5.1 Evolution & Natural Selection

Question Paper

Course	DP IB Biology
Section	5. Evolution & Biodiversity
Topic	5.1 Evolution & Natural Selection
Difficulty	Medium

To be used by all students preparing for DP IB Biology SL
Students of other boards may also find this useful

Question 1

Why do species evolve over time?

A. To become better adapted to their environment.

B. Because of changes in the bodies of organisms.

C. Because of changes in the heritable characteristics of organisms.

D. Because certain characteristics are advantageous.

[1 mark]

Question 2

Which of the following must occur for speciation to take place?

I. Two populations of a species must be separated by a mountain range or body of water.
II. No gene exchange can take place between two populations of a species.
III. Two populations must develop differences in their physical characteristics.

A. I and II only

B. II only

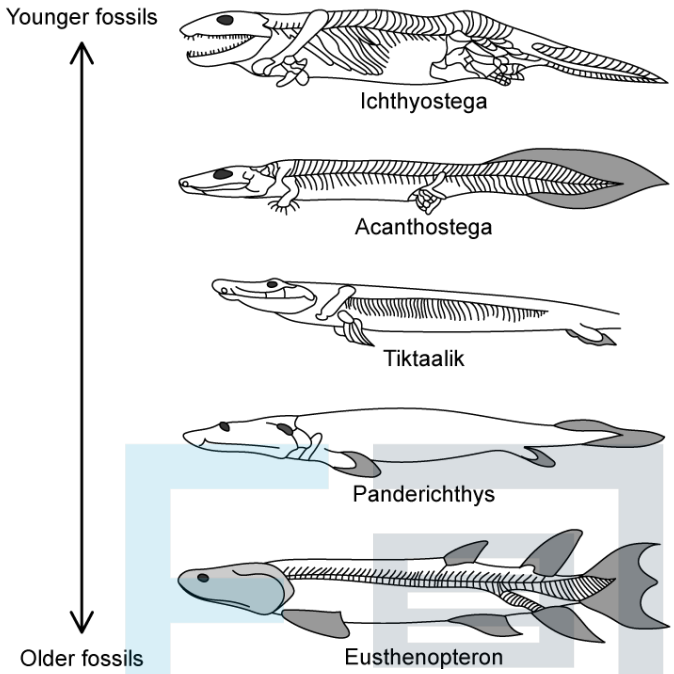
C. II and III only

D. I, II, and III

[1 mark]

Question 3

The image below shows a series of fossils.



How does this set of fossils provide evidence for evolution?

A. They show the complete transition between fish and four-legged land animals.

B. They show that species change to become better adapted to their environment.

C. They strengthen the evidence for species change over time provided by the rest of the fossil record.

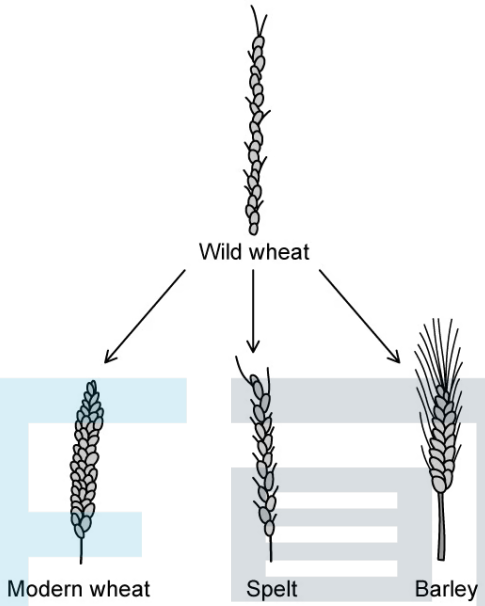
D. They show that limbs are always advantageous over fins.

[1 mark]

Question 4

The diagram below shows how selective breeding has developed several modern crop varieties from wild wheat.

The selective breeding of modern wheat from wild wheat would begin with the breeders selecting individuals with many, large seeds.



What is the correct continuation of the process for the selective breeding of modern wheat from wild wheat?

	Stage 1	Stage 2	Stage 3
A	Selected individuals are bred together	Offspring which produce many, large seeds are bred together	Stages 1–3 are repeated over many generations
B	Selected individuals are allowed to reproduce asexually	Offspring are allowed to mature	Stages 1–3 are repeated over many generations
C	The genes for these desirable characteristics are isolated	These desirable genes are inserted into wheat gametes	Fertilisation takes place and the plants are allowed to mature
D	Selected individuals are bred together	Offspring which produce many, large seeds are bred together	Stages 1–3 are repeated once more

[1 mark]

Question 5

Which of the following processes generate genetic variation?

I. Random assortment
II. Mitosis
III. DNA replication
IV. Random fertilisation

A. I and III only

B. I and IV only

C. I, III, and IV only

D. I, II, III, and IV

[1 mark]

Question 6

Which of the following must occur for natural selection to take place?

A. Sexual reproduction.

B. Genetic variation.

C. The presence of predators.

D. Advantageous characteristics.

[1 mark]

Question 7

Which of the following is **not** a reason for the evolution of melanism in peppered moths?

A. Predators such as birds act as a selection pressure, leading to differences in survival rates of moths with and without melanism.

B. Pollution from industry causes the death of lichens, leading to darkening of tree bark.

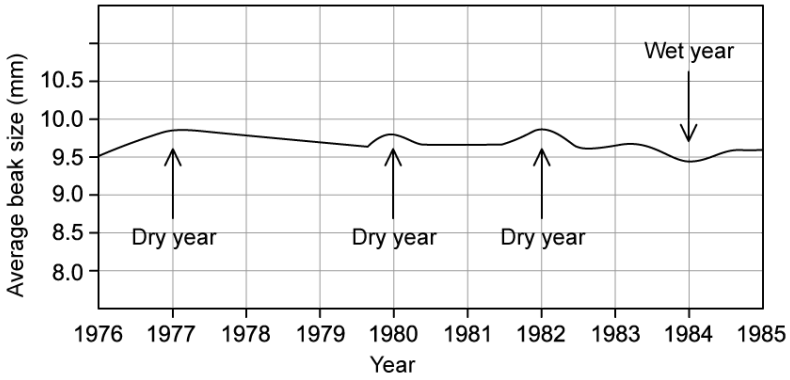
C. There is variation in the gene coding for melanin production in the moth population.

D. Some moths acquire darkened wings as a result of soot particles in the air, providing them with camouflage.

[1 mark]

Question 8

Research was carried out on beak size in the island-living finch species *Geospiza fortis*. *G. fortis* feeds on seeds, which are plentiful, small, and soft in the years when the weather is normal, but which become larger and tougher in drought years. Some of the research results are shown in the graph below.



Which of the following statements explains the results in the graph?

A. Finches adapt to drought years by developing larger beaks, passing on the characteristic to their offspring, and leading to an increase in average beak size.

B. Average finch beak size increases during years of drought and decreases during wet years.

C. Average beak size increased from 9.5 mm in 1976 to 9.9 mm in 1977, before slowly decreasing to 9.7 mm by 1979.

D. Finches with larger beaks have an advantage when competing for food in drought years, and are therefore more likely to survive and pass on their alleles, leading to an increase in average beak size.

[1 mark]

Question 9

Which of the following would reduce the likelihood of antibiotic resistance evolving?

I. Reducing the use of antibiotics.
II. Taking measures to reduce the spread of infectious bacteria.
III. Researching new antibiotics.

A. I only

B. I and II only

C. I and III only

D. I, II, and III

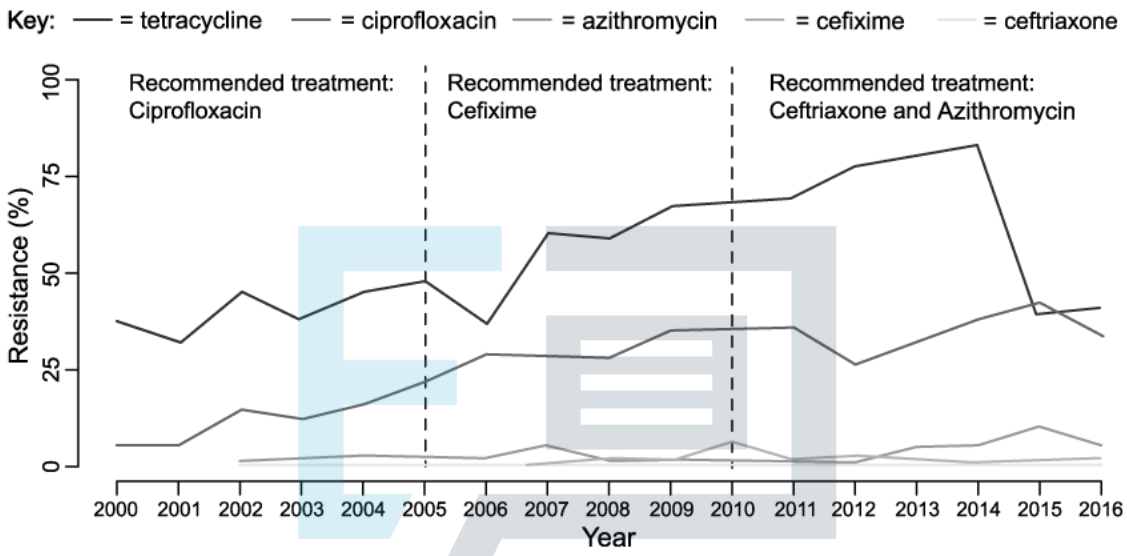
[1 mark]

Question 10

Research was carried out into the emergence of antibiotic resistance in the antibiotics used to treat infection X between the years 2000–2016.

Different antibiotics were recommended during different time periods due to concerns about developing resistance. Note that ciprofloxacin is used to treat a range of infections and not just infection X, while tetracycline is not used to treat infection X but is used to treat many other mild infections.

Some of the results of the research are shown below.



What conclusion can be drawn from these results?

A. Resistance evolves when the use of an antibiotic increases.

B. Ceftriaxone should be used to treat all infections.

C. Infection X should not be treated with antibiotics.

D. Tetracycline should no longer be used.

[1 mark]