



CHEMISTRY ONLINE
— **TUITION** —

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BIOLOGY

GENETICS, BIODIVERSITY & CLASSIFICATION

Level & Board	AQA (A-LEVEL)
TOPIC:	SPECIES AND TAXONOMY
PAPER TYPE:	QUESTION PAPER - 1
TOTAL QUESTIONS	6
TOTAL MARKS	27

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Species and Taxonomy - 1

1.

(a) The names of the species and genus are used in taxonomy to identify an organism.

What the term for this system of organism naming? (1)

2.

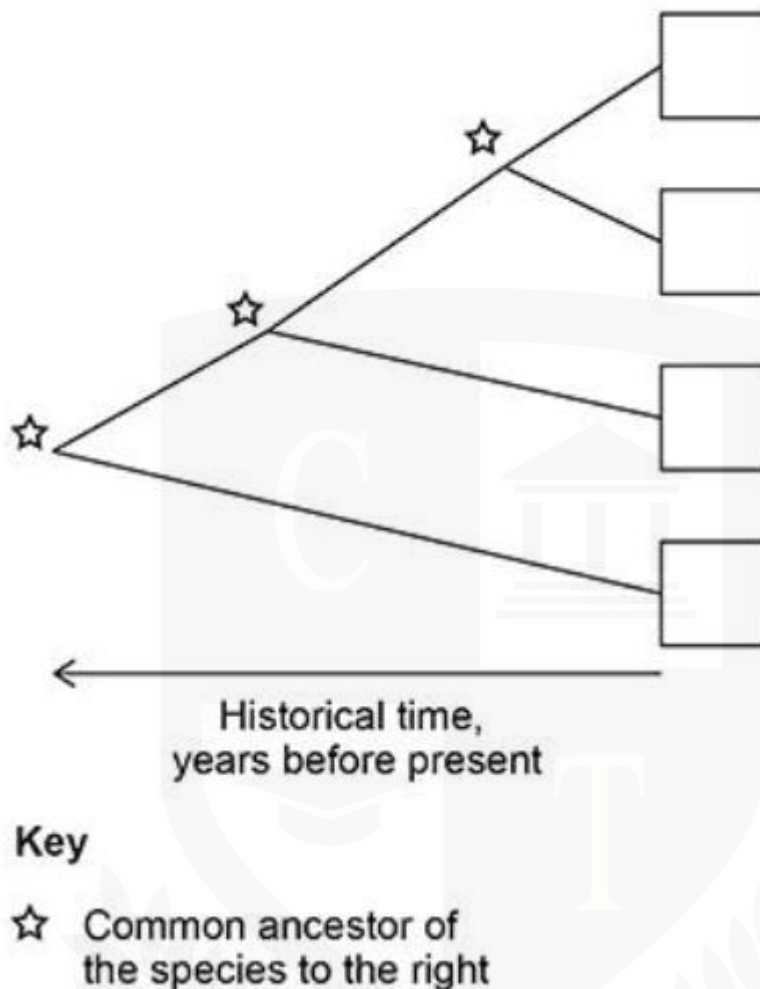
The percentage similarity in the non-coding repeated repeats of base sequences of four species of carrot are reported in Table 2.

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	

(a) Complete the phylogenetic tree depicted in the image below using the data in Table 2.

In each box, write the letter that corresponds to the appropriate species. (1)



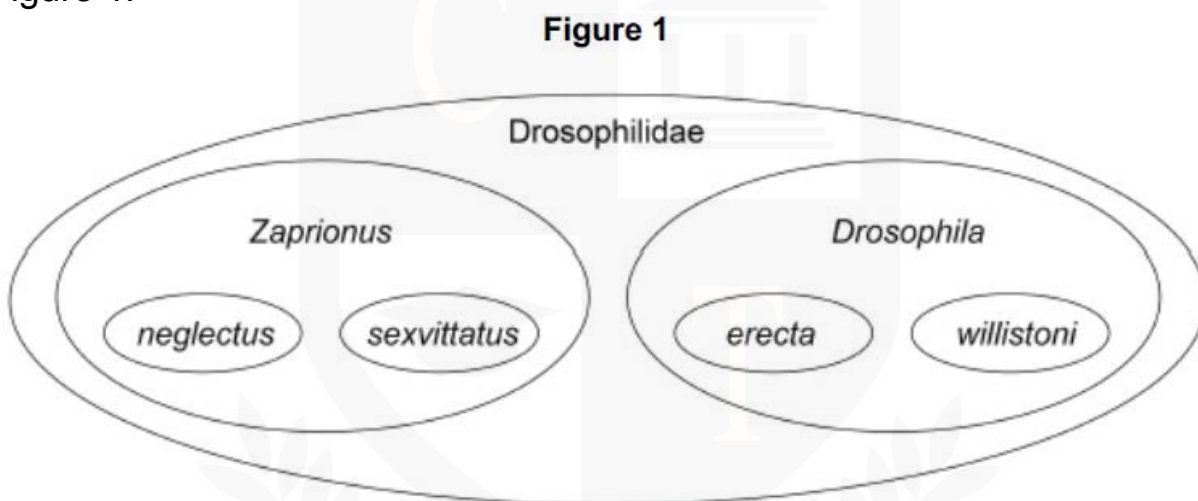
(b) Five members of each species were examined by the scientists. Sixty-six percent of the five members of species N have similarities.

To assess how this information impacts the phylogenetic tree's validity, see Table 2. (2)

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3.

The evolutionary classification of four distinct fruit fly species is shown in Figure 1.



(a) Figure 1 depicts a hierarchy. Describe how? (2)

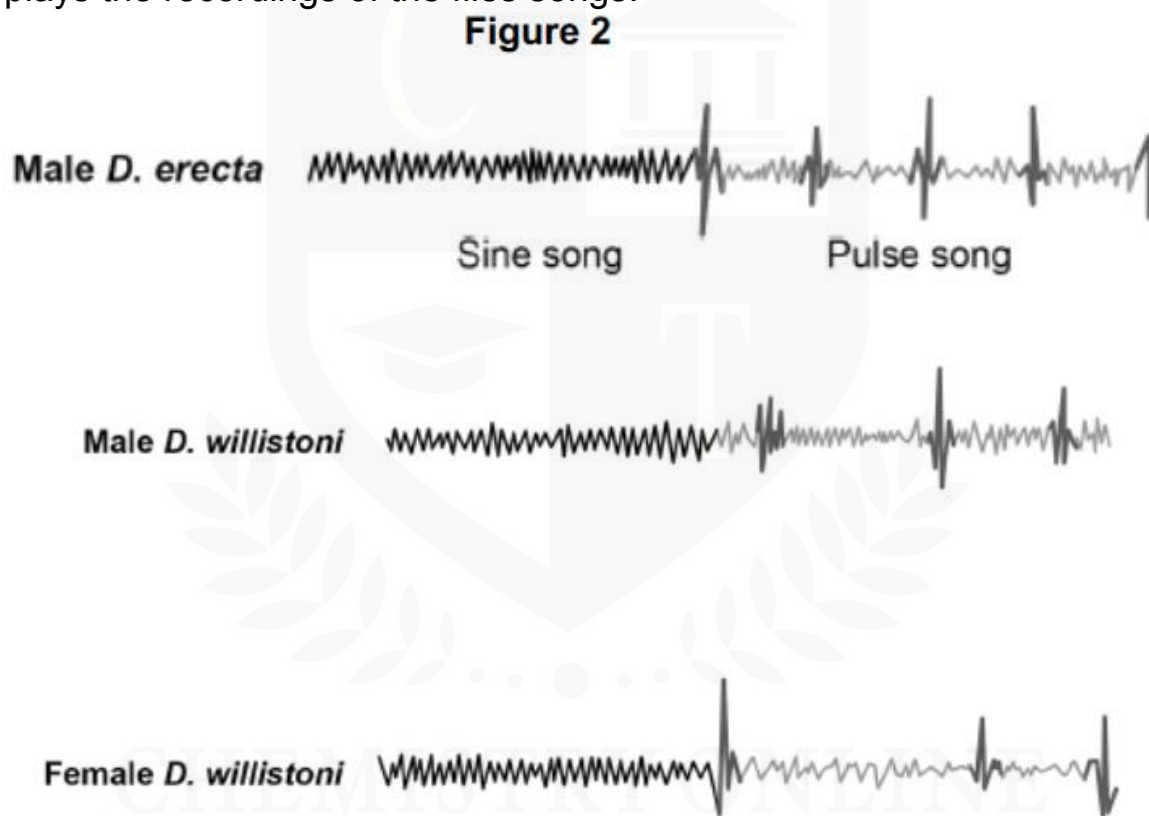
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(b) Identify the taxon that includes the Drosophilidae family. (1)

Fruit flies called *Drosophila* exhibit courting behaviors. Male singing is one of the wooing stages. A guy will often make two types of sounds: a "sine song," which is continuous with louder peaks, and a "pulse song," which is continuous with no peaks.

Researchers recorded the songs of three fruit flies at the same time period after exposing them to a visual stimulus that caused them to sing. Figure 2 displays the recordings of the flies songs.



(c) Although they are distinct species, *D. erecta* and *D. willistoni* are closely related.

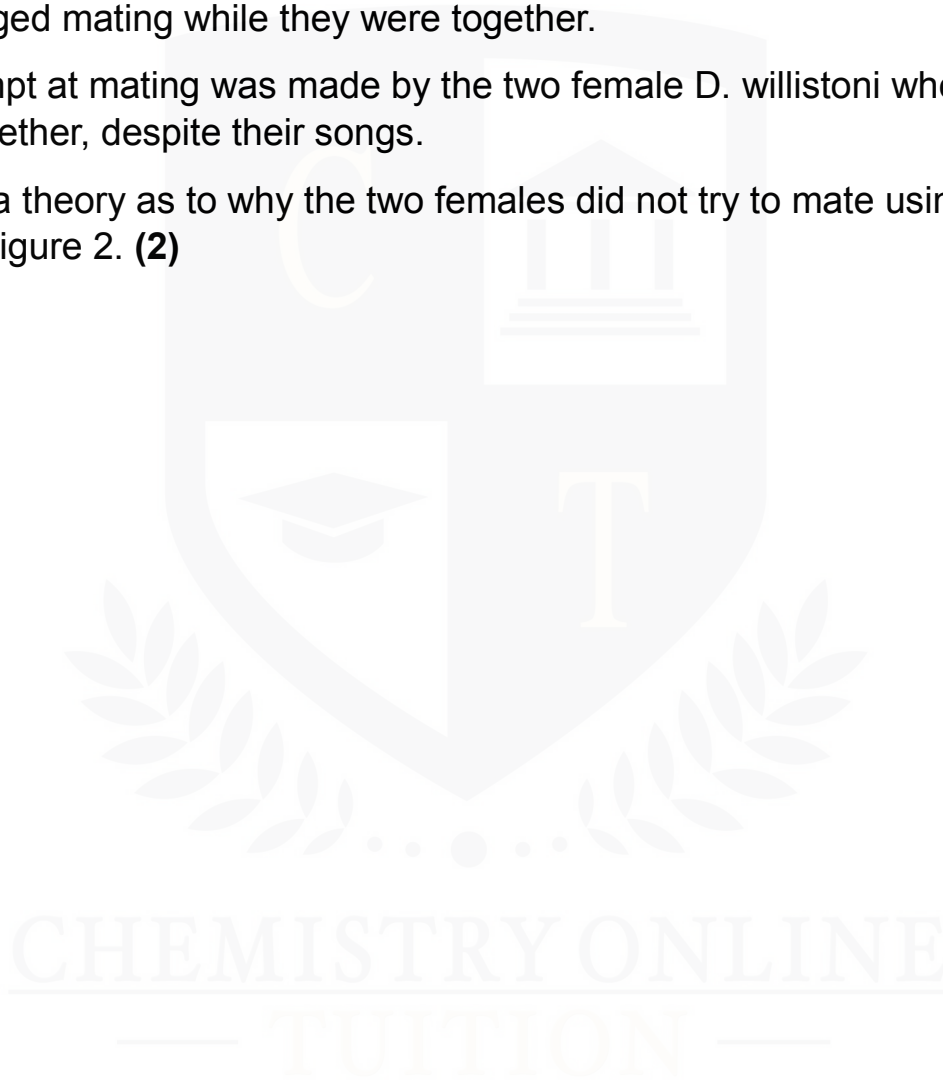
Explain the Figure 2 evidence that backs up this claim. **(2)**

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(d) The researchers conducted the same tests again, this time use female fruit flies as the visual cue. The singing of a male and female *D. willistoni* encouraged mating while they were together.

No attempt at mating was made by the two female *D. willistoni* when they were together, despite their songs.

Provide a theory as to why the two females did not try to mate using the data in Figure 2. **(2)**

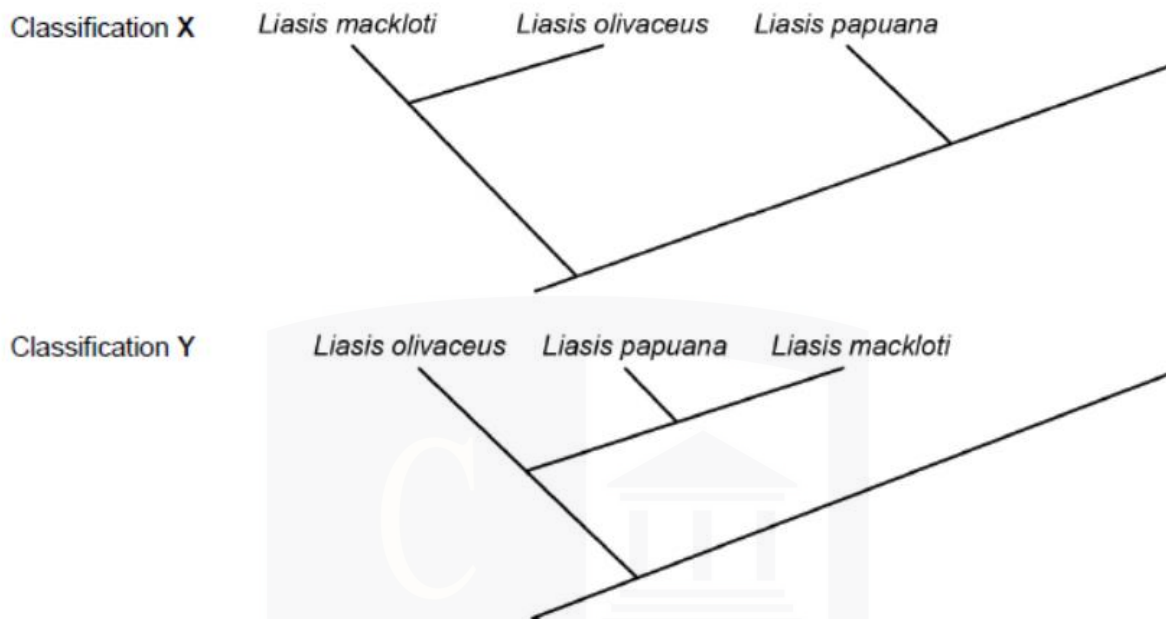


4.

The same three snake species are classified in two distinct ways in the diagram.

• Based on the frequency of observable characteristics, Classification X
Classification Y is predicated on further genetic trait comparisons.

All three species of snakes are members of the family Python.



(a) What do these divisions imply about the evolutionary connections among these snake species? **(2)**

(b) Fill in the blanks in the table below to indicate which taxa these snakes belong to. **(1)**

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

(c) Indicate which taxonomic group these snakes are in by filling in the gaps in the table below. **(1)**

(d) List the three genetic diversity comparisons that the researchers utilized to arrive at Classification Y. **(2)**

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5.

(a) Field mice come in a wide variety of species throughout Europe. Based on phylogenetic categorization, the names of these species all begin with *Apodemus*.

What details about field mice does this provide? (2)

Apodemus sylvaticus, the long-tailed field mouse, is a tiny mammal that is widespread throughout continental Britain.

(b) Fill in Table 1 to display the long-tailed field mouse categorization. (2)

Table 1

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

There is only one island off the coast of Scotland where the St. Kilda field mouse can be found. It resembles the long-tailed field mouse in appearance, but it is bigger and has lighter fur.

Researchers sought to determine if populations of long-tailed field mice and St. Kilda field mice belonged to distinct species. Numerous members of the two populations were measured for length of the same features.

Table 2 presents the findings.

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) Does Table 2 data support the idea that the two populations are distinct species? Utilize ratio computations to bolster your response. **(3)**

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(d) Explain how genetic testing could establish if the two groups belong to the same species. **(2)**

6.

The taxa and their names that are used to categorize a single species of otter are displayed in the table. They are not in the proper sequence.

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	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) Sort the letters in the table above into the appropriate boxes. For you, a few boxes have already been finished. (1)

		O	M			L	Q
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(b) Identify this otter by its scientific name. (1)

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