Mark scheme

Human influences on ecosystems

Biology 0610 · Questions from Paper 3 and Paper 4

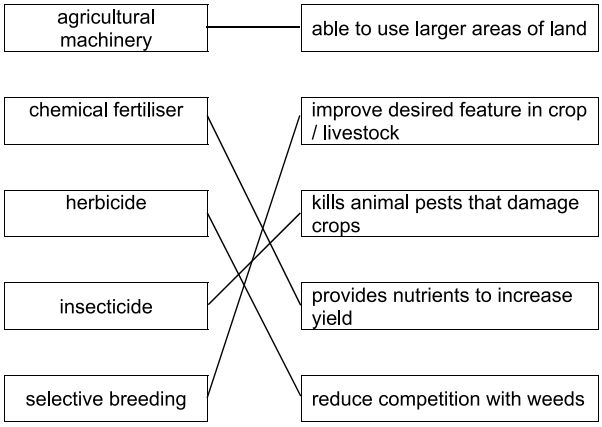
Total marks

89

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
6	7	8	12	12	7	9	11	10	7	**89**

Question 1 [6]

1(a)		**4**	5 correct = 4 marks 3 or 4 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark
1(b)	loss of biodiversity ; reduction in genetic variation ; production of, (named) greenhouse gases / global warming ; water pollution / AW ; habitat destruction ;	**2**	

STEM | Exam Builder

Question 2 [7]

2(a)(i)	*any three from:* habitat destruction ; loss of biodiversity / extinction ; loss of soil / soil erosion / desertification ; flooding / drought ; increased carbon dioxide in the atmosphere ;	**3**	
2(a)(ii)	*any two from:* loss of biodiversity / extinction of species ; *idea of* disease / pests, transferring to wild populations ; disruption of food chains / described ; loss of habitats ; pollution / described ; less water available / AW ;	**2**	

2(b)	*any two from:* ref. to seed banks ; captive breeding (programmes) / AW ; education ; idea of legislation ; keeping them in, zoos / parks / reserves ; protecting / preserving, habitats; monitoring, species / habitats ; protecting species / described ;	**2**	e.g. preventing / limiting, hunting / collecting / poaching

Question 3 [8]

3(a)	*any four from:* slow and easy to catch; not enough left to reproduce; not enough grow to breeding age AW; hunting drove them out of their natural habitats; difficult to find mates; competition for food / not enough food; introduction of disease; destruction of habitat; (goats) damaged their eggs / hatchlings;	**max 4**	
3(b)	*any two from:* captive breeding program; zoos / reserves / national parks; ban hunting; conserve / protect, habitat AW; remove predators / competitors; educate / awareness / research; idea of ecotourism;	**max 2**	
3(c)	*any two from:* more, primary consumers / herbivores / prey; fewer producers; increase in the numbers of other secondary consumers; fewer, tertiary consumers;	**max 2**	
		Total: 8	

STEM | Exam Builder

Question 4 [12]

4(a)(i)	1980 to 1985 ;	**1**	
4(a)(ii)	133 (%) ;	**3**	MP1 correct readings from graph MP2 correct value calculated to any number of decimal places i.e. ((200 ÷ 150) × 100 =)133.33 recurring MP3 evidence of correct rounding to a whole number **ecf** from previous step
4(b)	*any three from:* fertiliser use ; herbicide use ; insecticide use ; selective breeding ; use of agricultural machinery ; monoculture ; genetic modification ; **AVP** ;	**3**	e.g. clear more land / irrigation
4(c)(i)	*any three from:* less energy used, for movement / maintain body temperature ; (so) more energy used for growth / AW ; increased yield / more product / more people able to be fed ; more profit / cheaper product ; less land needed (for livestock) / more land available for other uses ; *idea of* easier to care for animals ; use, technology / machinery, so less manual labour needed AW ; protection from predators ; **AVP** ;	**3**	
4(c)(ii)	*any two from:* pollution ; fish / other aquatic life, die (due to lack of oxygen) ; decreased biodiversity ; food chains / webs, are affected / described ; spread / cause, of disease / pathogen ; habitat destruction ; **AVP** ;	**2**	e.g. less oxygen in the water

STEM | Exam Builder

Question 5 [12]

5(a)	*any one from:* rice fields / wetlands ; cattle / livestock ; AVP ; e.g., melting permafrost / termites / wildfires / (burning) fossil fuels / natural gas / fracking	**1**	
5(b)	increase ; 1600 / 1720 ; 1100 ;	**3**	**A** value in range 1720 to 1730 **A** value in range 1080 to 1100
5(c)(i)	combustion ;	**1**	**A** decomposition / decay
5(c)(ii)	*any two from:* enhanced greenhouse effect ; climate change / global warming / global heating ; large scale changes in weather patterns / extreme weather events ; sea level rising / ice caps melting ; reduction in biodiversity / extinction ;	**2**	
5(c)(iii)	photosynthesis / AVP ;	**1**	
5(d)(i)	anaerobic respiration / fermentation ;	**1**	
5(d)(ii)	*any three from:* reduces nutrient level in soil / requires more use of fertilisers ; encourages pests / requires more use of pesticides ; (leads to) increased pesticide resistance ; requires more water / irrigation ; contamination of water / increased run-off / pollution ; increases soil erosion ; lack of biodiversity ; loss of habitats / deforestation ; less land available for food crops ; AVP ; e.g., requires more fossil fuel energy	**3**	

Question 6 [7]

6(a)	1 ringing allows monitoring of, species / population; 2 to check on (population) numbers; 3 find out about life span; 4 to find out where they go (during migration) / to track their position; 5 find out how far birds travel; 6 to find out when they migrate; 7 allows checks on, health of birds / survival rates; 8 breeding success; 9 do not harm the birds / do not make them obvious to predators; 10 AVP; e.g. information from ringing is used in conservation	**2**	**I** 'to track them' unqualified
6(b)	1. to prevent extinction; 2. maintain biodiversity; 3. provide feeding grounds for animals / ref. to disruption of food, chains / web; 4. provide, breeding grounds / places for breeding; 5. provide, habitats / shelter; 6. vulnerable to the effects of, development / drainage / AW; 7. ref to flooding / natural disasters; 8. ref to nitrogen cycle; 9. ref to maintenance of water cycle; 10. ref to carbon cycle; e.g. greenhouse gas / carbon storage / carbon sink 11. waste disposal; 12. provide, resources / food / fuel / drugs / raw materials; 13. idea of areas for, recreation / (eco)tourism / education; 14. ethical reasons / aesthetic reasons / AW; 15. AVP; e.g. soil erosion	**5**	**I** food chain (singular)
		Total: 7	

STEM | Exam Builder

Question 7 [9]

7	**(a)**		*Gallirallus* ;	[1]	**R** *Galliralus calayanensis*
	(b)		*(clearing land for)* agriculture ; roads / transport ; housing ; fuel ; timber qualified ; e.g. for building material AVP ; e.g. mining / industrialisation	[max 3]	 **A** furniture manufacture / paper
	(c)		*decrease* habitat loss ; fewer nesting sites ; less reproduction ; ref to, camouflage / exposed to predation ; less food / food chain disrupted ; more competition ; higher temperature / more exposure to storms / AW ; *increase* fewer predators ; more food ; fewer competitors ; simpler food web ;	[max 3]	**No credit for** ‘decrease’ / ’extinction’ / ’increase’ without qualification
	(d)		*Question asks for reasons why conserving species is important – answers must be in this context* *ecological* ref to food chain / food web ; interdependence / AW ; *aesthetic* species are unique / AW ; (eco)tourism ; ref to biodiversity ; retain genes / maintain gene pool / AW ; qualified potential use for humans ; AVP ; e.g. ethical considerations for future generations to appreciate	[max 2]	 **R** ‘become extinct’ without further qualification **A** maintain / balance ecosystem **A** ‘knock-on’ effects / possible example / AW
			[Total: 9]		

STEM | Exam Builder

Question 8 [11]

8	(a)		**1** – producer ; **2** – <u>secondary</u> / <u>2nd level</u> / <u>2nd order</u> , consumer ;	[2]	
	(b)	**1** **2** **3** **4** **5** **6** **7** **8**	*idea that* energy is lost, along the food chain / at each trophic level / between trophic levels ; *idea that* 90% lost between trophic levels / 10% passed on ; respiration / movement / heat loss / metabolism ; excretion ; food not eaten / food not digested / ref. to egestion / AW ; tuna / top carnivores, are in smaller numbers ; more energy available in, trophic level 2 / herbivorous fish, than in, level 4 / tuna or dolphins ; AVP ;	[max 3]	
	(c)	**1** **2** **3** **4** **5** **6** **7** **8** **9** **10** **11**	*idea that* if not conserved they would become extinct ; ref. to, maintaining numbers of other species in food web / disruption of food web / maintaining balance in food web ; maintaining (bio)diversity ; so increase in number of, carnivorous fish / squid / trophic level 3 ; reduction in, herbivores / herbivorous fish / zooplankton / tropic level ; less food available for, consumers / AW ; would be less, tuna / food, for humans ; aesthetic reason (for conserving) / AW ; economic reason (for conserving) / AW ; AVP ; AVP ;	[max 4]	**A** ‘extinguished’
	(d)	**1** **2** **3** **4**	persists / not broken down / does not decay ; eaten by animals ; fish / turtles / mammals, get entangled / trapped / suffocate ; AVP ;	[max 2]	
				[Total: 11]	

STEM | Exam Builder

Question 9 [10]

9(a)	*any five from:* **1** habitat loss / deforestation ; **2** large mammals need large amounts of space ; **3** (named example of) climate change ; e.g. desertification *use of land for* **4** land developed for agriculture ; **5** land developed for, housing / transport / factories / AW ; **6** land used for extraction of (named) material(s) ; **7** competing with humans for space ; **8** idea that populations are isolated ; **9** hunt / trophies / high value / poaching ; **10** laws are not enforced to protect from hunting ; **11** lack of education ; **12** poisoning / pollution ; **13** need a large quantity of food / lack of food sources / starvation ; **14** slow reproduction rate / hard to breed in captivity ; **15** AVP ;	**5**	
9(b)(i)	*any two from:* inbreeding / AW ; reduce (genetic) variation ; (reduced variation) less able to respond to, environmental changes / disease ; increase in homozygosity / described in terms of alleles ; increase chance of genetic disease(s) / birth defects ; any example ; e.g. lameness increase chance of infertility ;	**2**	
9(b)(ii)	*any three from:* **1** collect semen / sperm *(implied by context)* ; **2** freeze semen / sperm, / use sperm bank / use sperm collected, far away/ long ago ; **3** selecting / washing / screening, of sperm / AW ; **4** use hormones for (super)ovulation ; **5** determine when female is about to ovulate ; **6** insert, semen / sperm, into female (vagina / uterus) ;	**3**	

Question 10 [7]

10(a)	poor absorption of calcium / weak bones / weak teeth / depression / fatigue / muscle pain / joint pain / rickets / osteomalacia / AVP ;	**1**	
10(b)	*reasons why endangered:* (described) overfishing / hunting ; food chain disrupted (described); overconsumption (by humans) ; (named) pollution ; introduced diseases / species ; habitat destruction ; climate change ; *risks if populations drop:* reduced variation ; reproduction rate is lower / harder to find a mate ; extinction ; AVP ; *how to maintain fish stocks:* education ; quotas ; no-catch zones / nursery zones / seasonal fishing / protected areas / MPAs / Marine Protected Areas ; fines ; restocking ; fish farms ; method of fishing (described) ; AVP ;	**6**	

STEM | Exam Builder