

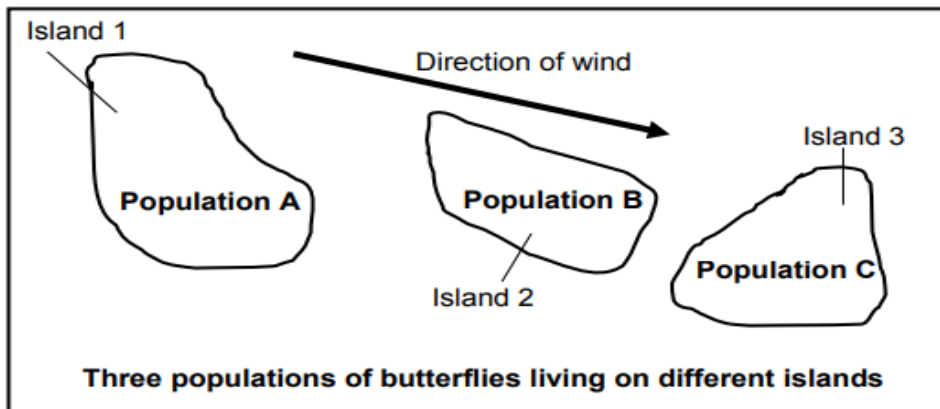
PAST PAPERS QUESTIONS – NATURAL SELECTION & SPECIATION
10 AUGUST 2024

Paper 2 – November 2014

3.1 Three populations of butterflies, **A**, **B** and **C** live separately on three oceanic islands. The butterflies on Island 2 and Island 3 originated from Island 1.

The islands experience strong prevailing winds from the north-west throughout the year.

Populations **A** and **B** can interbreed and produce fertile offspring. Population **B** can mate with Population **C**, but the offspring are infertile. Mating does not occur between Populations **A** and **C** at all.



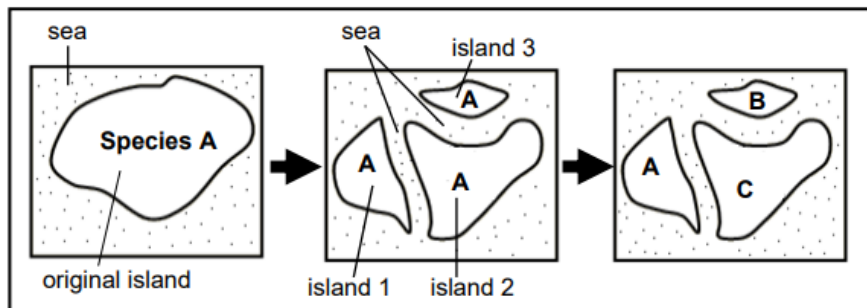
[Adapted from *Advanced Biology*, M Kent, 2000]

- | | | |
|-------|---|------------|
| 3.1.1 | How many species are represented by the three populations? | (1) |
| 3.1.2 | Explain your answer to QUESTION 3.1.1. | (2) |
| 3.1.3 | Use the information provided to explain how speciation might have taken place in the above example. | (5) |
| | | (8) |

Paper 2 – November 2015

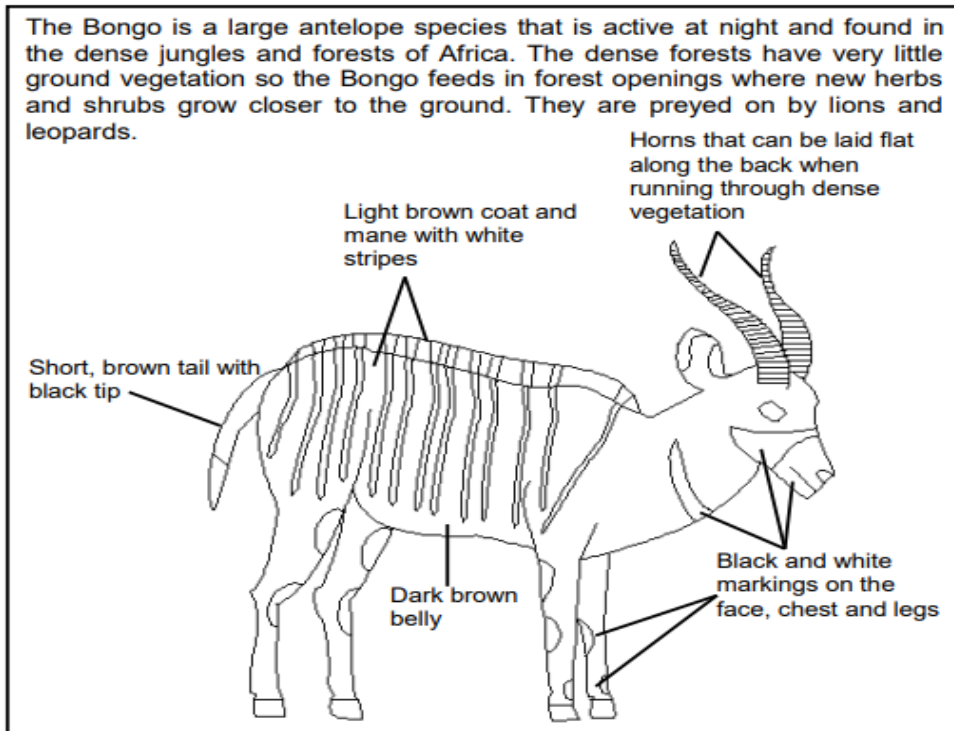
2.1 The diagrams below represent the process of speciation in tortoises.

Over a period of time species **B** and **C** evolved from species **A**.



- | | | |
|-------|--|------------|
| 2.1.1 | Explain why species A continued to exist on island 1. | (2) |
| 2.1.2 | Describe how species B and C evolved from species A . | (6) |
| | | (8) |

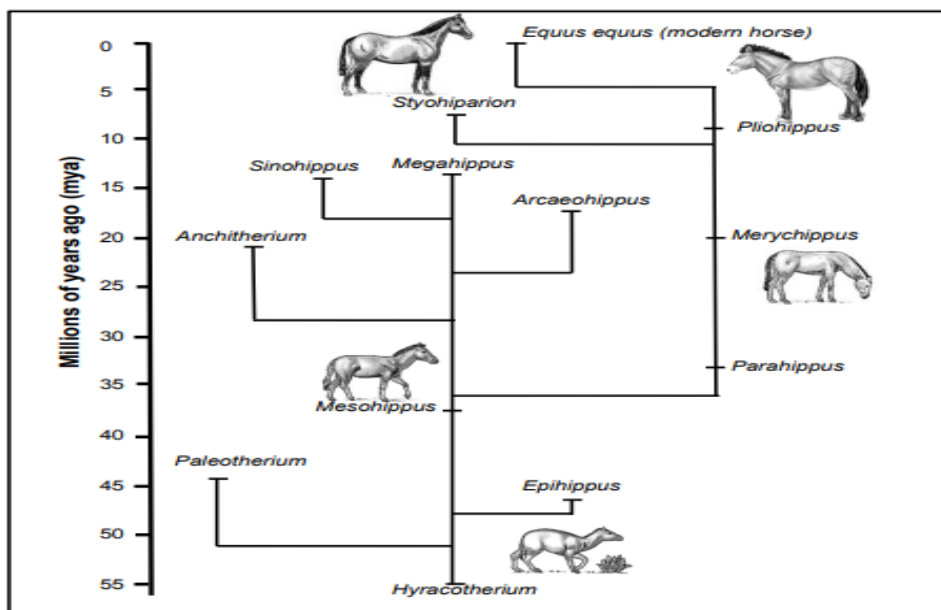
- 2.4 The extract and the diagram below provide information about a type of antelope called a Bongo.



- 2.4.1 State TWO characteristics that help the Bongo to camouflage themselves in the dense jungle. (2)
- 2.4.2 Use your knowledge of natural selection and explain how the Bongo's ability to lay its horns along its back could have developed over the years. (5)
(7)

Paper 2 – November 2016

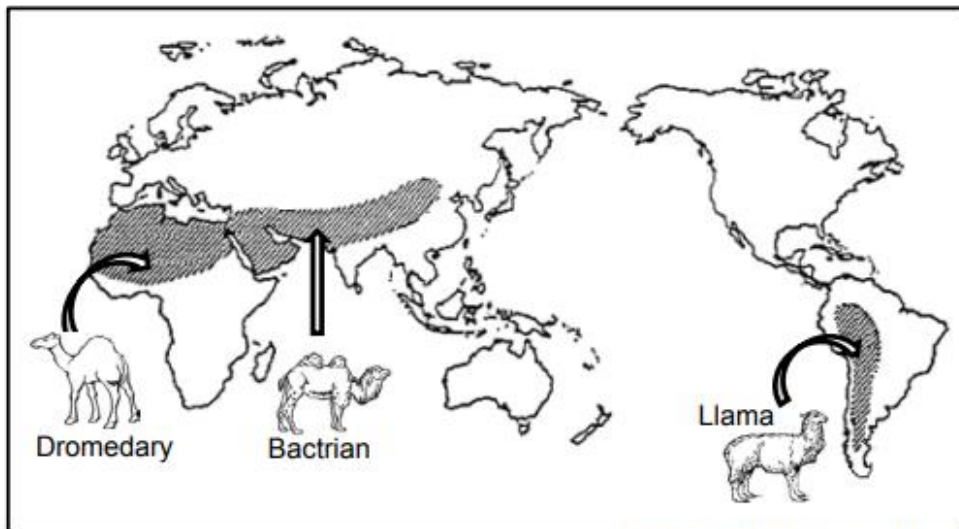
- 1.6 The diagram below represents the possible evolution of the horse.



[Adapted from <http://archaeoqvinfo.com>]

- 1.6.1 Name the:
- (a) Common ancestor of all horses (1)
- (b) Genus most closely related to *Megahippus* (1)
- 1.6.2 When did *Paleotherium* become extinct? (2)
- 1.6.3 How long did it take for the modern horse to evolve from *Hyracotherium*? (2)
- (6)**

- 3.3 The diagram below shows the distribution of members of the camel family on the different continents. The arrows indicate the current distribution of the animals.



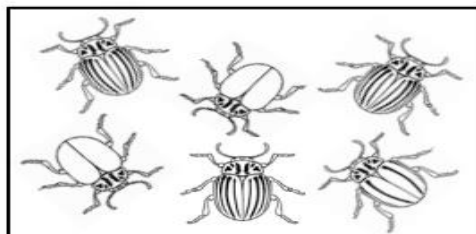
[Adapted from <http://www.ck12.org>]

Explain how speciation of camels may have occurred.

(6)

Paper 2 – November 2017

- 1.1.3 Charles Darwin based the theory of evolution through natural selection on many observations.



Which ONE of his observations is represented in the diagram above?

- A Limited environmental resources
- B Populations remain stable over time
- C Individuals within a population may vary widely
- D Only the fittest will survive

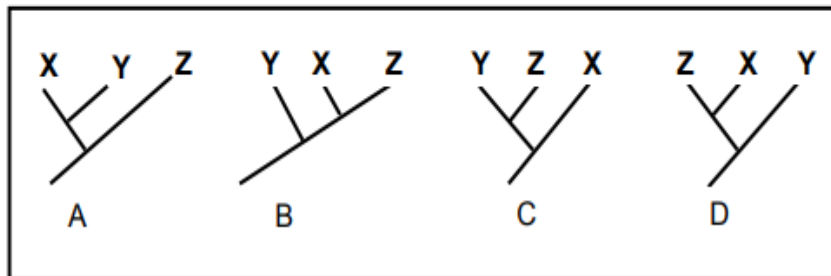
1.1.4 Antibiotic resistance in bacteria is an example of evolution in present times.

Which ONE of the following is a CORRECT explanation for this evolution?

- A The bacteria acquire resistance to the antibiotic by being exposed to it.
 - B There is variation in the bacteria and the resistant bacteria survive.
 - C The greater the number of bacteria, the higher the resistance.
 - D The greater the number of bacteria, the lower the resistance.
-

1.1.5 Three related species, X, Y and Z, share a common ancestor. Species Y and Z share the MOST RECENT common ancestor.

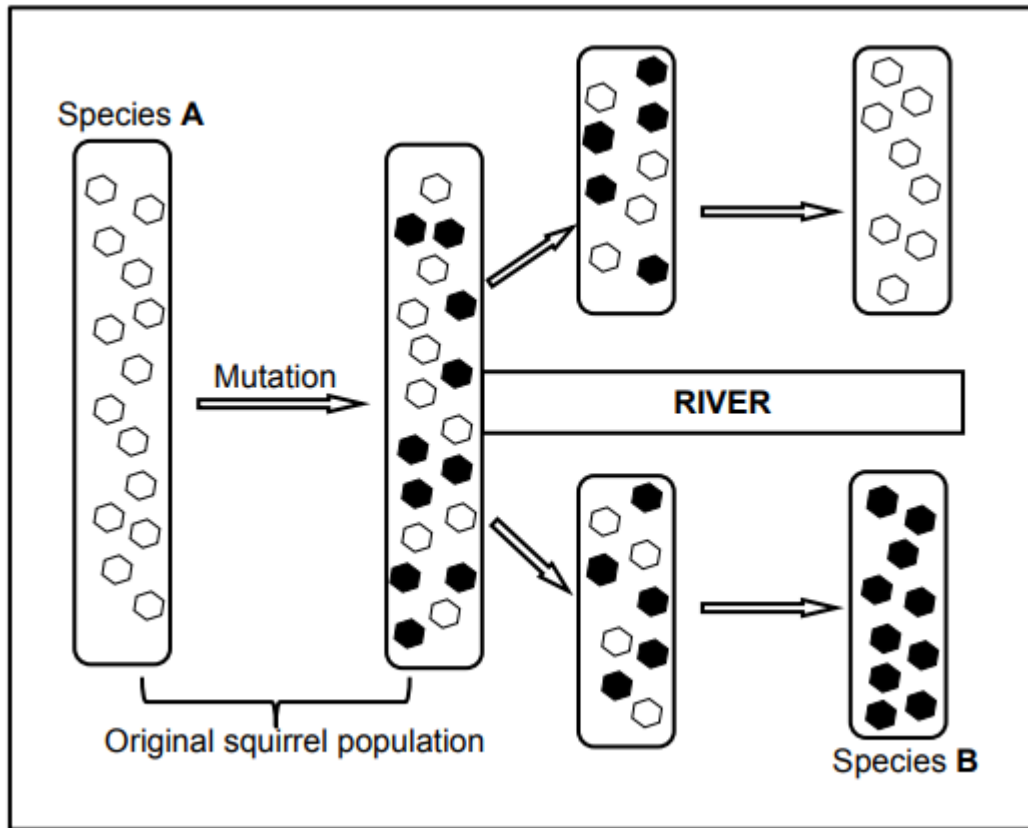
Which phylogenetic tree most accurately represents their evolutionary relationship?



1.1.7 Which ONE of the following is a reproductive isolating mechanism?

- A Breeding at different times of the year
 - B Same pollinators for different species of plants
 - C Absence of a geographic barrier
 - D Cloning
-

2.2 A mutation occurred within a population of squirrels. This population was then separated by a river. Many years later it was discovered that the original population had undergone speciation. The process of speciation is shown in the diagram below.



- 2.2.1 Define a *population*. (2)
- 2.2.2 Other than mutations, give THREE causes of variation in a population. (3)
- 2.2.3 Explain why there were eventually more squirrels with the mutation on one side of the river. (3)
- 2.2.4 Explain what effect the process above has on the biodiversity in this ecosystem. (2)
- 2.2.5 It was discovered that species **A** and **B** were TWO separate species.

Describe what can be done to confirm that the squirrels belong to two different biological species.

(2)
(12)