

- M1.(a)**
1. Recognise / identify / attract same species;  
*Ignore: references to letting them produce fertile offspring*
  2. Stimulates / synchronises mating / production / release of gametes;
  3. Recognition / attraction of mate / opposite sex;  
*Accept finding a mate*  
*Accept: gender*
  4. Indication of (sexual) maturity / fertility / receptivity / readiness to mate;
  5. Formation of a pair bond / bond between two organisms (to have / raise young).

**3 max**

- (b)
1. Use a (real) male (with intact wings / no wing removed);  
*Mark ignoring reference to birds / or other types of animals*  
*Accept: use a real cricket, since only males sing*
  2. Determine (percentage) response (of females compared with **L**).  
*Accept: compare results with **L***

2

- (c)
1. Lowest / only 30% courtship with no song / **K** / (or) courtship still occurred when no song played / **K**;  
*Note: throughout, for courtship accept response / stimulation / reaction*  
*Neutral: references to methodology*  
*Answer must make clear there is no song / version **K***
  2. Reduced courtship when no ticks / **M** / there is some courtship when no ticks / **M**;
  3. Reduced courtship when no chirps / **N** / there is some courtship when no chirps / **N**;  
*Accept: use of figures from the table in an explanation*
  4. (So) courtship must involve a visual stimulus / other factor involved;
  5. Chirps more important as lowest courtship when none / **N** / ticks less important as similar courtship when changed / **M**;  
*Must make comparison to gain mark*
  6. Data only show presence and absence of chirps / 0 and 7 chirps.

*Note: 'courtship still occurred when no sound played so a visual stimulus / other factor / something else (e.g. pheromone?) must be involved'*  
= 2 marks

4 max

[9]

**M2.(a)** Aves;

1

(b) Gallicolumba kubaryi;

*Must have both words and in this order*

*Must be capital G*

*If starts with k, award mark as impossible to recognise difference*

*Ignore: underlining*

*Accept: phonetic spelling*

*Accept: G kubaryi (must be a capital / upper case G)*

1

(c) No overlap.

1

[3]

**M3.(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]

**M4.(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]

**M5.(a)** (i) 1. Groups within groups;

*Accept: idea of larger groups at the top or smaller groups at the bottom*

2. No overlap (between groups); 2

(ii) 3; 1

(iii) Chordata;  
*Accept: if phonetically correct eg 'Cordata'* 1

(b) (i) 1. (To provide) genetic variation;  
*Genetic variation must be directly stated and not implied*  
2. (Allows) different combinations of maternal and paternal chromosomes / alleles;  
*Accept: any allele of one gene can combine with any allele of another gene* 2

(ii) 1. (Zedonk has) 47 / odd / uneven number of chromosomes;  
*Accept: diploid number would be odd*  
*Reject: if wrong number of chromosomes is given*  
2. Chromosomes cannot pair / are not homologous / chromosome number cannot be halved / meiosis cannot occur / sex cells / haploid cells are not produced;  
*Accept: cannot have half a chromosome*  
*Q Reject: meiosis cannot occur in sex cells* 2

[8]

**M6.(a)** 1. Group of similar organisms / organisms with similar features / organisms with same genes / chromosomes;  
1. *Accept: same number of chromosomes*  
1. *Accept: smallest taxonomic group*

1. *Reject: genetically identical. Only allow 1 max if mentioned*

1. *Q Neutral: similar genes / chromosomes*

2. Reproduce / produce offspring;

2. *Accept: breed / mate*

3. That are fertile;

3. *Neutral: that are 'viable'*

*'Produce fertile offspring' = 2 marks*

2 max

(b) (i) Correct answer of 6.97 to 7 = 2 marks;

One mark for 6320 as numerator or 906 as denominator;

2

(ii) 1. Decrease in variety of plants / fewer plant species;

1. *Accept: reference to monoculture or description*

1. *Neutral: fewer plants*

2. Fewer habitats / niches;

2. *Neutral: fewer homes / less shelter*

3. Decrease in variety of food / fewer food sources;

3. *Neutral: less food*

3. *Accept: less variety of prey*

3

[7]

**M7.(a)** (i) 1. Groups within groups;

1. *accept idea of larger groups at the top / smaller groups at the bottom*

2. No overlap (between groups);

2

(ii) (Grouped according to) evolutionary links / history / relationships / common ancestry;

*Neutral: closely related*

*Neutral: genetically similar*

1

- (b) (i) 1. (Only) one amino acid different / least differences / similar amino acid sequence / similar primary structure;  
2. (So) similar DNA sequence / base sequence;

2

- (ii) 1. Compared with humans / not compared with each other;  
*Accept: degenerate code / more than one triplet (codes) for an amino acid*  
2. Differences may be at different positions / different amino acids affected / does not show where the differences are (in the sequence);

1 max

- (iii) 1. All organisms respire / have cytochrome c;  
*Accept: converse arguments for haemoglobin*  
1. *Accept 'more' instead of 'all'*  
1. *Accept 'animals' instead of organisms* □  
2. (Cytochrome c structure) is more conserved / less varied (between organisms);  
2. *Neutral: cytochrome c is conserved*

1 max

[7]