

1. (a) The larger the wood the greater the diversity/positive correlation; 1
- (b) (i) Great spotted woodpeckers are larger in size and therefore need a greater area to supply food; 1
- (ii) Blackbirds and house sparrows eat plant food/have wide range of food; This is found in arable land/do not need woodland to provide food/ Enough food for primary consumers but not enough of these to feed secondary consumers; max 2
- (c) Would be better to plant a large wood rather than a number of small ones; Will favour insect-eating woodland birds; 2 [6]
2. (a) Number of individuals of each species. 1
- (b) (i) More species and greater diversity in deciduous woodland  
More species and greater diversity in younger woodland.  
(Allow 1 mark for ref to number or diversity only for both) 2
- (ii) Leaves of deciduous trees 'easier' to eat/ more varied, or more leaves for detritivores in deciduous woods / vice versa. 1 [4]
3. (a) grid area;  
method of generating coordinates;  
to place quadrat at random; (max 2 for sampling)  
number of individuals;  
number of each species; 3 max
- (b) more light reaches the ground;  
more type of plant/producers; (reject reference to trees)  
more habitats/microclimates;  
more varieties of food/more complex food web;  
more niches;  
different nesting sites;  
dead wood/leaves left to rot providing more nutrients/shelter;  
greater variety of herbivore/primary consumer/carnivore;  
(ignore reference to animals) 4 max

- (c) reduces (the variety of alleles) / genetic diversity;  
 only certain phenotypes allowed / selected to breed;  
 (phenotypic) character controlled by allele;  
 some/non-selected alleles eliminated/frequency decreased;  
 others/selected alleles increase in frequency;  
 (*reject reference to genes*) 4 max

[11]

4. (a) suitable method of capture;  
 mark individuals and release;  
 count percentage recaptured/use Lincoln index/equation; 2 max

(b)  $\frac{282 \times 281}{25384} = 3.12$  2

(*accept 3.1/3.122*)

- (c) decrease in total numbers of butterflies;  
 (*reject population*)  
 change in proportion of species/example(s);  
 increase in diversity in logged forest/ calculation(4.01); 2 max

[6]

5. (a) (i) Two marks for correct answer of 3.21;;  
 One mark for incorrect answer that clearly shows understanding  
 of  $\sum n(n - 1)$ ; 2

- (ii) Measures number of individuals and number of species;  
 Some species only present in small numbers; 2

*Q First marking point can only be awarded if there is a reference to species*

- (b) (i) Directly proportional/positive correlation/bird species  
 diversity depends on plant structural diversity; 1

- (ii) The more varied the structure, the greater the number of  
 habitats/niches/places for birds to live;  
 Birds feed/nest at different heights in vegetation; 2

*Q Since candidates will not have studied ecological principles in detail, they cannot be expected to use such terms as habitat and niche in this question*

	(iii) Increase, more habitats/niches/variety of food sources;	1	
			<b>[8]</b>
<b>6.</b>	(a) Kingdom/phylum/class;	1	
	(b) (i) 6;	1	
	(ii) Family;	1	
	(iii) The two species of <i>Mirounga</i> shared a common ancestor more recently than they did with <i>Monarchus tropicalis</i> ;	1	
	(c) Difference in DNA/base sequence/alleles/genes;	1	
	(d) (i) Genetic bottleneck linked to low genetic diversity/smaller gene pool; Reference to very low seal population/population in 1910/under 100 seals/caused by hunting;	2	
	<i>Must refer to data provided for second mark</i>		
	(ii) New colonies formed by small number (of seals)/ small number of founders; Founders have different/fewer alleles/genes / have smaller gene pool;	2	
			<b>[9]</b>