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**

<table>
<tr><th></th><th>Answers</th><th>Marks</th><th>Guidance for Examiners</th></tr>
<tr><td>1 (a)</td><td>
<table>
<tr><th>group of vertebrates</th><th>scaly skin</th><th>external ear (pinna)</th><th>feathers</th><th>glands</th></tr>
<tr><td>birds</td><td>✓</td><td>×</td><td>✓</td><td>×</td></tr>
<tr><td>bony fish</td><td>✓</td><td>×</td><td>×</td><td>× ;</td></tr>
<tr><td>amphibians</td><td>×</td><td>×</td><td>×</td><td>× ;</td></tr>
<tr><td>reptiles</td><td>✓</td><td>×</td><td>×</td><td>× ;</td></tr>
<tr><td>mammals</td><td>×</td><td>✓</td><td>×</td><td>✓ ;</td></tr>
</table>
</td><td>[4]</td><td></td></tr>
<tr><td>(b)</td><td>• 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 ;</td><td>[2]</td><td>I refs to teeth</td></tr>
</table>

1	Answers		Marks	Guidance for Examiners
(c)	**1** **2** **3** **4** **5** **6**	wind (dispersal) **;** 'hairs' / wing(s), on seed / fruit, to aid dispersal **;** self– (dispersal) **;** explosive, pods / fruits **;** water (dispersal) **;** 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 ºC **I** humidity
(e)	**1** **2** **3** **4** **5**	(cassowaries are large birds) so need large, territory / habitat / feeding area / lots of space **;** cannot fly so cannot move easily from one area to another **;** need many trees to produce enough fruit **;** cassowaries are dependent on many (tree) species **;** 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 / *Rhizobium* **;** (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 **;** *only for detail of any of the points above*	[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 *do not allow anything for events that occur after bacteria or plants die*
(c) **1** **2** **3** **4** **5** **6** **7** **8** **9** **10** **11** **12** **13**	*proteins in* ***cells*** 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 *DNA in* ***cells*** 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 phagocy **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	<u>eutrophication</u> ;		
	2	growth of algae / algal bloom / weed growth ;		
	3	reduces light reaching other plants ;		
	4	algae / plants, die ;		e.g. from lack of light / no resourc
	5	bacteria, decompose / feed on, dead plants ; **A** dead animals / 'eat'		**A** decomposers / fungi / microorganisms for bacteria
	6	<u>aerobic</u> respiration ; **A** aerobic bacteria		
	7	(bacteria cause) oxygen (concentration in water) to decrease ;		**R** decrease in oxygen if linked to less photosynthesis
	8	(so) fish / invertebrates / animals, suffocate / die / migrate ;		**R** change in pH / toxins as cause of death
	9	AVP ; e.g. any further detail or consequence of any of the above marking points, e.g. reduces biodiversity / destroys food chains		must be linked to shortage of oxygen (however caused)
			[max 4]	
			[Total: 15]	

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)	**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 m^2	max 3	***ignore*** 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)	**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 ;		**A** species become, rare / endangered
		10	effect on carbon dioxide in the atmosphere ;		**A** increase or decrease if justified e.g. leading to global warming
		11	justification for effect ; **A** unproductive forest / productive crop		
		12	AVP ;	max 4	
				[Total : 14]	

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 ; *idea of* 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 *idea* **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]		