<table>
<tr><th>Question number</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td>B</td><td>1</td><td></td></tr>
<tr><td>2</td><td>B</td><td>1</td><td></td></tr>
<tr><td>3</td><td>
<table>
<tr><td>Term</td><td>Description</td></tr>
<tr><td>a. Biodiversity</td><td>The variety of living organisms present in an area.</td></tr>
<tr><td>Genetic biodiversity</td><td>b. The variety of genes which make up a species</td></tr>
<tr><td>c. Random sample</td><td>A sample produced without bias; each individual has an equal likelihood of selection.</td></tr>
<tr><td>Abiotic factor</td><td>d. Non-living component of a habitat</td></tr>
<tr><td>e. Systematic sampling</td><td>A sampling technique where different areas within a habitat are identified and sampled separately; for example, by using a line transect.</td></tr>
</table>
</td><td>5</td><td></td></tr>
<tr><td>4 (a) (i)</td><td>Collecting a number of representative organisms</td><td>1</td><td></td></tr>
<tr><td>4 (a) (ii)</td><td>Any two from:
to reduce time required to collect / count organisms;
to minimise costs;
some organisms cannot be easily located / collected;
organisms move in / out of habitat; other appropriate suggestion</td><td>1</td><td></td></tr>
<tr><td>4 (b)</td><td>Random – all individuals have an equal chance of selection; non-random – some element of bias affects the likelihood of an individual’s selection;
random advantage – more representative of the population / sample produced is unbiased;
non-random advantage – allows easier comparison between abiotic factors / changing abiotic conditions can be studied;</td><td>3</td><td></td></tr>
<tr><td>4 (c)</td><td>Any six from:
Up to two animal sampling techniques
e.g. Use of sweep nets to catch flying insects / insects in tall grass;
Up to two plant sampling techniques
e.g. Use of quadrats to measure percentage cover of different plant species;
Use of random / non-random sampling approach;
with justification;
Collection of several samples with use of averaging;
with justification;
Measurement of a named abiotic factor;
in relation to plant / animal abundance;
Correct use of term species richness / species evenness;</td><td>2

2

1
1

1
1
1
1
1
6 max</td><td></td></tr>
</table>

5 (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, 41 700, 41 666, 41668 or 42 000. If the answer is incorrect ALLOW 1 mark for (2500x100)/6
5 (b)	1 Part of ecosystem / habitat for other organisms; 2 Part of food, chain / web 3 wood useful for specific purpose 4 (potential) source of medicine 5 genetic resource 6 aesthetic value / give pleasure / beautiful trees 7 ethical reason / moral responsibility 8 resource for (non-medical) scientific research	3 max	Mark the first three reasons regardless of lines 1 IGNORE biodiversity 2 ACCEPT food source 2 IGNORE home 3 e.g. making, fences / furniture / boundary marker 5 ACCEPT description or example but must refer to genes 6 ACCEPT tourism 7 ACCEPT idea that they have a right to exist 7 DO NOT CREDIT 'playing God'
5 (c) (i)	Not in, natural / normal, habitat / environment;	1	
5 (c) (ii)	1 most plants produce an excess 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 6 idea of remaining viable for long periods; ora 7 less susceptible to, disease / pests / environmental change ; ora	4 max	5 ACCEPT can easily be sent where wanted 6 Answers must have some reference to survival, not just 'can be stored for a long time' 7 IGNORE recovery/survival, from disease 7 CREDIT answers that describe (greater) disease

<table>
<tr><td></td><td></td><td></td><td>resistance as a property of the seeds themselves
Or that the seed bank is a (more) protected environment for the seeds
IGNORE cheaper
unqualified</td></tr>
<tr><td>5 (c) (iii)</td><td>1 (maintain/increase) genetic variation / gene pool;
2 reduced chance of (future), disease / environmental change, affecting (whole) population;
3 reduces chance of interbreeding;
4 maintain, geographical variation / varieties / races / strains / subspecies ;</td><td>3 max</td><td>1 ACCEPT different alleles
1 DO NOT CREDIT different genes
2 ACCEPT ‘so if one dies from a disease some might survive’
2 ACCEPT ‘to get some plants that are resistant to different diseases’
4 IGNORE variation unqualified</td></tr>
<tr><td>6 (a) (i)</td><td><table>
<tr><td>species</td><td>Number of individuals (n)</td><td>n/N</td><td>(n/N)2</td></tr>
<tr><td>Dog’s mercury</td><td>40</td><td>0.40</td><td>0.16</td></tr>
<tr><td>Wild strawberry</td><td>13</td><td>0.13</td><td>0.02</td></tr>
<tr><td>Common avens</td><td>43</td><td>0.43</td><td>0.19</td></tr>
<tr><td>Wood sorrel</td><td>4</td><td>0.04</td><td>0.01</td></tr>
<tr><td></td><td>N = 100</td><td></td><td>$\Sigma(n/N)^2$ = 0.38</td></tr>
<tr><td></td><td></td><td></td><td>1-($\Sigma(n/N)^2$) = 0.62</td></tr>
</table>; ; ;</td><td>3</td><td>Award 3 marks for the correct answer (0.62 to 2 dp)
If answer is incorrect:
IGNORE numbers in first 4 rows
‘N = 100’ = 1 mark
$\Sigma(n/N)^2$
ALLOW ecf for correct calculation from candidate’s incorrect N value
1-($\Sigma(n/N)^2$)
ALLOW ecf for correct calculation from candidate’s $\Sigma(n/N)^2$ value
Answer must be given to 4 dp for ecf</td></tr>
<tr><td>6 (a) (ii)</td><td>species richness
number of species (in an area / habitat) ;
species evenness
number of / how many, individuals there are of, each / every, species (in an area / habitat) ;</td><td>2</td><td>IGNORE organisms / abundance / quantity / variety
DO NOT CREDIT amount
ACCEPT ‘organisms’ as AW for individuals
CREDIT relative abundance of (each) species / population size of</td></tr>
</table>

			each species IGNORE relative abundance of, a / one, species DO NOT CREDIT amount
6 (a) (iii)	(habitat) dominated by, one / few / AW, species ; change in one species , likely to affect whole habitat / AW ; community / ecosystem / habitat / area , is unstable / not able to withstand change / easily damaged ;	2	ACCEPT high number of one species IGNORE environment / biodiversity as AW for community IGNORE the community / AW will be damaged
6 (b)	1 idea of random sampling ; 2 standardisation of technique ; 3 use of, key/identification chart ; 4 survey at different , times of year / season ; 5 include , trees / species larger than quadrat ;	2	IGNORE prompt lines and mark as prose 1 ACCEPT description of randomisation method 2 ACCEPT description of standardisation method 2 ACCEPT count the same way each time 4 IGNORE 'repeat' unqualified 4 IGNORE different times of day / different times
7 (a)	idea that: 1 not all , areas explored / species yet discovered ; 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 ;	2	CREDIT any valid point where seen 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
7 (b) (i)	1 both / assessed and threatened , show increase ; 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 ;	3	Marking points 1-5 must be stated in words, not implied by figures 1 IGNORE both are similar shape unqualified

	5 after 2004 , both / assessed and threatened , have, reduced rate of increase / slower increase / AW ; 6 figures to support any above statement ;		1 ACCEPT general statement or referring to given time period 1 ACCEPT assessed and threatened show positive correlation 4 IGNORE 'at the start' answers must mention years 5 IGNORE 'between 2004 and 2005' answers must imply whole of subsequent time period 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
7 (b) (ii)	<table><tr><th>Year</th><th>Total number of species</th><th>Total species threatened</th><th>Increase in total number of species since 2000</th><th>Increase in number of species threatened since 2000</th><th>Acceptable range for % or total</th></tr><tr><td>2000</td><td>16500</td><td>11500</td><td>-</td><td>-</td><td>65-75</td></tr><tr><td>2001</td><td>16500</td><td>11500</td><td>0</td><td>0</td><td>65-75</td></tr><tr><td>2002</td><td>16500</td><td>11500</td><td>0</td><td>0</td><td>65-75</td></tr><tr><td>2003</td><td>22000</td><td>12500</td><td>5500</td><td>1000</td><td>53-60</td></tr><tr><td>2004</td><td>38000</td><td>15500</td><td>21500</td><td>4000</td><td>39-43</td></tr><tr><td>2005</td><td>38500</td><td>15500</td><td>22000</td><td>4000</td><td>38-42</td></tr><tr><td>2006</td><td>40000</td><td>16500</td><td>23500</td><td>5000</td><td>40-43</td></tr><tr><td>2007</td><td>41500</td><td>16500</td><td>25000</td><td>5000</td><td>38-41</td></tr><tr><td>2008</td><td>45000</td><td>17000</td><td>28500</td><td>5500</td><td>36-39</td></tr><tr><td>2009</td><td>47500</td><td>17500</td><td>31000</td><td>6000</td><td>35-38</td></tr><tr><td>2010</td><td>57500</td><td>18500</td><td>41000</td><td>7000</td><td>31-33</td></tr><tr><td></td><td>Accept +/- 500</td><td>accept +/- 500</td><td>accept +/- 1000</td><td>accept +/- 1000</td><td></td></tr></table>	2	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."
7 (b) (iii)	1 (total species assessed is increasing because) , a idea of more sampling / exploration (leads to more species identified) or b improved identification , techniques / described ; 2 (threatened species is increasing because) , a loss of habitat or b climate change or c increased human population or d idea of interspecific competition from introduced species or e idea that some of the newly-identified species are likely to be threatened ; 3 (there is a widening gap between total and threatened species because) , a 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 ;	2	1 IGNORE refs to speciation as time frame too short 1 eg DNA fingerprinting 1 IGNORE study if used in the context of species that have already been identified IGNORE idea of conservation not working IGNORE refs to hunting IGNORE 'competition from newly discovered species' as this implies that the candidate thinks the species was not present until it was discovered e.g 'as more species are discovered, the number of threatened species will go up'
7 (c)	range / number , of habitats / ecosystems ; genetic variation (within species) ;	1	CREDIT only these answers
7 (d)	CITES 2 max C1 regulate / monitor / prevent , trade in , selected / certain / endangered , species C2 ensure (international) trade does not endanger , wild populations / AW ; 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 ; R2 share genetic resources ; R3 share access to , scientific knowledge / technology ;	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' C1 ACCEPT ref to products from

	R4 idea of promoting (named) ex situ conservation method(s) ; R5 idea of raising profile of (biodiversity) with , governments / public bodies / general public ; R6 idea of international cooperation (on biodiversity issues) ;		endangered species, e.g. leopard skin C1 ACCEPT 'illegal' as AW for 'selected / AW' C2 DO NOT AWARD if 'all trade in wild plants' stated R1 ACCEPT example e.g. replanting trees / fishing quotas / large mesh size R2 AWARD in context of access to or benefits from genetic resources R4 e.g. 'set up seed banks' / 'captive breeding programmes' R4 IGNORE 'zoos' unqualified R4 IGNORE 'in situ' R5 ACCEPT 'take biodiversity into account during planning processes' R5 ACCEPT 'informing people that it is their duty to consider biodiversity