# A-Level Biology

## Classification and Taxonomy

### Mark Scheme

**Time available: 65 minutes**
**Marks available: 53 marks**

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**1.**

(a) 1. (It shows) smaller groups within larger groups / larger groups containing smaller groups;

*Accept groups within groups*

2. With no overlap (between groups);

**2**

(b) Family;

*Accept phonetic spellings*

**1**

(c) 1. Sine song is (very) similar / same length (for both, so closely related).

2. (But) have different peaks / pulses (in pulse song);

*Must give a difference, not just state they are different*

*Accept suitable differences eg number / length / amplitude / interval*

**2**

(d) 1. (Three) peaks (in pulse song) occur at the same time (since both female) / songs identical / male peaks are different;

*Accept suitable differences in male peaks eg number / length / amplitude / interval*

2. (Therefore) no male (song) to stimulate / cause mating;
**OR**
Nothing to stimulate / cause mating;

**2**

**[7]**

**2.**

(a) 1. (Without genetic analysis / **X**) *mackloti and olivaceus* have a more recent common ancestor with each other (than with *papuana*);

2. (Genetic analysis indicates / **Y**) *papuana and mackloti* have a more recent common ancestor with one another (than with *olivaceus*);

*Accept 'more closely related to' for 'more recent common ancestor'*

**2**

(b)

| | |
|---|---|
| **Domain** | Eukaryote |
| **Kingdom** | Animal |
| **Phylum** | Chordata |
| **Class** | Reptilia |
| **Order** | Squamata |
| Family | Python |

;

All 5 correct = 1 mark
Any errors = 0 marks

**1**

(c) Genus / genera;

*If the response has two answers no mark is awarded.*

**1**

(d) 1. The (base) sequence of DNA;

*Accept 'DNA hybridisation'*

2. The (base) sequence of mRNA;
3. The amino acid sequence (of proteins);

**3**

**[7]**

**3.** (a) 1. Same genus;

2. Same evolutionary origin / common ancestor.

**2**

(b)

| **Taxon** | **Name of Taxon** |
|---|---|
| **Domain** | Eukarya |
| Kingdom | Animalia |
| **Phylum** | Chordata |
| **Class** | Mammalia |
| Order | Rodentia |
| Family | Muridae |

*3 correct = 2 marks*
*2 correct = 1 mark*
*1 or 0 correct = 0 marks*

**2**

(c) 1. (No) SDs of means of body sizes / sizes of parts of bodies overlap;

2. Calculation of correct head and body: tail ratios;

3. Almost identical, so same body shape / proportions;

**3**

(d) 1. Breed the two mice together;

2. (Same species) produce fertile offspring.

**2**

**[9]**

**4.**

(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]**

**5.**

(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]**

**6.** (a) Aves;

**1**

(b) Gallicolumba kubaryi;

*Must have <u>both</u> words and in <u>this</u> 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]**

**7.** (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]**

**8.** (a) (i) Kingdom / phylum / class;

*Accept Animalia / animal kingdom / Chordata / Chordates / Aves*

*Allow phonetic spelling*

**1**

(ii) Family;

**1**

(b) 1. Shows the spread of the data / how data varies;

*1. Reject range.*

*Accept varies from the mean*

2. Overlap = no difference / due to chance / not significant;

*2. Allow converse*

**2**

(c) 1. Different species would have different amino acid sequences;

*Accept more closely related = more similar sequence*

2. Amino acid sequence is the result of DNA / alleles / base sequence;

*References to incorrect statements about coding negates second mark*

**2**

**[6]**