

Human Influences on Ecosystems

Mark Scheme 5

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Human Influences on Ecosystems
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 5

Time Allowed: 56 minutes

Score: /46

Percentage: /100

	Answers	Marks	Guidance for Examiners
1 (a) (i)	amino acid / protein / RNA / DNA / AW;	[1]	A named protein, both plant and animal
(ii)	secondary (consumer) / carnivore / predator ;	[1]	R third / tertiary
(iii)	excretion ;	[1]	
(iv)	nitrification ;	[1]	A oxidation
(b)	1 <i>idea that</i> (fixed) nitrogen is in limited supply ; 2 <i>idea that</i> if not recycled is not available for plants to absorb ; 3 needed for many biological compounds ; 4 (required by organisms to make) amino acids / proteins / DNA / chlorophyll ; 5 for growth / for repair / for enzymes / for genes / AW ;	[max 3]	
(c)	1 not ideal habitat / not well adapted to habitat / conditions not favourable ; 2 any suitable reason ; e.g. too dry / wrong soil / wrong pH / wider leaves / larger leaf surface (area) 3 (seedlings) eaten by impala / herbivores ; 4 much tastier than grass / better nutritional content ; 5 competition with grasses ; 6 for any resource ; e.g. light / nutrients / minerals / water 7 slow growing ; 9 AVP ; e.g. few seeds produced, lack of suitable pollinators, lack of suitable / required symbiont, soil contains plenty of nitrate (so no advantage to being a nitrogen fixer, because of much animal dung) / poor seed dispersal 8 Connection...lightning and nitrogen in soil ;	[max 3]	I competition with self A lack of light / minerals / water

	Answers	Marks	Guidance for Examiners
1 (d)	<p>1 <i>general idea of</i> energy loss (in food chain) ;</p> <p>2 cheetahs are at a higher trophic level (than impala) / impala are the primary consumers / prey ;</p> <p>3 each cheetah eats many impala;</p> <p>4 large population of cheetahs cannot be sustained / number of impala controls or determines the number of cheetahs ;</p> <p>5 hunted / poached (for skins) ;</p> <p>6 killed by local people as they feed on animals ;</p> <p>7 reference to balanced ecosystem / food chain / food web;</p> <p>8 cheetahs do not eat, all impalas / all parts of an impala</p> <p>9 'lose energy', in respiration / as heat to environment ;</p> <p>10 <i>and in</i> movement / excretion / egestion / reproduction ;</p> <p>11 offspring killed / die (while growing) by other predators / their prey</p> <p>12 AVP ;</p>	[max 4]	
(e)	<p>1 idea of interdependence ;</p> <p>2 if one species is lost others may become extinct ;</p> <p>3 rely indirectly on plants ;</p> <p>4 impala eat a variety of plants ;</p> <p>5 cheetahs eat a variety of other prey animals ;</p> <p>6 <i>idea of</i> conserving habitats ;</p> <p>7 to ensure species continue for future generations to, enjoy / use ;</p> <p>8 biodiversity reference;</p>	[max 3]	<p>A idea of knock-on effect / AW</p> <p>A tourism</p>
		[Total:17]	

Question	E answers	Mark	Additional Guidance
2 (a)	unsegmented ; A no segments soft bodies ; (muscular) foot ; ignore feet mantle ; visceral mass ; AVP ;	[max 2]	ignore no (exo)skeleton no backbone no bones radula bilaterally symmetrical shell / exoskeleton
(b)	(8) legs / tentacles / arms / limbs / ; (large) eye ; has a head ; no shell / (completely) soft body / no exoskeleton / no external skeleton ; suckers (on tentacles) ;	[max 2]	R any internal features (see the question) R feelers / hands ignore no (muscular) foot / feet A suction pads
(c)	<i>look for an adaptation for attachment and an adaptation for survival when exposed to air</i> <i>allow ecf from part (a)</i> <i>attachment</i> threads / (muscular) foot / sticky fluid ; <i>survival in the air</i> <i>either</i> shell / exoskeleton, prevents / reduces, water loss / <i>or</i> shell / exoskeleton, protects against (named) predator(s) ;	[max 2]	A any suitable description of the threads e.g. fibres, projections, extension tentacles, etc. R suckers A slime / mucus for sticky fluid ignore protection unqualified ignore anything to do with gas exchange ignore camouflage if named must not be an aquatic predator

2 (d)	<p>1 has no, competitor(s) / predators (therefore increase in numbers) ;</p> <p>2 has no, pathogens / parasites / disease-causing organism(s) ;</p> <p>3 competes with existing species for, food/nutrients/space/oxygen ;</p> <p>4 could be a, predator / consumer , of other species ;</p> <p>5 A feeds on (many) other species</p> <p>6 could introduce, disease / parasite, for native species</p> <p>7 cause migration of native species ;</p> <p>AVP ; e.g. reduces <u>biodiversity</u> causes <u>extinction</u> decrease in numbers, higher in food web / at higher trophic levels increase in predators of zebra mussels</p>	[max 3]	
(e)	<p>1 do not move about / stay in one place, so exposed to pollutant (continuously) ;</p> <p>2 pollutant, kills them / reduces their numbers / prevents them breeding ;</p> <p>3 so presence / absence, is a good indicator ;</p> <p>4 pollutant accumulates (in animal's body) ;</p> <p>5 pollutant, detectable when concentrations are low / no longer present ;</p> <p>6 AVP ; they are filter feeders do not need to know what the pollutant is (as would be the case for a chemical test) no need for lab facilities / no need for equipment / can be done in the field</p>	[max 2]	<p>R more accurate</p> <p>ignore easy to, see / collect ; quicker to do skills / training needed / cheaper</p>

2 (f)	<i>non-biodegradable plastics</i>		
1	swallowed / ingested / eaten / cannot be digested ;		
2	caught around / trapped / entangled ;		
3	choke / blocks gut / smother / suffocate / injure / cut / trap / stuck in / AW ;		ignore kills / dies unqualified
4	plastic blocks light for <u>photosynthesis</u> ;		A organism is poisoned (by toxins)
5	may, contain / release, (oil-soluble) toxins / poisons ;		R 'plastics are toxic'
6	large pieces of plastic may block flow of water (in a river) ;		A suffocate in MP3 as a consequence of
7	that reduce concentration of dissolved oxygen ;		MP4
8	effect of loss of organism at a trophic level ;		MP6 and MP7 are linked
9	AVP ; e.g. any other consequence for organisms	[max 3]	

Question			Answers	Marks	Additional Guidance
3	(a)	1	provide, mineral (elements)/(named) ions/(plant) nutrients ;	[max 3]	MP2 A any reason, e.g. removed in crops at harvest/leached/AW MP5 R chloroplast
		2	that are in low concentration in soils ;		
		3	(minerals/ions are) limiting factor(s) ;		
		4	for, growth/yield ;		
		5	magnesium (ions) for chlorophyll production ;		
		6	for photosynthesis ;		
		7	nitrogen/nitrate (ions), for making, amino acids/ proteins ;		
	(b)		oxygen ; water/moisture ; suitable/ warm temperature ; AVP ;	[max 3]	ignore humidity unqualified R 'hot', 'heat' examples of AVPs any condition that breaks dormancy, e.g. light/optimum pH
	(c)	1	sulfuric acid has a bigger effect on roots than shoots ;	[max 4]	for MP5 and MP6 see the table of results (results from two rows are required in each case) units must be stated once
		2	0.003 mol per dm ⁻³ sulfuric acid has biggest effect ;		
		3	increase in root growth until 0.003 mol dm ⁻³ sulfuric acid ; ORA		
		4	negligible difference in effect (on root/ shoot) between 0.001 and 0.002 mol dm ⁻³ sulfuric acid ;		
		5	comparative data quote for <u>root</u> growth ;		
		6	comparative data quote for <u>shoot</u> growth ;		
	(d)	1	increase in burning, fossil fuels/named fossil fuel ;	[2]	more is not needed for MP2 as question says 150 years
		2	cars/factories/power stations/AW ;		

Question			E Answers	Marks	Additional Guidance
3	(e)	<p><i>effects of sulfur dioxide on organisms and their environment</i></p> <p>1 plants/leaves/roots/trees/bark, damaged/killed/stunted growth ;</p> <p>2 plants more likely to get diseased ;</p> <p>3 inhibits germination ;</p> <p>4 (sensitive species of) lichens killed ;</p> <p>5 microorganisms killed ;</p> <p>6 soil/lake/river, pH decreases ; AW</p> <p>7 aluminium ions become mobile ;</p> <p>8 nutrients/named example(s), leached ;</p> <p>9 shells damaged ;</p> <p>10 animals fail to reproduce ;</p> <p>11 low pH/aluminium ions, toxic to fish ;</p> <p>12 fish produce mucus which blocks gills ;</p> <p>13 AVP ;</p>			<p><i>ignore</i> sea</p> <p><i>ignore</i> marine (fish)</p> <p><i>examples of AVPs for MP13</i> chemical weathering/dissolve carbonate rocks respiratory problems in, human/animals (described) consequence for food chains</p> <p>[max 3]</p>
				[Total: 15]	