AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.6.2.4

Genetic engineering

Past-paper questions

Tier	**Foundation**
Question groups	**2**
Available paper years	**2022–2024**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.6.2.4 Genetic engineering

Question 01

June 2022 | 8464/B/2F | Original Q1

0 1 This question is about genetics.

0 1 . 1 Crop plants are genetically modified (GM) for useful characteristics.

Which useful characteristic are crops genetically modified for?

[1 mark]

Tick (✓) **one** box.

- Fewer roots ☐
- Larger yields ☐
- Smaller fruits ☐

0 1 . 2 What is **one** concern about GM crops?

[1 mark]

Tick (✓) **one** box.

- GM crops will add to global warming. ☐
- GM crops will cause air pollution. ☐
- GM crops will harm wildlife. ☐
- GM crops will produce too much food. ☐

Some inherited disorders are caused by a faulty piece of DNA.

0 1 . 3 What is the name of a piece of DNA that codes for a characteristic?

[1 mark]

_____

4.6.2.4 Genetic engineering

Question 01 · continued

0 1 . 4 DNA contains a code for making substances in the cell.

What type of substance is made using the DNA code?

[1 mark]

Tick (✓) **one** box.

- Fat ☐
- Protein ☐
- Starch ☐
- Sugar ☐

Cystic fibrosis (CF) is an inherited disorder.

The allele for having CF is recessive (**h**).

The allele for **not** having CF is dominant (**H**).

0 1 . 5 What is a recessive allele?

[1 mark]

Tick (✓) **one** box.

- An allele that is always expressed. ☐
- An allele that is expressed if only one copy is present. ☐
- An allele that is only expressed if two copies are present. ☐

Question 1 continues on the next page

4.6.2.4 Genetic engineering

Question 01 · continued

A man and a woman do **not** have CF. The man has the alleles **Hh**.

0 1 . 6 What word describes the alleles of the man?

[1 mark]

Tick (✓) **one** box.

Heterozygous ☐

Homozygous ☐

Phenotype ☐

0 1 . 7 The man and the woman want to have a child.

Complete **Figure 1** to show the possible genotypes of the child.

Draw a ring around the genotype of a child who will have CF.

[3 marks]

Figure 1

		Woman	
		H	**h**
Man	**H**		
	h		hh

4.6.2.4 Genetic engineering

Question 01 · continued

0 1 . 8 What is the chance that a child of the man and the woman will have CF?

[1 mark]

Tick (✓) **one** box.

25% ☐ 50% ☐ 75% ☐ 100% ☐

0 1 . 9 The woman is pregnant.

The woman can have embryo screening to find out if the child will have CF.

Suggest **one** reason why the woman might **not** want to have embryo screening.

[1 mark]

_____

_____

_____

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4.6.2.4 Genetic engineering

Question 02

June 2024 | 8464/B/2F | Original Q6

0 6 Potatoes are a food crop.

0 6 . 1 Potato plants are classified as eukaryota.

What type of classification group is eukaryota?

[1 mark]

Tick (✓) **one** box.

- Class ☐
- Domain ☐
- Kingdom ☐
- Phylum ☐

0 6 . 2 Potato plants can reproduce by asexual reproduction.

Which statement is true for asexual reproduction?

[1 mark]

Tick (✓) **one** box.

- Meiosis occurs. ☐
- Offspring are genetically identical. ☐
- Pollen and egg cells are produced. ☐

Question 6 continues on the next page

4.6.2.4 Genetic engineering

Question 02 · continued

0 6 . 3 Flowers of potato plants contain gametes for sexual reproduction.

How is a gamete different from other cells in a potato plant?

[1 mark]

Tick (✓) **one** box.

A gamete contains one-quarter of the number of chromosomes. ☐

A gamete contains half of the number of chromosomes. ☐

A gamete contains double the number of chromosomes. ☐

0 6 . 4 Plants in the same genus as potatoes have been studied by scientists.

Describe **one** way a new plant species could be identified as being in the same genus as potatoes.

[1 mark]

4.6.2.4 Genetic engineering

Question 02 · continued

0 6 . 5 Scientists have collected and stored seeds from species in the same genus as potatoes.

In the future, these seeds may be used for genetic modification of potato plants.

Genetically modified potato plants could help supply food to the human population as the climate changes.

Explain why genetic modification of crop plants may be important for the human population to survive climate change.

[6 marks]

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