

Q1.

- (a) In taxonomy, an organism is identified by referring to the species name and the genus name.

What term is used to describe this method of naming organisms?

(1)

Q2.

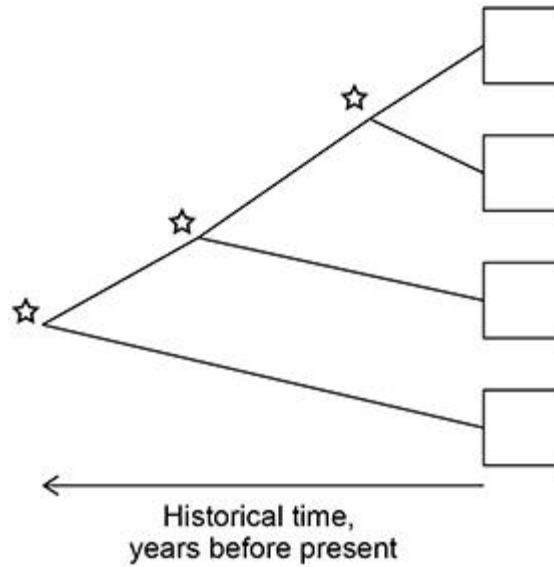
The percentage similarities in the non-coding multiple repeats of base sequences of four species of carrot are shown in **Table 2**.

Table 2

Species of carrot	Percentage similarity between non-coding multiple repeat base sequences			
	C	D	I	N
C		51.3	23.1	61.2
D	51.3		32.7	51.5
I	23.1	32.7		37.4
N	61.2	51.5	37.4	

- (c) Use the information in **Table 2** to complete the phylogenetic tree shown in the diagram below.

Write the letter that represents the correct species into each box.



Key

- ☆ Common ancestor of the species to the right

(1)

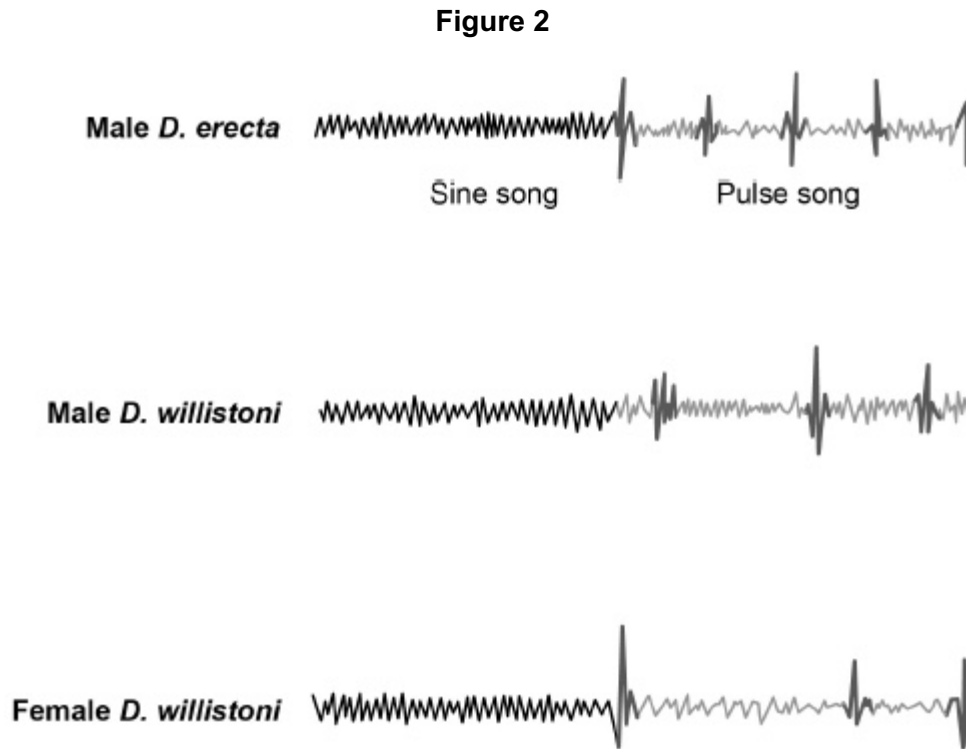
- (d) The scientists studied five individuals from each species. Within the five individuals of **species N** they found a percentage similarity of 66%.

Use **Table 2** to evaluate how this information affects the validity of the phylogenetic tree.

(2)

Scientists showed fruit flies a visual stimulus that made them sing. They made recordings of these songs.

Figure 2 shows the recordings of the songs of three flies over the same time period.



- (c) *D. erecta* and *D. willistoni* are closely related species but different species. Describe evidence from **Figure 2** that supports this statement.

(2)

- (d) The scientists repeated their experiments, using female fruit flies as the visual stimulus. When a male and female *D. willistoni* were together, their songs led to mating.

When two female *D. willistoni* were together, their songs did **not** lead to any attempt to mate.

Use information from **Figure 2** to suggest why the two females did not attempt to mate.

(2)

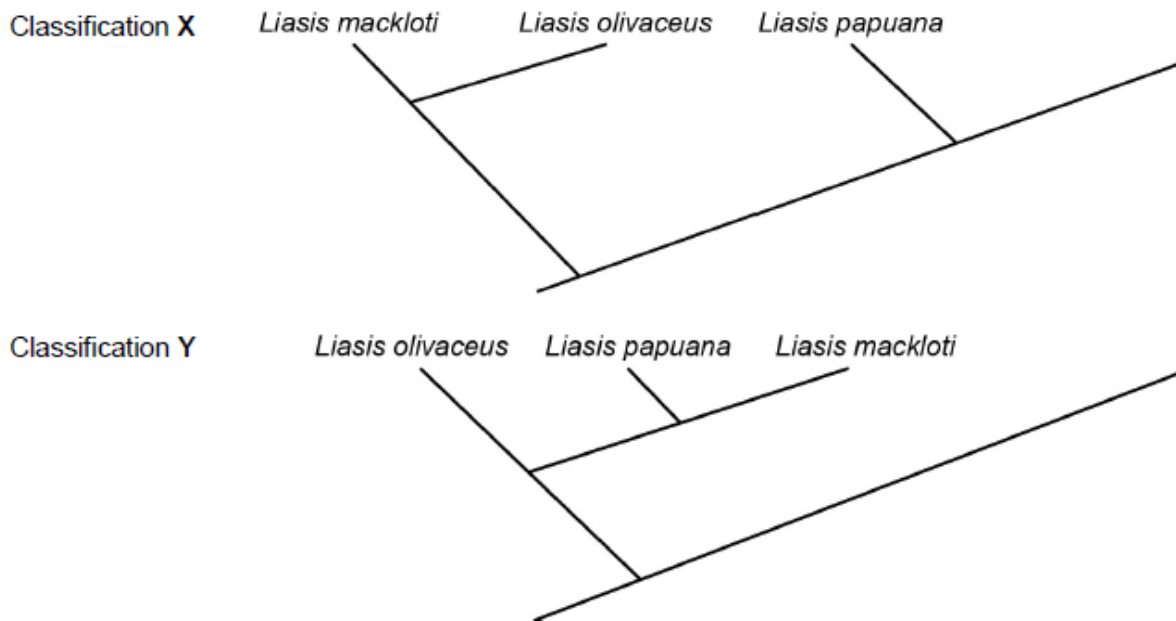
(Total 7 marks)

Q4.

The diagram shows two different ways of classifying the same three species of snake.

- Classification **X** is based on the frequency of observable characteristics
- Classification **Y** is based on other comparisons of genetic characteristics.

All three species of snake belong to the Python family.



(a) What do these classifications suggest about the evolutionary relationships between these species of snake?

Classification **X** _____

Classification **Y** _____

(2)

- (b) Complete the table below to show the missing names of the taxa when classifying these snakes.

Taxon (hierarchical order)	Name
	Eukaryote
	Animal
	Chordata
	Reptilia
	Squamata
Family	Python

(1)

- (c) There is a debate about the name of one of these species of snake. Some scientists name it *Liasis papuana* and other scientists name it *Apodora papuana*.

Give the name of the taxon about which the scientists disagree.

(1)

- (d) State **three** comparisons of genetic diversity that the scientists used in order to generate Classification Y.

1. _____

2. _____

3. _____

(3)

(Total 7 marks)

Q5.

- (a) There are many different species of field mouse in Europe. Using a phylogenetic classification, all of these species have names that start with *Apodemus*.

What information does this give about field mice?

(2)

The long-tailed field mouse, *Apodemus sylvaticus*, is a small mammal common in mainland Britain.

- (b) Complete **Table 1** to show the classification of the long-tailed field mouse.

Table 1

Taxon	Name of Taxon
	Eukarya
Kingdom	Animalia
	Chordata
	Mammalia
Order	Rodentia
Family	Muridae

(2)

The St. Kilda field mouse lives only on one island off the coast of Scotland. It is very similar in appearance to the long-tailed field mouse but is larger and has lighter coloured fur.

Biologists wanted to find out if the St. Kilda field mouse and the long-tailed field mouse populations belonged to different species. They measured the length of the same features of a large number of individuals from the two populations.

The results are shown in **Table 2**.

Table 2

Population	Mean length (\pm SD) / mm	
	Head and body	Tail
St. Kilda field mouse	112.3 (\pm 9.3)	105.5 (\pm 8.4)
Long-tailed field mouse	95.2 (\pm 8.2)	90.2 (\pm 7.3)

- (c) Do the data in **Table 2** provide evidence that the two populations belong to different species? Use calculations of ratios to support your answer.

(3)

- (d) Describe how breeding experiments could determine whether the two populations are from the same species.

(2)

(Total 9 marks)

Q6.

The table shows the taxons and the names of the taxons used to classify one species of otter. They are **not** in the correct order.

	Taxon	Name of taxon
J	Family	Mustelidae
K	Kingdom	Animalia
L	Genus	Lutra
M	Class	Mammalia
N	Order	Carnivora
O	Phylum	Chordata
P	Domain	Eukarya
Q	Species	lutra

- (a) Put letters from the table above into the boxes in the correct order. Some boxes have been completed for you.

		O	M			L	Q
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(1)

- (b) Give the scientific name of this otter.

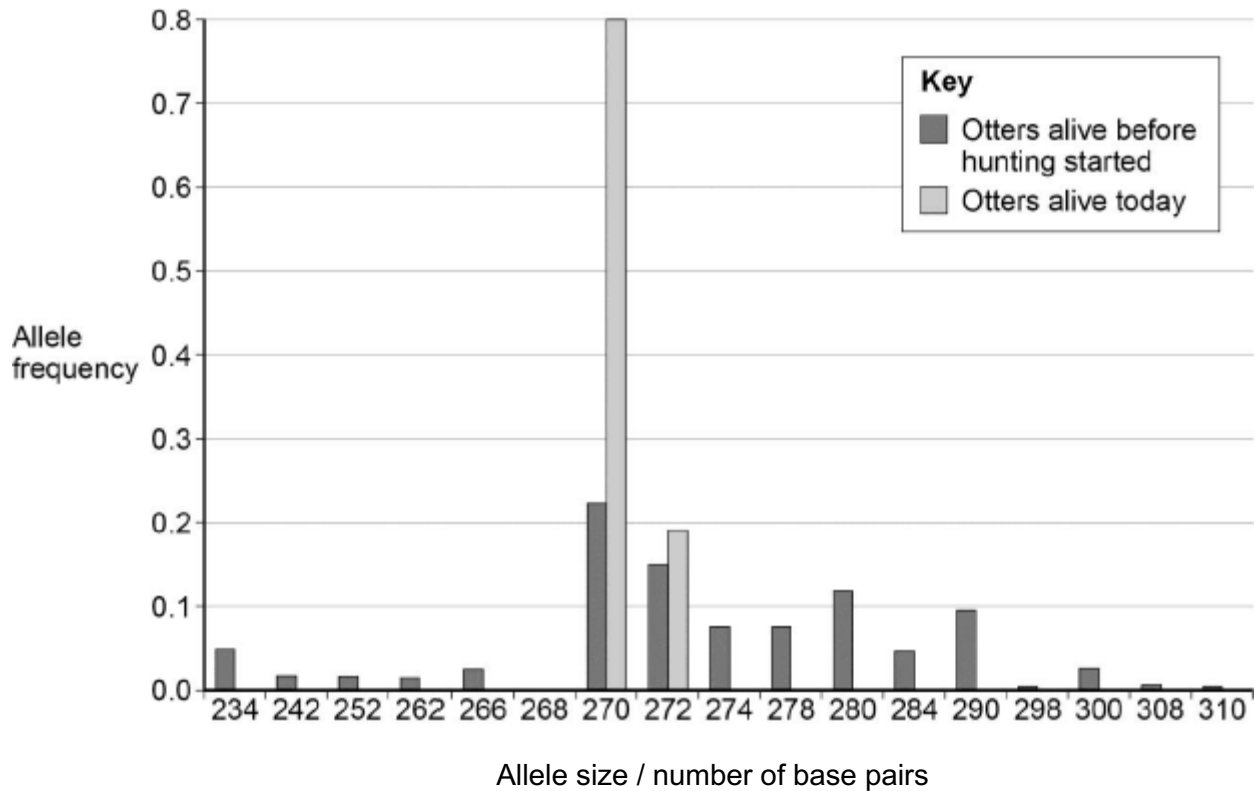
(1)

Scientists investigated the effect of hunting on the genetic diversity of otters. Otters are animals that were killed in very large numbers for their fur in the past.

The scientists obtained DNA from otters alive today and otters that were alive before hunting started.

For each sample of DNA, they recorded the number of base pairs in alleles of the same gene. Mutations change the numbers of base pairs over time.

The figure below shows the scientists' results.



- (c) The scientists obtained DNA from otters that were alive before hunting started.

Suggest **one** source of this DNA.

(1)

- (d) What can you conclude about the effect of hunting on genetic diversity in otters? Use data from the figure above to support your answer.

(2)

- (e) Some populations of animals that have never been hunted show very low levels of genetic diversity.

Other than hunting, suggest **two** reasons why populations might show very low levels of genetic diversity.

1. _____

2. _____

(2)
(Total 7 marks)

Q7.

Table 1 shows how a bird called the bluethroat (*Luscinia svecica*) is classified by biologists.

Table 1

Taxon	Name of taxon
Domain	Eukaryota
	Animalia
	Chordata
	Aves
	Passeriformes
	Muscicapidae
Genus	
Species	

- (a) Complete **Table 1** by filling the seven blank spaces with the correct terms.

(2)

