EVOLUTION

Q:1 The drawings show two different species of butterfly.

Amauris

Hypolimnas

- Both species can be eaten by most birds.
- Amauris has a foul taste which birds do not like, so birds have learned not to prey on it.
- Hypolimnas does not have a foul taste but most birds do not prey on it.

(a) Suggest why most birds do not prey on Hypolimnas.

_____

_____

_____

_____

(2 marks)

(b) Suggest an explanation, in terms of natural selection, for the markings on the wings of Hypolimnas.

_____

_____

_____

_____

_____

_____

_____

_____

(3 marks)

Q:2 Copper compounds are found in water that has drained through ash from power stations. Invertebrate animals are used to monitor the concentration of copper compounds in water. First, scientists must find out which invertebrate animals can survive in a range of concentrations of copper compounds.

This is how the procedure is carried out.

Solutions of different concentrations of a copper compound are prepared.

Batches of fifty of each of five different invertebrate species, A, B, C, D and E, are placed in separate containers of each solution.

After a while, the number of each type of invertebrate which survive at each concentration is counted.

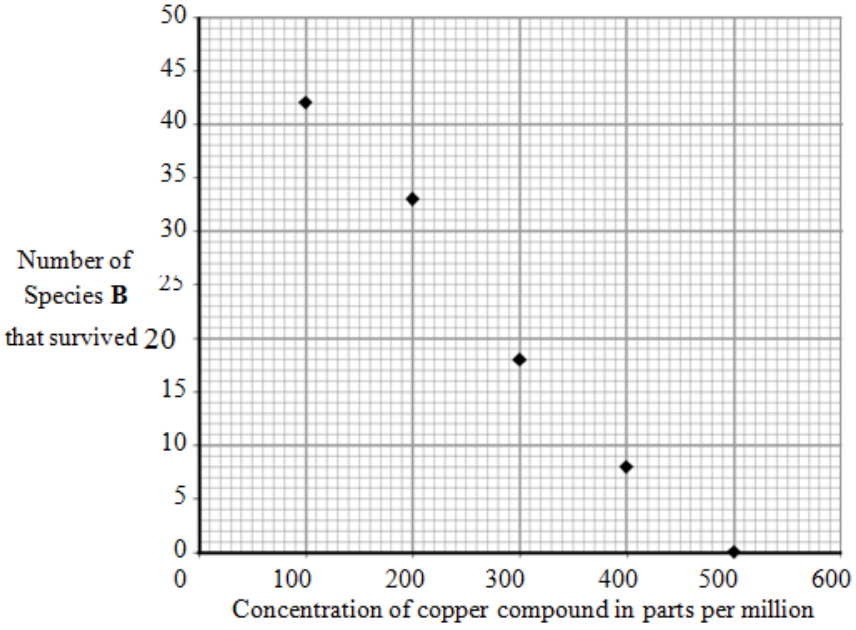
(a) Give two variables that should be controlled in this investigation so that the results are valid.

1 _____

2 _____

(2 marks)

(b) The graph below shows the results for species B.

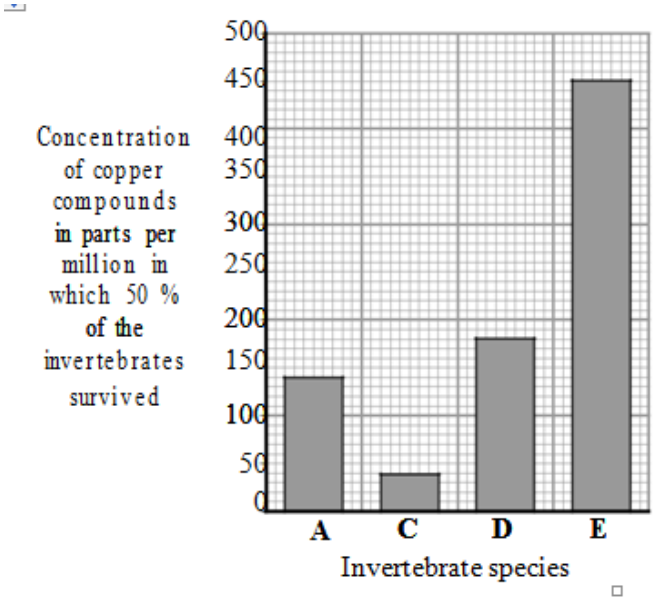


Use the graph to find the concentration of copper compounds in which 50 % of Species B survived. To obtain full marks you must show clearly on the graph how you obtained your answer.

Concentration _____ parts per million

(2 marks)

(c) The graph below shows the results of the tests on the other four invertebrate species.



(i) Which species, A, C, D or E, is most sensitive to the concentration of copper in the water?

_____

Give the reason for your answer.

_____

_____

(1 mark)

(ii) It is often more convenient to use invertebrates rather than a chemical test to monitor water for copper.

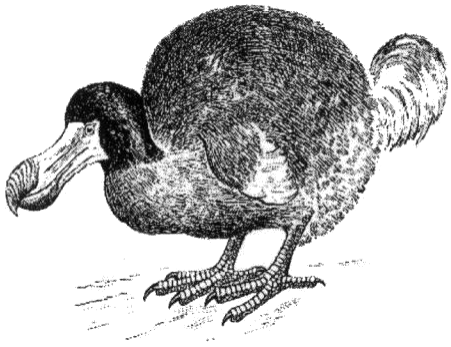
Suggest one explanation for this.

_____

_____

(2 marks)

Q:3 The dodo is an extinct bird. The drawing shows an artist's impression of the bird.



Dodo – a flightless bird

The dodo lived on a small island in the middle of the Indian Ocean. Its ancestors were pigeon-like birds which flew to the island millions of years ago. There were no predators on the island. There was a lot of fruit on the ground. This fruit became the main diet of the birds. Gradually, the birds became much heavier, lost their ability to fly and evolved into the dodo.

(a) Suggest an explanation for the evolution of the pigeon-like ancestor into the flightless dodo.

_____

_____

(4 marks)

(b) The dodo became extinct about 80 years after Dutch sailors first discovered the island in the eighteenth century.

Scientists are uncertain about the reasons for the dodo's extinction. Suggest an explanation for this uncertainty.

_____

_____

(1 mark)

Q:4 Draw a ring around the correct answer to complete each sentence.

(a) **(i)** Evolution can be explained by a theory called

genetic engineering

mutation .

natural selection

(1 mark)

(a) **(ii)** This theory was suggested by a scientist called

Darwin

Charles Lamarck .

Semmelweiss

(1 mark)

(a) (iii) This scientist said that all living things have evolved from

monkeys

dinosaurs .

simple life forms

(1 mark)

(b) Many religious people oppose the theory of evolution. Give one reason why.

_____

_____

(1 mark)

Q:5 Charles Darwin proposed the theory of natural selection.

(a) What is meant by natural selection?

_____

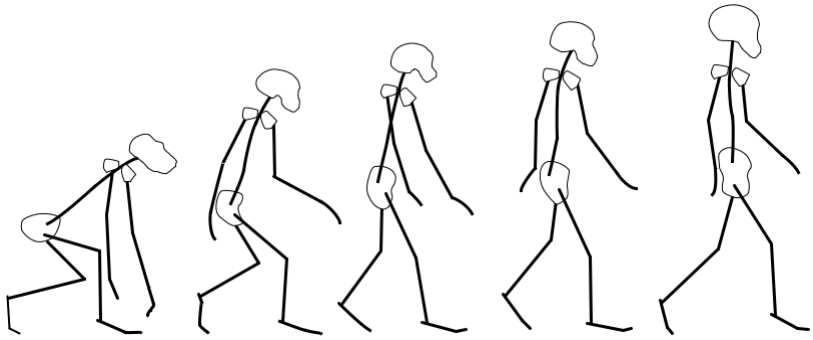
_____

_____

_____

(2 marks)

(b) The drawings show stages in the evolution of the human skeleton. All the drawings are to the same scale.



Ape-like ancestor Modern human

Use information from the drawings to describe two trends in the evolution of the human skeleton.

1 _____

_____

2 _____

_____

(2 marks)

(c) Darwin said that humans had evolved from ape-like ancestors. Many people disagreed with him at the time.

Give two reasons why.

1 _____

_____

2 _____

_____

(2 marks)

(d) Lamarck's theory of evolution stated that useful changes which occur in an organism during its lifetime will be inherited by its offspring.

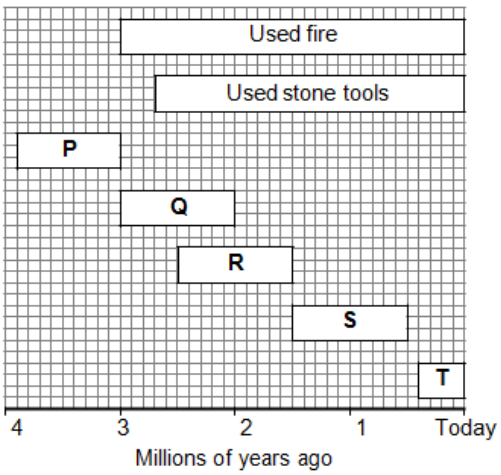
Give one way in which Darwin's theory differs from Lamarck's.

_____

_____

(1 mark)

Q:6 The diagram shows a time line for the evolution of humans.



(i) How many millions of years ago did humans first use fire?

☐ millions of years ago

(1 mark)

(a) (ii) Which human ancestor, P, Q, R or S, was the first ancestor to use tools?

☐

(1 mark)

(a) (iii) For how many millions of years did human ancestor R live on Earth?

☐

(1 mark)

(b) How do we know that human ancestors P, Q, R and S lived on Earth?

_____

_____

(1 mark)

(c) Which scientist suggested that humans have evolved from ape-like ancestors?

Draw a ring around one answer.

Darwin **Mendel** **Semmelweiss**

(1 mark)

TOTAL MARKS=26