R via soil (fixed nitrogen etc) needed for growth ; used to make, amino acids / proteins / DNA / RNA / chlorophyll / AW ; (so) nitrogen made available to, animals / other organisms ; AVP ; <i>only for detail of any of the points above</i>	[max 4]	ignore incorrect name or type of bacteria R if root nodules fix nitrogen ignore nitrate / R if occurs in soil ignore 'useful' nitrogen A useable nitrogen ecf provide nitrate to plant if penalised in MP3 R chloroplast <i>do not allow anything for events that occur after bacteria or plants die</i>
(c) 1 2 3 4 5 6 7 8 9 10 11 12 13	<i>proteins in cells</i> enzymes ; control / catalyse, reactions / AW ; e.g. respiration / photosynthesis ; A ref. to any specific reaction(s) (part of cell) membranes ; carrier proteins / description of role allowing movement in and out of cell ; haemoglobin ; transport of, oxygen / carbon dioxide / gases ; making cytoplasm / (cell) growth ; AVP ; e.g. chloroplast / named organelle / providing energy <i>DNA in cells</i> ref. to, genes / alleles / genetic information / genetic code ; control functions of the cell ; code for proteins ; AVP ; e.g. a specific feature of cells / cell division / mitosis / meiosis	[max 3] [max 2]	R digestion unless clearly inside cell, e.g. in a phagocytosis A protein pumps R antibodies / hormones / collagen / keratin ignore repair R produce / make energy R hereditary material / AW A 'sends messages to the cytoplasm' / 'tells the cells what to do' A ref. to mRNA

Question	answers	Mark	Additional Guidance
2 (d) 1 2 3 4 5 6 7 8 9	<p><u>eutrophication</u> ;</p> <p>growth of algae / algal bloom / weed growth ;</p> <p>reduces light reaching other plants ;</p> <p>algae / plants, die ;</p> <p>bacteria, decompose / feed on, dead plants ; A dead animals / 'eat'</p> <p><u>aerobic</u> respiration ; A aerobic bacteria</p> <p>(bacteria cause) oxygen (concentration in water) to decrease ;</p> <p>(so) fish / invertebrates / animals, suffocate / die / migrate ;</p> <p>AVP ; e.g. any further detail or consequence of any of the above marking points, e.g. reduces biodiversity / destroys food chains</p>	<p>[max 4]</p> <p>[Total: 15]</p>	<p>e.g. from lack of light / no resource</p> <p>A decomposers / fungi / microorganisms for bacteria</p> <p>R decrease in oxygen if linked to less photosynthesis</p> <p>R change in pH / toxins as cause of death</p> <p>must be linked to shortage of oxygen (however caused)</p>

Question		Answers	Marks	Additional Guidance
3	(a)	group of organisms / individuals, of same species ; can interbreed ; live in same area / habitat (at same time) ;	max 2	R 'people'
	(b)	<ol style="list-style-type: none"> 1 numbers of brown plant hoppers remain low, up to 40 days / day 40 ; 2 low numbers when spraying occurs (days 15 to 38) ; 3 rapid increase when spraying stopped / AW ; 4 then, crash / decrease ; 5 any population figure with unit ; e.g. to maximum of over 1000 per m² 	max 3	<i>ignore</i> ref. to resistance
	(c)	pesticide absorbed by the plants ; transported through the plant in the phloem ; ingested / AW, by insect when it, eats / sucks ; toxic / poisonous, to insect ;	max 2	A 'eats the plant'
	(d)	<ol style="list-style-type: none"> 1 no population explosion / AW ; 2 effective at reducing the numbers / AW ; 3 ref. to comparative figures from the graph ; 4 no pollution / damage to environment ; 5 no killing of harmless species ; 6 no concentration of pesticide in food chain ; 7 no pesticide left in foods / no harm to humans from the spray ; 8 no development of resistance to pesticide ; 9 less cost / economic benefits ; 10 AVP ; e.g. accept part of natural food chain 	max 3	

Question		Answers	Marks	Additional Guidance
3	(e)	1 decreased rainfall ; 2 flooding ; 3 erosion / loss of (top)soil ; 4 desertification ; 5 silting of rivers ; 6 loss of (plant) nutrients / soil fertility ; 7 disruption to food chain ; 8 loss of habitat ; 9 extinction / loss of biodiversity ; 10 effect on carbon dioxide in the atmosphere ; 11 justification for effect ; A unproductive forest / productive crop 12 AVP ;	max 4	A species become, rare / endangered A increase or decrease if justified e.g. leading to global warming
			[Total : 14]	

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Question		Answers	Marks	Additional Guidance
4	(a)	amylase ; prote(in)ase ; lipase ;	[3]	R carbohydrase R trypsin / pepsin / peptidase R 'protase', A 'proteas'
	(b)	1 prevents spread of (named) disease / AW ora ; 2 avoids pollution / removes harmful substances ; 3 makes, water / sewage / effluent, safe / AW ; 4 avoids smells ; 5 recycling of water ; 6 AVP ; e.g. ref. to eutrophication	[max 1]	A removes harmful microbes / bacteria R 'germs' A examples no need to specify for whom or what it is safe, but R 'safer' unqualified, treat 'marine organisms' as 'aquatic'
	(c)	1 mixes microorganisms with sewage ; 2 good contact between microorganisms and solids ; 3 more collisions ; 4 (aerobic) respiration ; R if anaerobic respiration 5 microorganisms produce carbon dioxide ; 6 gain / release / transfer, energy ; 7 (for) growth ; 8 (for) reproduction ; 9 to make enzymes ; A ref. to digestion	[max 4]	A microbes / bacteria
	(d)	to start the breakdown of the sewage quickly ; continuous process ; do not have to, breed / buy, the microorganisms ; <i>idea of</i> without waiting for the lag phase ;	[max 3]	A 'the right organisms to digest the sewage' A ref. to cost / less wastage of microbes A keeps the population of microbes constant <i>idea</i> R 'to save time' unqualified R 'to use over and over again'
	(e)	destroys / kills, bacteria / microorganisms ; prevents spread of, disease / pathogens ; makes water suitable for drinking ;	[max 2]	R disinfection R 'removes bacteria'
			[Total: 13]	