



**Exampro A-level Biology
(7401/7402)**

Name:

Class:

Taxonomy QP

Author:

Date:

Time: **53**

Marks: **46**

Comments:

M1.(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]

M2. (a) Kingdom, phylum and class;;
Lose 1 mark for each error (i.e. omission or incorrect response). Sequence not essential. 2

(b) (i) Shows evolutionary relationship; 1

(ii) 26; 1

(c) (i) 1. Base sequence will be similar / some bases in common;
 2. These bases will bind together / hydrogen bonds / complementary pairs;
Do not accept same here.

Accept converse providing that it is clear that the converse argument is being made.

2

- (ii) 1. Relationship is closer / more complementary bases / more base pairs forming more hydrogen bonds;
2. More heat energy needed (to separate bonds);
Do not allow stronger hydrogen bonds.
Not higher temperature as this is in question.

2

[8]

M3. (a) (i) Order, Family, Genus.
(all correct = 2 marks; 2 correct = 1 mark)

2

(ii) 3 concentric circles in Carnivora, labelled Felidae, Panthera and L;

1

(b) (i) large groups split into smaller groups (which do not overlap);

1

(ii) (phylogenetic) based on evolutionary history;
shows ancestry of groups / points of divergence / example,
e.g. reptiles and birds separated after mammals / reptiles
and birds more closely related than mammals;
(hierarchical) based on shared characteristics (seen today);

3

[7]

M4.(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]

- M5.** (a) Is species specific / allows recognition of same species;

Greater similarity in calls the closer the relationship (between the species);

Accept: 'Similar species have similar calls' as first marking point.

Reference to courtship on its own is not sufficient for a mark.

Must refer to relationship for second marking point.

2

- (b) *G. americana* and *G. monachus*; Highest percentage (DNA hybridisation) / more bases are similar / complementary / more hydrogen bonds / more base pairings;

Second marking point can be awarded without first marking

point.

2

- (c) 1. More closely related (species) have more similarities in amino acid sequence / primary structure;
2. In same protein / named protein e.g. albumin;

OR

3. Similar species have a similar immune response to a protein / named protein;
4. More closely related (species) produce more 'precipitate' / antibody-antigen (complexes) / agglutination;

Accept: 'Similar species have similarities in amino acid sequence' for first marking point.

Accept: Converse for marking points 1, 4 and 5.

Marking point 5 is for measuring the extent of the immune response.

2 max

[6]

- M6.** (a) group of organisms with similar features;
can (interbreed to) produce fertile offspring;

2

- (b) directional selection;
any TWO from
selection against one extreme / for one extreme;
against broadest beaks in B and narrowest beaks
in **A** / for narrowest in **B** and broadest in **A**;
whole distribution / range / mean / mode / median is
shifted towards favoured extreme;

3 max

[5]

- M7.(a)** 1. No interbreeding / gene pools are separate / geographic(al) isolation;

Accept: all marks if answer written in context of producing increased diversity of plants

1 Do not award this mark in context of new species being formed and then not interbreeding

1 Accept reproductive isolation as an alternative to no interbreeding

2. Mutation;
2 Accept: genetic variation
3. Different selection pressures / different foods / niches / habitats;
3 Accept: different environment / biotic / abiotic conditions or named condition
3 Neutral: different climates
4. Adapted organisms survive and breed / differential reproductive success;
5. Change / increase in allele frequency / frequencies;

5

- (b) Similar / same environmental / abiotic / biotic factors / similar / same selection pressures / no isolation / gene flow can occur (within a species);
Accept: same environment

1

[6]

- M8.** (i) Taxon **A** - there is more than one level / taxon below it / genus only has species / only has one level / taxon above it;
- (ii) Taxon **C** - there is more than one level / taxon above it / phylum only has kingdom / only has one level taxon above it;

[2]