Human Influences on Ecosystems

Mark Scheme 2

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Human Influences on Ecosystems
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 2

Time Allowed: 63 minutes

Score: /52

Percentage: /100

1	(a	(i)	autotrophic (organism) ; organism that makes its own organic nutrients / food ; (usually) using energy from the Sun / by photosynthesis ;	[2]	
		(ii)	**1** all arrows point from food to feeder ; **2** elephant grass added (at the producer level) ; **3** phytoplankton and elephant grass arrows go to fish ; **4** mulberry trees arrow goes to silkworms ; **5** vegetables and fish arrows go to humans ;	[5]	
	(b)		**1** not all of the plants are edible / some not digested ; **2** faeces / egestion ; **3** eaten by, pests / AW ; **4** dead leaves / AW, to decomposers ; **5** plants lose energy as a result of respiration ; AVP ; e.g. some energy not used for growth	[max 3]	
	(c)		**1** (another) source of income ; **2** provides source of, protein / vitamins ; **3** feed on waste materials / elephant grass cuttings / phytoplankton (from the dykes) ; **4** so do not need feed bought in / no waste removal required ; **5** makes use of large quantities of available (delta) water ; **6** AVP ; e.g. constant source of water (for irrigation) / reduced risk of eutrophication / biological control / less need for dredging	[max 3]	
			Total:	**[13]**	

Question	Answers	Marks	Additional Guidance
2 (a) (i)	*award two marks if the answer is correct – 49* *if there is no answer or it is incorrect, award one mark for correct working* (207+65+4+410+38+527=1251) (1251 / 2558) x 100 **;** 49 (%) **;;**	**[2]**	**ignore** 48.9 %
(ii)	(awareness / education) to use less paper ; alternatives to using paper ;	max [1]	
(iii)	green kitchen waste ; glass ;	max [1]	
(b)	paper collection / sorting / sent to recycling centre ; shredding ; pulping ; requires water / soaking ; deinking / described ; requires bleach ; rolling / pressing / flattened ; AVP ;	max [4]	process must be in the correct sequence **A** 'made thin'
(c)	global warming ; increase in rate of photosynthesis ; causes increase in plant growth / crop yield / vegetation ; any two qualified examples of environment effects of global warming e.g. flooding, extreme weather conditions, qualified habitat change, reduced biodiversity ;; AVP ; e.g. disruption to migration routes	max [4]	**R** holes in ozone, acid rain, polar ice caps melting.
		[Total:12]	

Question				Mark	Additional Guidance
3	(a	(i)	rat-tailed maggot, tubifex (worms), (water) louse (and mayfly nymph) ;	[1]	**R** stonefly (nymph)
		(ii)	stonefly (nymph) ;	[1]	**R** if stonefly (nymph) and mayfly (nymph)
	(b)		high / very high / highest, concentration of nitrate ; <u>nitrate</u> needed by plants for, growth / making proteins / AW ; ref to nitrate not being a limiting factor ; AVP ;	max [2]	**ignore** eutrophication unqualified **ignore** nitrogen
	(c)		invertebrates are present all the time ; pollutant, kills them / reduces their numbers / prevents them breeding ; so presence / absence, is a good indicator ; pollutant accumulates (in animal's body) ; pollutant, detectable when concentrations are low / no longer present ; 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 ; AVP ;	max [2]	**A** bioaccumulation

Question			Mark	Additional Guidance

3	**(d)**	remove solids / pass through a grid / filter / screening ;
		allow to sediment / (primary) sedimentation / settling tank ;
		use, microorganisms / bacteria / fungi ;
		in aerobic conditions / oxygen supplied / aerobic digestion / aeration tank ;
		microbes, digest / decompose, complex compounds to, simple / soluble, compounds ;
		any example ; e.g. proteins → amino acids, starch → glucose, fat to
		                  fatty acids (and glycerol)
		water is, disinfected / chlorinated / treated with ozone / treated with UV ;
		AVP ; e.g. ref to respiration / recycling bacteria into aeration
		        tank / flocculation described or explained
			max [4]	**A** activated sludge / trickle filter
				
				A 'chemicals to kill bacteria'

	(e)	plastic remains / persists / lasts a long time / not decomposed ; swallowed / ingested / eaten / cannot be digested / blocks gut ; caught, around / strangle / trapped / entangled / smother / suffocate / injure / cut / trap / stuck in, organism AW ; plastic blocks light for, <u>photosynthesis</u> ; may, contain / release, (oil-soluble) toxins / poisons / harmful chemicals; blocks the flow of water in streams or rivers ; so less aeration of water / reduces concentration of (dissolved) oxygen ; destruction of, habitat / ecosystem / food chain ; *idea of* bioaccumulation / biomagnification ; trapped / stationary water acts as a breeding site for mosquitoes ; AVP ; e.g. visual pollution / releases hormone-like chemicals / less oxygen from <u>photosynthesis</u>	max [3]	**ignore** cannot degrade choke can be **mp2** or **mp3** but not both **ignore** kills / dies unqualified **R** 'plastics are toxic'
			[Total: 13]	

4	(a)	increases, landfill / rubbish heaps / AW ; swallowed / ingested / eaten / cannot be digested ; trapped / entangled / suffocate / injure / cut / strangle / AW ; plastic blocks light for photosynthesis ; release, toxins / poisons ; large pieces of plastic may block flow of water (in a river) ; reducing (concentration of) dissolved oxygen ; habitat / ecosystem, destruction / creation ; persistent / cannot decompose ; AVP **;** e.g. bioaccumulation / production of plastic pollutes the environment / eyesore	max [3]	**ignore** dies unqualified mp6 and 7 are linked
	(b) (i)	more waterborne and airborne (chemical) waste to make paper bags ; plastic needs oil (extraction) ; **ora** for paper bags paper bags require trees (to be felled) ; more energy needed to make paper bags ; **ora** for plastic bags appropriate comparative use of data with units ;	max [3]	**A** deforestation / **ora** for plastic bags
	(ii)	(heavy metals / acid) are toxic / harmful to organisms ; bioaccumulation / biomagnification (of heavy metal) / description ; decreases <u>pH</u> ; (acid) burns, shells / skin / plants ; aquatic, habitat / ecosystem, destruction ; AVP ; any qualified consequence of a named heavy metal	max [2]	**ignore** acid rain throughout **ignore** 'polluted' unqualified e.g. Minimata disease caused by mercu

4	(c)	(i)	more energy used to make than recycle (plastic bags) ; 594 kJ to make and 17 kJ (per bag) to recycle (plastic bags) ;;	max [2]	577 kJ (per bag) difference
		(ii)	deforestation / description ; two examples of the effects of deforestation e.g. soil erosion / habitat loss / so / reduced biodiversity ;; increase in carbon dioxide (from deforestation / coal / oil, power stations) ; carbon dioxide is a greenhouse gas ; causes global warming / enhanced greenhouse effect ; two examples of the effects of global warming e.g. rising sea levels / climate change / des / increased yield ;; AVP ; e.g. increased use of fossil fuels ref to power stations, affecting breathing / asthma / causes acid rain	max [4]	
				[Total: 14]	