Question			Answer		Marks	Guidance
1	(a)			*idea that:*	2	**CREDIT** any valid point where seen
			1	not all , areas explored / species yet discovered **;**		**1 ACCEPT** 'not all species have been identified (yet)' **1 IGNORE** 'yet to be named' **1 IGNORE** refs to speciation **1, 2, 3 ACCEPT** 'organism' as AW for species as it is an '*idea that*' marking point
			2	microscopic / small / nocturnal / camouflaged , species difficult to see **;**		
			3	sampling might miss rare species **;**		
			4	organisms mistakenly identified as one species may actually be two (or more) species **;**		
			5	concept of species is difficult to define **;**		

Question			Answer		Marks	Guidance
1	(b)	(i)			3	Marking points 1-5 must be stated in words, not implied by figures
			1	both / assessed **and** threatened , show increase **;**		**1 IGNORE** both are similar shape unqualified **1 ACCEPT** general statement or referring to given time period **1 ACCEPT** assessed and threatened show positive correlation
			2	number of assessed (species) , always / AW , higher (than threatened species) **; ora**		
			3	*idea of*: widening gap between assessed (species) and threatened (species) / higher rate of increase for assessed species **;**		
			4	between 2000 and 2002 / in first two years , both / assessed **and** threatened , were level / AW **;**		**4 IGNORE** 'at the start' answers must mention years
			5	after 2004 , both / assessed **and** threatened , have, reduced rate of increase / slower increase / AW **;**		**5 IGNORE** 'between 2004 and 2005' answers must imply whole of subsequent time period
			6	figures to support any above statement **;**		**6** figures must support another point that has been credited **6** Answers must quote numbers for total assessed species **and** for threatened species along with two years **6 ACCEPT** calculated comparisons

Table of acceptable figures:

Year	total number of species	total species threatened	increase in total number of species since 2000	increase in number of species threatened since 2000	acceptable range for % of total
2000	16500	11500	-	-	65 - 75
2001	16500	11500	0	0	65 - 75
2002	16500	11500	0	0	65 - 75
2003	22000	12500	5500	1000	53 - 60
2004	38000	15500	21500	4000	39 - 43
2005	38500	15500	22000	4000	38 - 42
2006	40000	16500	23500	5000	40 - 43
2007	41500	16500	25000	5000	38 - 41
2008	45000	17000	28500	5500	36 - 39
2009	47500	17500	31000	6000	35 - 38
2010	57500	18500	41000	7000	31 - 33
	accept +/- 500	accept +/- 500	accept +/- 1000	accept +/- 1000	

Examples of acceptable figure quotes to support each point

mp1 "between 2000 and 2009 total assessed species increase by 31000 and threatened species increase from 11500 to 17500"

mp2 "in 2004 total assessed species was 38000 and threatened was 15500"

mp3 "in 2000 there were 5000 more assessed species than threatened, in 2006 the gap was 23500"

mp4 "between 2000 and 2002 assessed species were 16500 and threatened were 11500"

mp5 "in the 4 years before 2004, total species rose by 21500 and threatened by 4000. In the 4 subsequent years total assessed rose by13000 and threatened rose by 1500."

5	**(b)**	**(ii)**	31 / 32 / 33 **;;**	2	Correct answer = 2 marks If answer incorrect, **AWARD** 1 mark for 18,500 (± 500) ÷ 57,500 (± 500) **or** If answer not given to the nearest whole number **AWARD** 1 mark for any figure between 31.0 and 33.4

1	(b)	(iii)	1 a	*(total species assessed is increasing because)* , *idea of* more sampling / exploration (leads to more species identified)	2	**1 IGNORE** refs to speciation as time frame too short
				or		
			b	improved identification , techniques / described **;**		**1** eg DNA fingerprinting **1 IGNORE** study if used in the context of species that have already been identified
			2 a	*(threatened species is increasing because)* , loss of habitat		**IGNORE** idea of conservation not working
				or		
			b	climate change		
				or		
			c	increased human population		**IGNORE** refs to hunting
				or		
			d	*idea of* interspecific competition from introduced species		**IGNORE** 'competition from newly discovered species' as this implies that the candidate thinks the species was not present until it was discovered
				or		
			e	*idea that* some of the newly-identified species are likely to be threatened **;**		e.g 'as more species are discovered, the number of threatened species will go up'
			3 a	*(there is a widening gap between total and threatened species because)* , new species tend to be discovered in areas where humans don't live so they are not threatened		
				or		
			b	conservation techniques are working / AW **;**		

Question			Answer	Marks	Guidance
1	(c)		range / number , of habitats / ecosystems **;** genetic variation (within species) **;**	1	**CREDIT** only these answers

Question				Answer	Marks	Guidance
1	(d)				4	If correct points included under the wrong headings then award **max 1** for that convention **ACCEPT** suitable synonyms for trade throughout, e.g. 'buying and selling'
				CITES *2 max*		
			C1	regulate / monitor / prevent , trade in , selected / certain / endangered , species		**C1 ACCEPT** ref to products from endangered species, e.g. leopard skin **C1 ACCEPT** 'illegal' as AW for 'selected / AW'
			C2	ensure (international) trade does not endanger , wild populations / AW **;**		**C2 DO NOT AWARD** if 'all trade in wild plants' stated
			C3	prohibit (commercial) trade in wild plants **;**		
			C4	allow trade in , artificially propagated plants / AW **;**		
			C5	allow (some) trade in less endangered **,** wild species / organisms / animals and plants **;**		
				Rio Convention *2 max*		
			R1	sustainable use of **,** organisms / habitats / ecosystems **;**		**R1 ACCEPT** example e.g. replanting trees / fishing quotas / large mesh size
			R2	share genetic resources **;**		**R2 AWARD** in context of access to or benefits from genetic resources
			R3	share access to **,** scientific knowledge / technology **;**		
			R4	*idea of* promoting (named) *ex situ* conservation method(s) **;**		**R4** e.g. 'set up seed banks' / 'captive breeding programmes' **R4 IGNORE** 'zoos' unqualified **R4 IGNORE** 'in situ'
			R5	*idea of* raising profile of (biodiversity) with , governments / public bodies / general public **;**		**R5 ACCEPT** 'take biodiversity into account during planning processes' **R5 ACCEPT** 'informing people that it is their duty to consider biodiversity'
			R6	*idea of* international cooperation (on biodiversity issues) **;**		
				Total	**14**	

Question			Answer		Marks	Guidance
2	(a)	(	1	artificial selection / selective breeding ;	3 max	
			2	select (male and female) sheep that are, larger / woollier / meatier/ have desired characteristics ;		2 ACCEPT ‘large / woolly / meaty, male and female that can produce healthy offspring’ ; 2 ‘sheep’ can be inferred from ‘individuals’ as it is in the stem of the question
			3	crossbreed / breed (together) / mate (together) / interbreed ;		3 ACCEPT ‘reproduce’
			4	select , best / AW, offspring ;		
			5	*idea of* breeding (and selecting) for , many / several , generations ;		5 IGNORE traits passed on through generations, answers must imply breeding and selection
		(ii)			1 max	**Mark the first answer.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks**
				(use of) (named) antibiotics ; (use of) (named) pesticides / insecticides / fungicides ;		IGNORE refs to ‘fertiliser’ etc., as ‘sheep’ is in question stem IGNORE refs to diet
				cloning / genetic modification / AW ; artificial insemination / AI / IVF / marker-assisted selection ;		
				hormones ; vaccinations ;		ACCEPT ‘steroids’ / ‘growth supplements’ IGNORE ‘better veterinary care’

Question			Answer		Marks	Guidance
2	(b)	(	1	broken down by, decomposers / bacteria / fungi ;	3 max	
			2	add (named) mineral(s) to soil ;		2 **IGNORE** nutrients **ACCEPT** ions
			3	nitrate and phosphate and potassium / NPK ;		3 **ACCEPT** nitrogen , $NO_3^{(-)}$, $PO_4^{(3-)}$, $K^{(+)}$ NH_3, $NH_4^{(+)}$, ammonium, ammonia 3 **IGNORE** phosphorous, P , N_2
			4	specific use of (any) named mineral ;		4 eg nitrate or nitrogen for protein, magnesium for chlorophyll, etc. 4 **DO NOT CREDIT** vague uses like 'nitrate for growth'
			5	lack of (named) , mineral(s) / nutrient(s) / ion(s), is limiting factor (for growth) ;		
			6	*example of* way in which soil quality is improved ;		6 **ACCEPT** for example change in pH / crumb size / air content / moisture content / less leaching of minerals / increased humus / presence of (named) detritivores / less risk of soil erosion

Question			Answ			Guidance
2	(b)	(i	1	(fertiliser) promotes growth of, one / few, (plant) species ;	2 max	1 **ACCEPT** 'once species might grow more than another' 1 **IGNORE** 'yield'
			2	other (plant) species , out-competed / AW (as a result of competition from crop species) ;		2 **IGNORE** fertilisers / eutrophication , killing other plants 2 **ACCEPT** 'other plants die' in the context of their being out-competed by the crop plant
			3	*idea of* disruption of food chains ;		3 **DO NOT CREDIT** in the context of biomagnification / eutrophication
			4	*idea of* reduction in , soil quality / humus , over time so plants cannot grow ;		4 **ACCEPT** 'might change soil pH so some plants can't grow'
		(iii)			3 max	**IGNORE** answers in the context of genetic variation **within the domestic population**. For example,' if one plant is susceptible to a disease then they might not all die'.
			1	loss of genetic , diversity / variation (in wild population) ;		1 **ACCEPT** small / reduced , gene pool
			2	environment / agricultural requirements, may change (in future) ;		
			3	(lost) genes / alleles , may have been useful ;		3 **ACCEPT** 'potential genetic resource may have been lost'
			4	e.g. of gene useful to agriculture ;		4 *e.g., gene for* pest resistance / disease resistance / heat tolerance / drought tolerance ; 4 **DO NOT CREDIT** immunity to diseases
			5	fewer pollinators ;		
			6	loss of (pest) predators ;		
				Total	12	

Question			Answer	Marks	Guidance
3			<table><tr><th>definition</th><th></th></tr><tr><td>sampling in which the observer does not decide when and where to take measurements</td><td>random ;</td></tr><tr><td>a representative group of organisms that are selected from a population</td><td>sample ;</td></tr><tr><td>the area in which an organism lives</td><td>habitat ;</td></tr><tr><td>a measure of the relative numbers of individuals in each species</td><td>species evenness ;</td></tr><tr><td>the frequency of occurrence of plants in a particular area</td><td>abundance ;</td></tr><tr><td>the number of species present in a particular area</td><td>species richness ;</td></tr></table>	6	**DO NOT AWARD** mark if two or more answers are given in any box except **IGNORE**s listed below **IGNORE** systematic **IGNORE** percentage cover **IGNORE** biodiversity
			Total	**6**	

Question			Answer		Marks	Guidance
4	(a)		41 667 **;** **;**		2	Award 2 marks for a correct answer**,** even if no working shown. **ALLOW** 1 mark for 41 666.666˙,41 666.7, 41 666.67, 41 666.667, 41 670, 41 700, 41 666, 41668 or 42 000. If the answer is incorrect **ALLOW** 1 mark for $\frac{2500 \times 100}{6}$
	(b)				3	**Mark the first three reasons regardless of lines**
			1	part of ecosystem / habitat for other organisms **;**		**1 IGNORE** maintains biodiversity
			2	part of food, chain / web **;**		**2 ACCEPT** food source **2 IGNORE** home
			3	wood useful for specific purpose **;**		**3** e.g. making , fences / furniture / boundary marker
			4	(potential) source of medicine **;**		
			5	genetic resource **;**		**5 ACCEPT** description or example but must refer to genes
			6	aesthetic value / give pleasure / beautiful trees **;**		**6 ACCEPT** tourism
			7	ethical reason / moral responsibility **;**		**7 ACCEPT** *idea that* they have a right to existence **7 DO NOT CREDIT** 'playing God'
			8	resource for (non-medical) scientific research **;**		

Question			answer		Marks	Guidance
	(c)	(i)	not in, natural / normal, habitat / environment **;**		1	
		(ii)	**1**	most plants produce an excess **;**	4 max	
			2	(so) can be collected (from wild) without damaging (wild) , plants / organisms / population / habitat **;**		
			3	take up little space **; ora**		
			4	able to store, large numbers / more species **; ora**		
			5	easy / cheaper, to transport / AW **; ora**		**5 ACCEPT** can easily be sent where wanted
			6	*idea of* remaining viable for long periods **; ora**		**6** Answers must have some reference to survival, not just 'can be stored for a long time'
			7	less susceptible to, disease / pests / environmental change **; ora**		**7 IGNORE** recovery / survival , from disease **7 CREDIT** answers that describe (greater) disease resistance as a property of the seeds themselves **or** that the seed bank is a (more) protected environment for the seeds **IGNORE** cheaper unqualified

Question			Answer		Marks	Guidance
4	(c)	(ii	1	(maintain / increase) genetic variation / gene pool ;	3 max	1 **ACCEPT** different alleles 1 **DO NOT CREDIT** different genes
			2	reduced chance of (future), disease / environmental change, affecting (whole) population ;		2 **ACCEPT** 'so if one dies from a disease some might survive' 2 **ACCEPT** 'to get some plants that are resistant to different diseases'
			3	reduces chance of inbreeding ;		
			4	maintain, geographical variation / varieties / races / strains / subspecies ;		4 **IGNORE** variation unqualified
				Total	13	

Question			Expected Answers		Mark	Additional Guidance
5	(a)		photosynthesis ; starch ; nucleic acids ; monomers ; cellulose ;		5	**Mark the first answer in each space.** If the answer is correct and an additional answer is given that is incorrect or contradicts the correct answer then = **0 marks** **ACCEPT** minor mis-spellings
5	(b)		**1**	without fertiliser <u>yield</u> falls (over time) / fertiliser maintains <u>yield</u> / AW ;		**IGNORE** 'nutrients/ minerals' throughout **1** **ACCEPT** it / nitrate / nitrogen as AW for fertiliser **ACCEPT** fertiliser increases yield
			2	application of fertiliser replaces lost , nitrogen / nitrates ;		**2** **ACCEPT** it / nitrate / nitrogen as AW for fertiliser
			3	nitrogen / N, required for **,** amino acids / (named) protein / growth / (named) nucleic acids / (named) nitrogenous base ;		**3** **IGNORE** 'development' **IGNORE** fertiliser / nitrate / N_2
			4	*idea that* nitrogen / N / nitrate / $NO_3^{(-)}$, removed (from soil / system) by , plant / harvesting ;		**4** Answers must refer to depletion (from soil) 'used' alone does not imply depletion
			5	*idea of* denitrification ;		
			6	nitrates / $NO_3^{(-)}$, are soluble ;		
			7	nitrates / $NO_3^{(-)}$, are **,** leached / washed from soil ;	**3 max**	

Question			Expected Answers		Mark	Additional Guidance
5	(c)					**ACCEPT** 'tolerance' as AW for resistance If candidates write 'immunity' penalise once and then ecf
			1	natural selection ;		
			2	insecticide is the , selective agent / selection pressure ;		
			3	*idea of* mutation / (genetic) variation ;		3 **DO NOT CREDIT** idea of insecticide or natural selection *causing* mutation **DO NOT CREDIT** variation that could be environmental
			4	random / naturally occurring ;		
			5	resistant survive / non-resistant die ;		5 **ACCEPT** AW for resistant, e.g. 'the ones with the mutation'
			6	(resistants will) pass on , allele / mutation , for resistance (to offspring) ;		6 **ACCEPT** gene for resistance **IGNORE** 'pass on resistance / trait'
			7	higher proportion of / more , resistant individuals in population ;		7 **CREDIT** refs to increased allele / gene frequency **ACCEPT** 'the whole population becomes resistant'
			8	*idea that* resistance allele confers resistance only to a small dose of insecticide ;		
					4 max	
				Total	**[12]**	