

## Mark schemes

**Q1.**

- (a) 1. Comparing (measurable/observable) features/characteristics;  
 2. Comparing amino acid sequences/primary structures (of a/named/the same protein);  
*Must have idea of comparison/ differences/similarities*  
*Ignore courtship/ behaviour/mutations/ number of chromosomes/allele frequency/species richness/index of diversity*  
*Accept comparing amount of antibody bound to antigen/protein (in different species)*

2 max

- (b) 36 to 36.4;

1

- (c) B, A, C;

1

- (d) 1. Student's t-test;  
 2. Comparing mean of data sets/histograms  
**OR**  
 Comparing (2) means  
**OR**  
 Data are normally distributed;  
*Accept average for 'mean'*  
*Ignore difference between means*

2

**[6]****Q2.**

- (a) 1. Kingdom, Phylum, Class, Order, Family;  
 2. *Luscinia svecica.*  
*1 mark for each correct column*  
*Allow Genus and Species if both placed in box for species but not if both placed in genus box*

2

- (b) Number of different alleles of each gene.  
*Accept number of different base sequences (found) in each gene*

1

- (c) 1. Has greater proportion of genes / percentage of genes showing diversity;  
 2. Percentage is 35% compared with 28% / proportion is 0.35

compared with 0.28.

*Allow correct figures that are not rounded up, i.e.,  
34.9% / 0.349 and 27.8% / 0.278*

2

[5]

**Q3.**

(a) PKNJ.

1

(b) *Lutra lutra*.

1

(c) Bone / skin / preserved remains / museums.

1

(d) 1. (Hunting) reduced population size(s), so (much) only few alleles left;

*Accept bottleneck*

2. Otters today from one / few surviving population(s);

*Accept founder effect*

3. Inbreeding.

*Allow any two*

2 max

(e) 1. Population might have been very small / genetic bottleneck;  
2. Population might have started with small number of individuals /  
by one pregnant female / founder effect;  
3. Inbreeding.

*Allow any two*

2 max

[7]