PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 3: GENETICS (PACK 2)

SCORE	PERCENTAGE
/32	%

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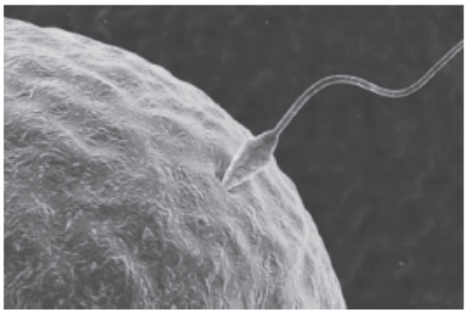
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Q1.

The photograph shows a sperm cell and an egg cell just before fertilisation.



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Describe the structure of DNA.

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Q2.

* Discuss the advantages and disadvantages of sexual reproduction and asexual reproduction.

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(Total for question = 6 marks)

Q3.

Mendel's research on pea plants showed that genetic traits are inherited.

(i) Which term is used to describe the expression of traits in an organism?

(1)

☒ **A** genotype

☒ **B** phenotype

☒ **C** allele

☒ **D** gamete

(ii) Mendel crossed pea plants that produced round seeds with pea plants that produced wrinkled seeds.

All the offspring produced round seeds.

He then crossed these offspring with each other.

Some pea plants in the next generation produced round seeds and the others produced wrinkled seeds.

Explain how this showed that some inherited traits are not expressed in an organism.

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(Total for question = 4 marks)

Q4.

Gregor Mendel investigated the genetics of peas.

He did not know about genes but showed that inherited characteristics can be dominant or recessive.

Explain how Mendel used homozygous tall and homozygous short pea plants to show that the tall allele is dominant to the short allele.

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(Total for question = 2 marks)

Q5.

DNA molecules contain base pairs.

Describe how the base pairs are bonded together in a DNA molecule.

(2)

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(Total for question = 2 marks)

Q6.

DNA molecules contain base pairs.

Describe how the base pairs are bonded together in a DNA molecule.

(2)

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(Total for question = 2 marks)

Q7.

The population of humans on Earth has increased significantly leading to food shortages.

The growth of drought-resistant crop plants could lead to an increase in food supply.

Describe how drought-resistant crop plants can be produced.

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(Total for question = 3 marks)

Q8.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Figure 4 shows a great tit on a bird feeder.



© taviphoto/Shutterstock

Figure 4

Scientists have found that great tits living now have longer beaks than great tits living 50 years ago.

Genetic analysis shows changes in the sequence of the bird's DNA.

(i) Give the complementary strand sequence for this DNA template.

(1)

A	T	G	T	T	A	C	G	T
:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:

(ii) Which statement correctly describes a DNA molecule?

(1)

☒ **A** two strands joined together by strong bonds to form a double helix

☒ **B** two complementary bases twisted into a double helix by strong bonds

☒ **C** a double helix with strands joined by hydrogen bonds between bases

☒ **D** four complementary strands joined together with hydrogen bonds

(iii) State the term used to describe a change in the sequence of DNA bases.

(1)

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(Total for question = 3 marks)

Q9.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

Figure 5 shows a great tit on a bird feeder.



© taviphoto/Shutterstock

Figure 5

Scientists have found that great tits living now have longer beaks than great tits living 50 years ago.

Genetic analysis shows changes in the sequence of the bird's DNA.

(i) Give the complementary strand sequence for this DNA template.

(1)

A	T	G	T	T	A	C	G	T
:	:	:	:	:	:	:	:	:
:	:	:	:	:	:	:	:	:

(ii) Which statement correctly describes a DNA molecule?

(1)

☒ **A** two strands joined together by strong bonds to form a double helix

☒ **B** two complementary bases twisted into a double helix by strong bonds

☒ **C** a double helix with strands joined by hydrogen bonds between bases

☒ **D** four complementary strands joined together with hydrogen bonds

(iii) State the term used to describe a change in the sequence of DNA bases.

(1)

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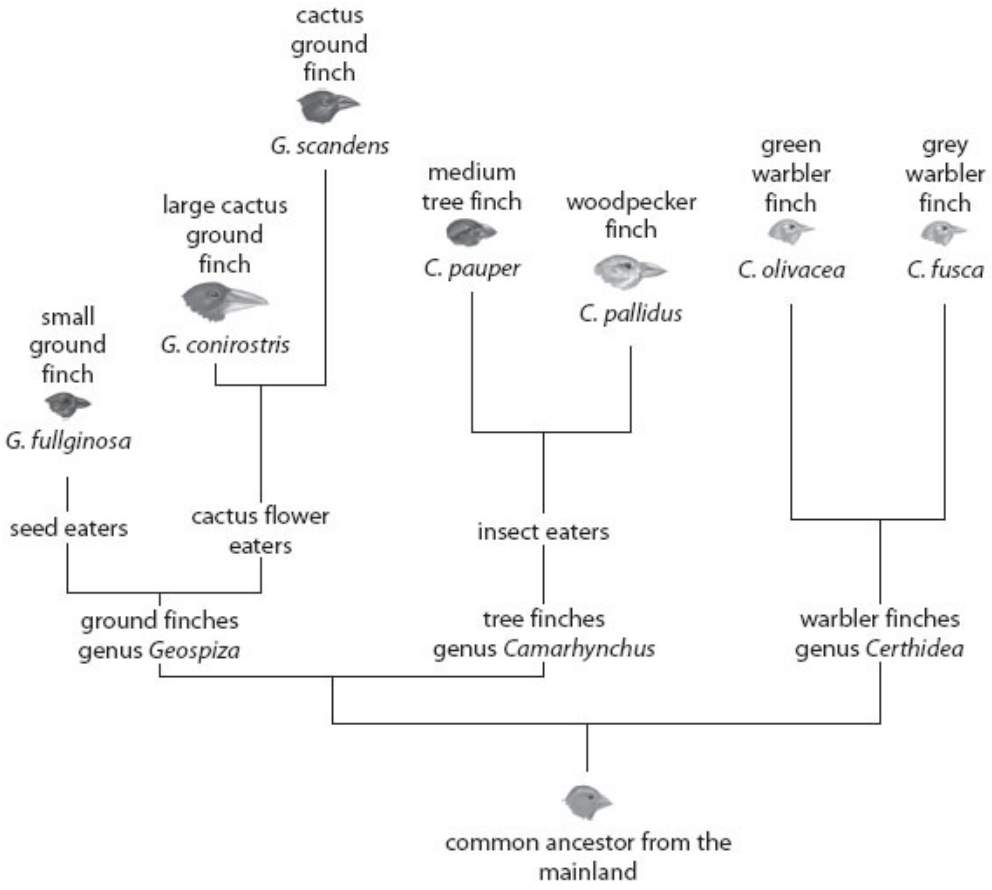
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Q10.

Charles Darwin studied the variety of finches on the Galapagos Islands.

He used this information to develop his theory of evolution.

Some of the finches are shown in the diagram.



(i) State the genus and the species of the large cactus ground finch.

(2)

genus .....

species .....

(ii) Suggest how the size and shape of their beaks enabled all of these types of finches to survive.

(2)

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(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Darwin's finches are an example of speciation due to

(1)

☒ **A** selective breeding

☒ **B** geographic isolation

☒ **C** hybridisation

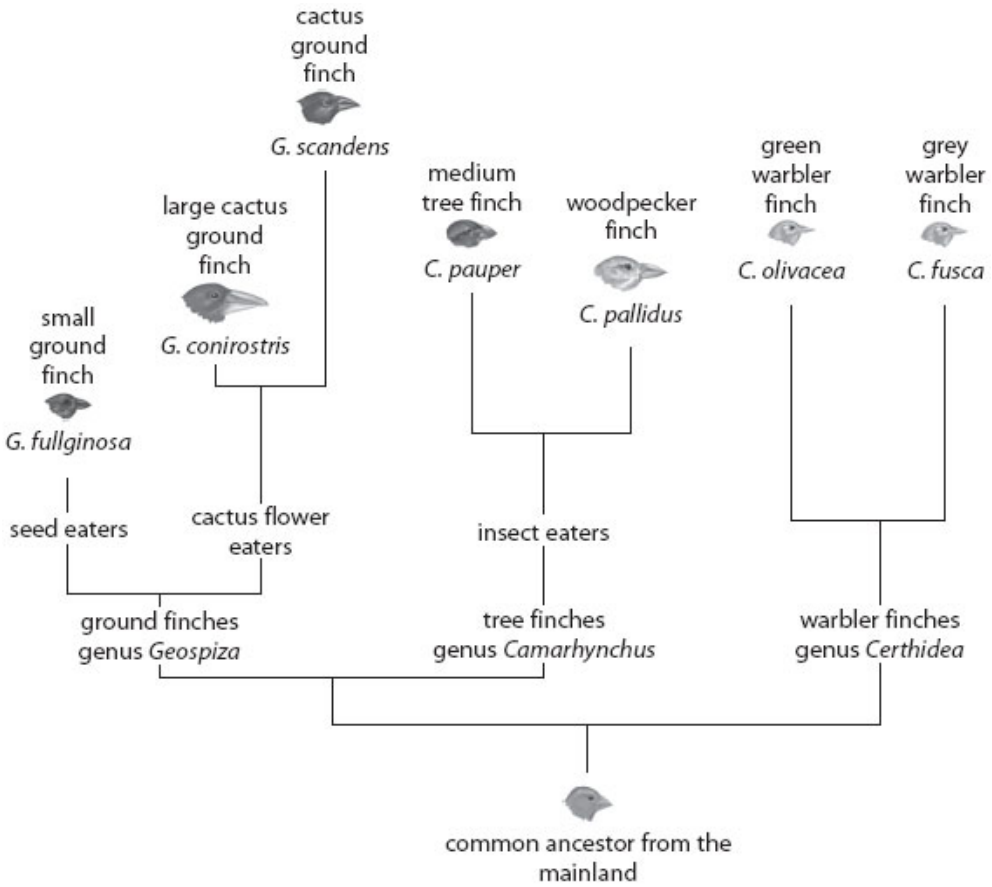
☒ **D** the development of ring species

Q11.

Charles Darwin studied the variety of finches on the Galapagos Islands.

He used this information to develop his theory of evolution.

Some of the finches are shown in the diagram.



(i) State the genus and the species of the large cactus ground finch.

(2)

genus .....

species .....

(ii) Suggest how the size and shape of their beaks enabled all of these types of finches to survive.

(2)

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(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Darwin's finches are an example of speciation due to

(1)

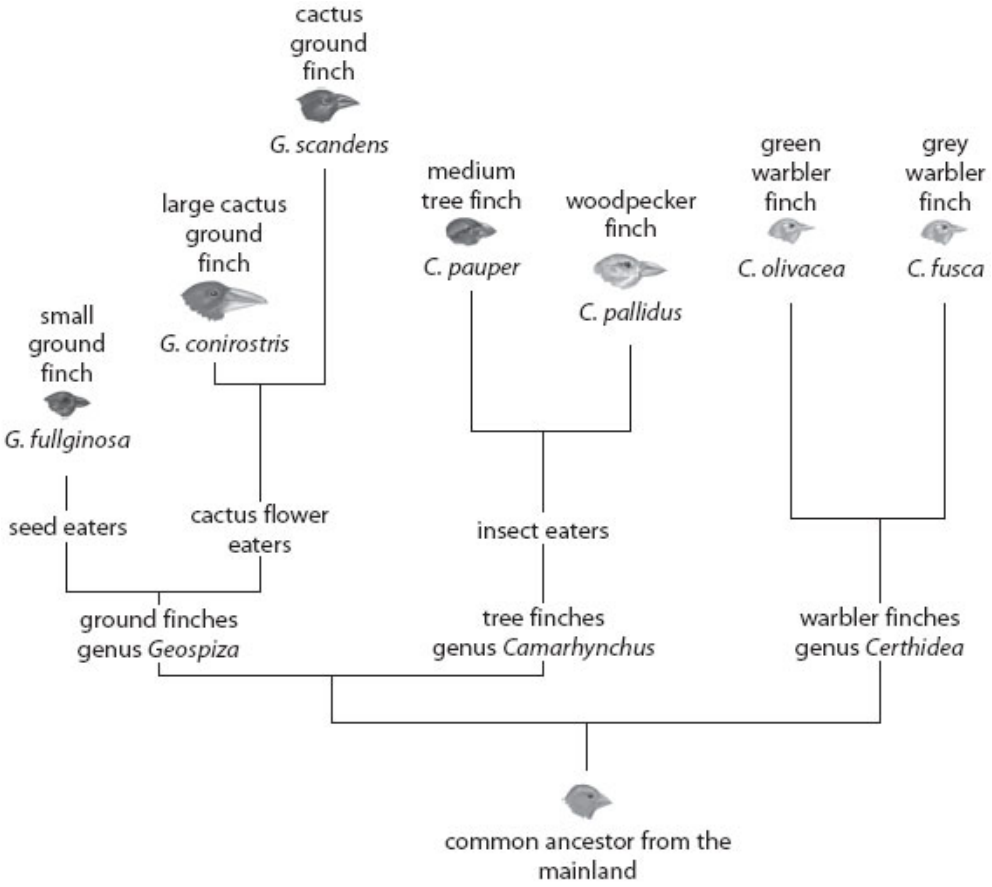
- ☒ **A** selective breeding
- ☒ **B** geographic isolation
- ☒ **C** hybridisation
- ☒ **D** the development of ring species

Q12.

Charles Darwin studied the variety of finches on the Galapagos Islands.

He used this information to develop his theory of evolution.

Some of the finches are shown in the diagram.



(a) (i) State the genus and the species of the large cactus ground finch.

(2)

genus .....

species .....

(ii) Suggest how the size and shape of their beaks enabled all of these types of finches to survive.

(2)

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(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Darwin's finches are an example of speciation due to

(1)

☒ **A** selective breeding

☒ **B** geographic isolation

☒ **C** hybridisation

☒ **D** the development of ring species

(b) Suggest how these species of finches could have evolved.

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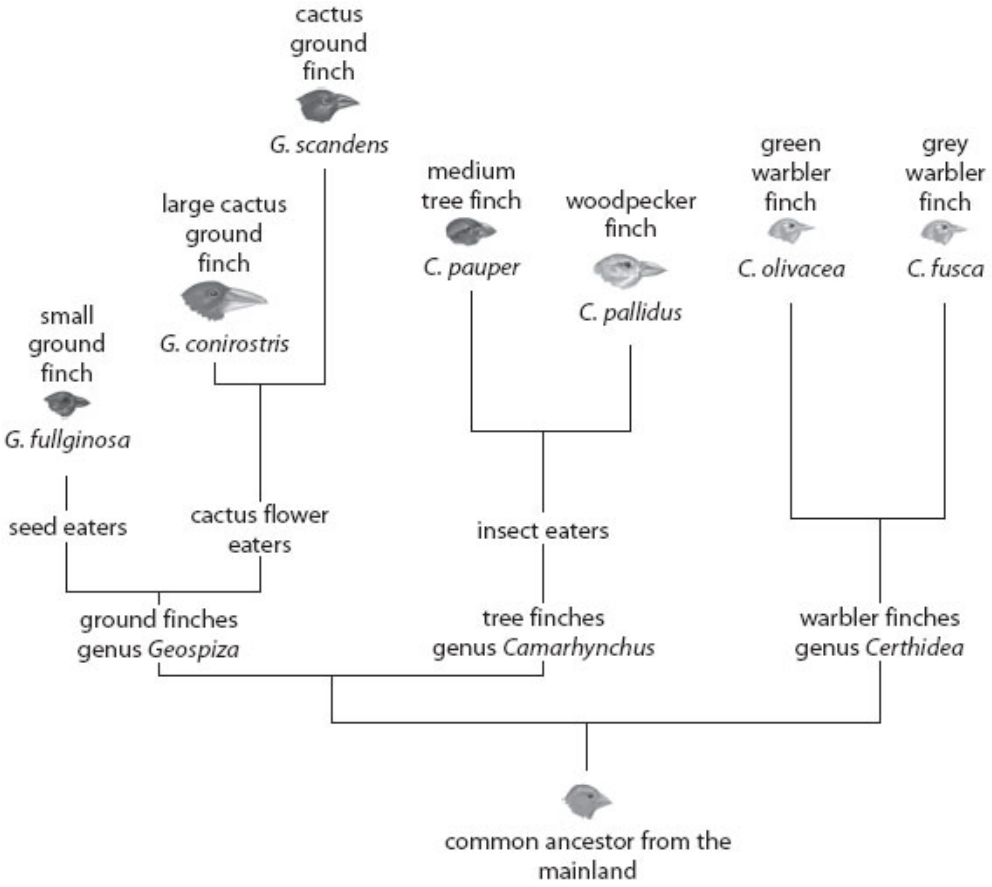
(Total for Question is 8 marks)

Q13.

Charles Darwin studied the variety of finches on the Galapagos Islands.

He used this information to develop his theory of evolution.

Some of the finches are shown in the diagram.



(a) (i) State the genus and the species of the large cactus ground finch.

(2)

genus .....

species .....

(ii) Suggest how the size and shape of their beaks enabled all of these types of finches to survive.

(2)

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(ii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Darwin's finches are an example of speciation due to

(1)

☒ **A** selective breeding

☒ **B** geographic isolation

☒ **C** hybridisation

☒ **D** the development of ring species

(b) Suggest how these species of finches could have evolved.

(3)

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(Total for Question is 8 marks)

Q14.

DNA is composed of four different DNA nucleotides.

(i) Which diagram represents the arrangement of the sugar, phosphate and the base in a DNA nucleotide?

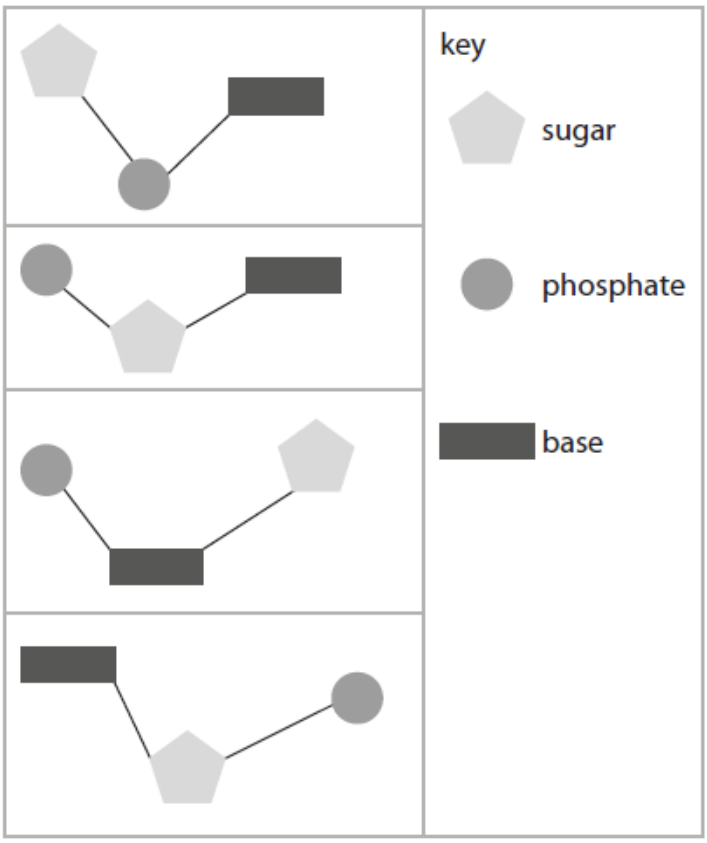
(1)

☒ A

☒ B

☒ C

☒ D



(ii) An allele starts with the DNA sequence ATGCATGTACCG.

Give the sequence of the complementary DNA sequence.

(1)

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(iii) The length of one DNA nucleotide was measured at 3.3×10^{-10} metres.

Calculate the approximate length of a gene containing 250 nucleotides in nanometres.

(2)

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(Total for question = 4 marks)

Q15.

Mitosis and meiosis are processes that produce new cells.

Compare the outcomes of mitosis and meiosis.

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(Total for question = 3 marks)