AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.6.1.1

Sexual and asexual reproduction

Past-paper questions

Tier	**Higher**
Question groups	**7**
Available paper years	**2018–2024**

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.

4.6.1.1 Sexual and asexual reproduction

Question 01

June 2018 | 8464/B/2H | Original Q7

0 7 Many people eat shellfish called oysters.

An oyster has 20 chromosomes in each body cell.

0 7 . 1 Which arrangement of chromosomes will a male oyster have in each body cell?

[1 mark]

Tick **one** box.

- One X and one Y chromosome and 8 pairs of other chromosomes ☐
- Two X and two Y chromosomes and 8 pairs of other chromosomes ☐
- One X and one Y chromosome and 9 pairs of other chromosomes ☐
- Two X chromosomes and 9 pairs of other chromosomes ☐

0 7 . 2 Oyster gametes only contain half the amount of DNA compared to a normal oyster body cell.

Describe the type of cell division that produces gametes.

[3 marks]

Question 7 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 01 · continued

Biologists have discovered a way to produce oysters that have three sets of chromosomes (triploid) instead of the usual two sets (diploid).

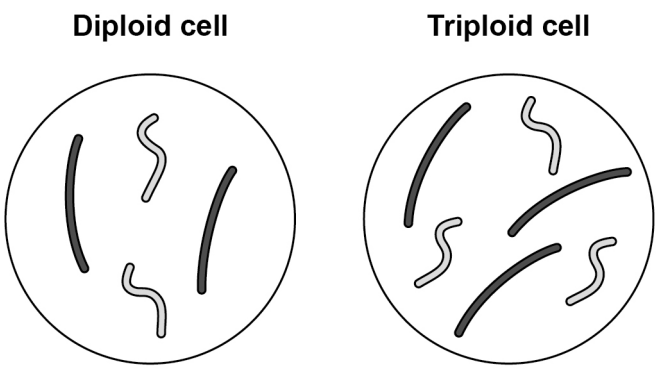
The triploid oysters cannot reproduce and so they grow more quickly.

Diploid oysters do not taste good in the reproductive season. Triploid oysters taste good all year.

Figure 5 shows the chromosomes in a diploid cell and in a triploid cell.

Only two sets of chromosomes are shown.

Figure 5



0 7 . 3 Suggest why the triploid oysters are **not** able to reproduce.

[1 mark]

0 7 . 4 Explain why the triploid oysters grow more quickly than the diploid oysters.

[2 marks]

4.6.1.1 Sexual and asexual reproduction

Question 01 · continued

0 7 . 5 The population of diploid oysters growing in the wild has reduced by over 80% in the last 20 years.

Suggest **two** environmental factors which may be causing this reduction.

Give a reason why each factor may be causing the reduction in the population.

[2 marks]

1 _____

_____

2 _____

_____

0 7 . 6 Oyster farmers grow the triploid oysters from young seed oysters.

The production of seed oysters involves the use of a chemical called cytochalasin B. Cytochalasin B has been shown to cause cancer in mice.

Evaluate the production of triploid oysters for supermarkets and restaurants.

[6 marks]

_____

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4.6.1.1 Sexual and asexual reproduction

Question 02

November 2020 | 8464/B/2H | Original Q4

0 4 . 1 In sexual reproduction, cells divide by meiosis to form gametes.

Which **two** statements are true for cell division by meiosis?

[2 marks]

Tick (✓) **two** boxes.

- Daughter cells have two sets of chromosomes. ☐
- Four daughter cells are formed. ☐
- The daughter cells are genetically identical. ☐
- The DNA replicates twice. ☐
- The parent cell divides twice. ☐

4.6.1.1 Sexual and asexual reproduction

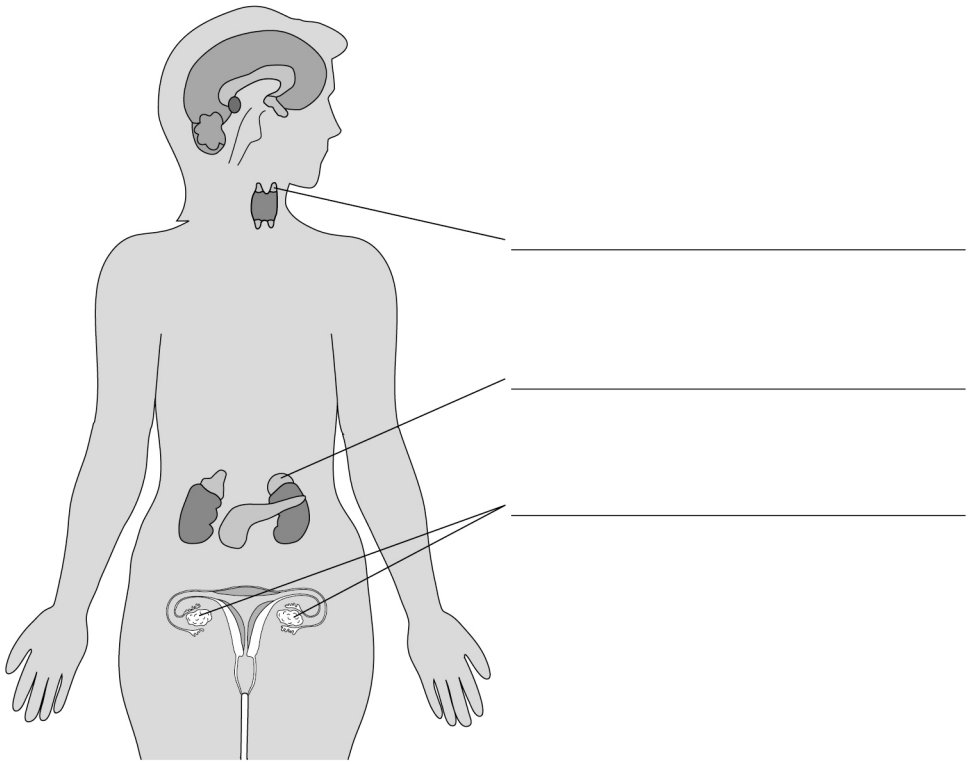
Question 02 · continued

Hormones are released from endocrine glands.

Each hormone travels in the bloodstream to a target organ.

Figure 3 shows the position of endocrine glands in a female.

Figure 3



0 4 . 2 Label the endocrine glands on **Figure 3**.

[3 marks]

Question 4 continues on the next page

0 4 . 3 Complete **Table 2**.

[3 marks]

Table 2

Hormone	Name of gland which releases hormone	Target organ of hormone
Luteinising hormone (LH)	Pituitary gland	
	Adrenal gland	
Glucagon		

Millions of geranium plants are sold each year in garden centres.

Geraniums can be reproduced asexually or sexually.

Figure 4 shows a potted geranium plant.

Figure 4



4.6.1.1 Sexual and asexual reproduction

Question 02 · continued

Garden centres usually grow new geranium plants by asexual reproduction.

0 4 . 4 Suggest **two** advantages for garden centres of growing geraniums by asexual reproduction compared with sexual reproduction.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 5 Suggest **two** disadvantages for garden centres of growing geraniums by asexual reproduction compared with sexual reproduction.

[2 marks]

1 _____

_____

2 _____

_____

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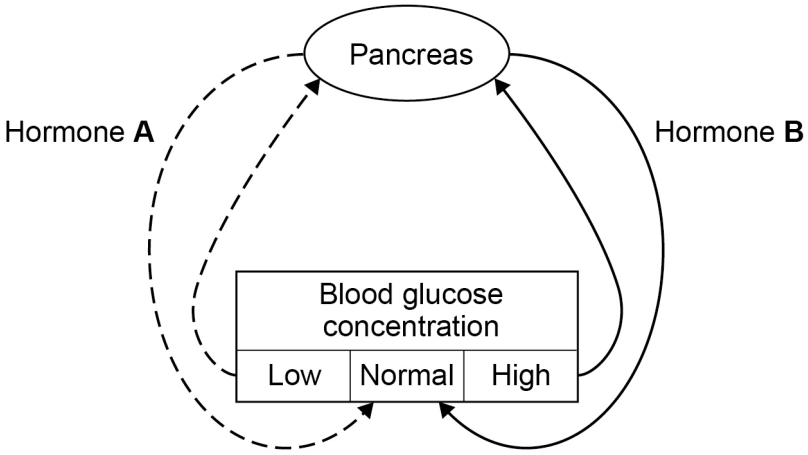
4.6.1.1 Sexual and asexual reproduction

Question 03

0 5 Blood glucose concentration in the human body needs to be kept within the normal range.

Figure 4 shows that two hormones control blood glucose concentration.

Figure 4



0 5 . 1 Name the type of hormonal control shown in **Figure 4**.

[1 mark]

_____

0 5 . 2 Name hormones **A** and **B** in **Figure 4**.

[1 mark]

A _____

B _____

4.6.1.1 Sexual and asexual reproduction

Question 03 · continued

0 5 . 3 Explain how the two hormones in **Figure 4** keep the blood glucose concentration within the normal range for 3 hours after a meal.

[6 marks]

Question 5 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 03 · continued

Female reproductive hormones are used to treat infertility in women.

0 5 . 4 Follicle Stimulating Hormone (FSH) and then Luteinising Hormone (LH) can be injected into a woman to help her become pregnant by sexual intercourse.

Explain how injecting FSH and then LH will help a woman to become pregnant.

[3 marks]

0 5 . 5 In some women the injections of FSH and LH are the first steps for In Vitro Fertilisation (IVF).

Describe the remaining steps in IVF.

[4 marks]

4.6.1.1 Sexual and asexual reproduction

Question 03 · continued

0 5 . 6 There are two different processes of cell division in humans.

Describe **three** differences between cell division to form sperm cells compared with cell division to form liver cells.

[3 marks]

1 _____

_____

_____

2 _____

_____

_____

3 _____

_____

_____

18

4.6.1.1 Sexual and asexual reproduction

Question 04

June 2023 | 8464/B/2H | Original Q1

0 1 Sexual reproduction in humans involves the production of egg cells and sperm cells.

0 1 . 1 Name the type of cell division that produces egg cells and sperm cells.

[1 mark]

_____

0 1 . 2 Sexual reproduction produces offspring that are genetically different from each other.

Give **two** reasons why sexual reproduction causes variation in the offspring.

[2 marks]

1 _____

_____

2 _____

_____

Question 1 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 04 · continued

Polydactyly is an inherited disorder.

The allele for polydactyly is dominant, **D**.

A person with two copies of the allele **d** will **not** have polydactyly.

0 1 . 3 A person with the genotype **DD** is homozygous.

What word describes the genotype **Dd**?

[1 mark]

_____

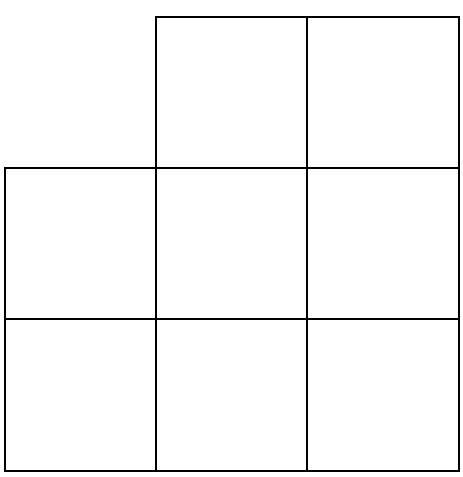
0 1 . 4 A person with the genotype **Dd** and a person with the genotype **dd** plan to have a child.

Determine the probability that the child will have polydactyly.

You should:

- complete the Punnett square diagram
- identify any offspring genotype that would have polydactyly.

[5 marks]



Probability that the child will have polydactyly = _____

4.6.1.1 Sexual and asexual reproduction

Question 04 · continued

0 1 . 5 Embryos can be screened for the alleles that cause inherited disorders.

Give **two** advantages of embryo screening.

[2 marks]

1 _____

_____

2 _____

_____

11

Turn over for the next question

4.6.1.1 Sexual and asexual reproduction

Question 05

June 2023 | 8464/B/2H | Original Q5

0 5 In Vitro Fertilisation (IVF) can be used to treat infertility.

0 5 . 1 Which hormones are given to women having IVF treatment?

[1 mark]

Tick (✓) **one** box.

- FSH and LH ☐
- FSH and oestrogen ☐
- LH and oestrogen ☐

0 5 . 2 Name the target organ of the hormones used for IVF.

[1 mark]

_____

0 5 . 3 Describe why microscopes are needed in the process of IVF.

[1 mark]

_____

_____

Question 5 continues on the next page

4.6.1.1 Sexual and asexual reproduction

0 5 . 4 Describe how the hormones given to women during IVF treatment **interact** with other hormones to prepare the body for pregnancy.

[3 marks]

Scientists studied women who had IVF treatment.

Table 1 shows the results.

Table 1

	Number of women
Received IVF treatment	450
Successful IVF treatment	135

4.6.1.1 Sexual and asexual reproduction

Question 05 · continued

0 5 . 5 Calculate the **simplest** ratio of the number of women who had successful IVF to the number of women who had unsuccessful IVF.

Give the ratio in whole numbers.

[2 marks]

Ratio (whole numbers) = _____ : _____

0 5 . 6 Suggest **one** factor that can affect the probability of a woman having a child as a result of IVF treatment.

[1 mark]

0 5 . 7 Give **two** arguments against the use of IVF treatment.

Do **not** refer to cost or to religion in your answer.

[2 marks]

1

2

11

4.6.1.1 Sexual and asexual reproduction

Question 06

0 2 Potatoes are a food crop.

0 2 . 1 Potato plants are classified as eukaryota.

What type of classification group is eukaryota?

[1 mark]

Tick (✓) **one** box.

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

0 2 . 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 2 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 06 · continued

0 2 . 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 2 . 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]

4.6.1.1 Sexual and asexual reproduction

Question 06 · continued

0 2 . 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]

10

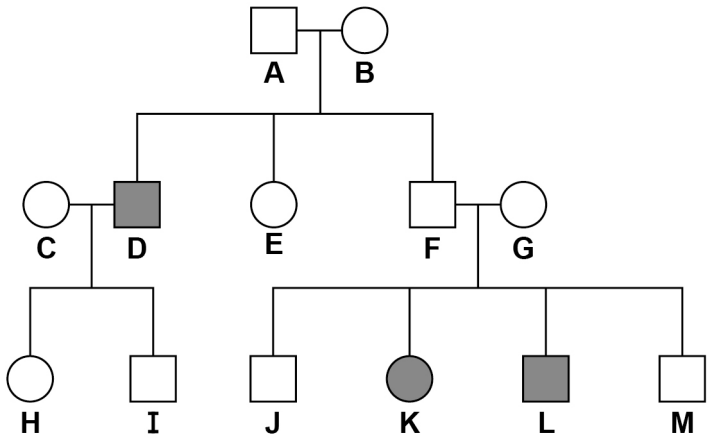
4.6.1.1 Sexual and asexual reproduction

Question 07

0 3 AKU is a genetic disorder.

Figure 3 shows the inheritance of AKU in one family.

Figure 3



Key

- Male who has AKU
- Female who has AKU
- Male who does **not** have AKU
- Female who does **not** have AKU

0 3 . 1 Describe how **Figure 3** shows that the allele for AKU is recessive.

[1 mark]

0 3 . 2 Which person is **definitely** heterozygous for AKU?

[1 mark]

Tick (✓) **one** box.

C ☐ D ☐ E ☐ G ☐

4.6.1.1 Sexual and asexual reproduction

0 3 . 3 A female who has AKU and a male who is heterozygous for AKU plan to have a child.

Determine the probability that the child will have AKU.

You should:

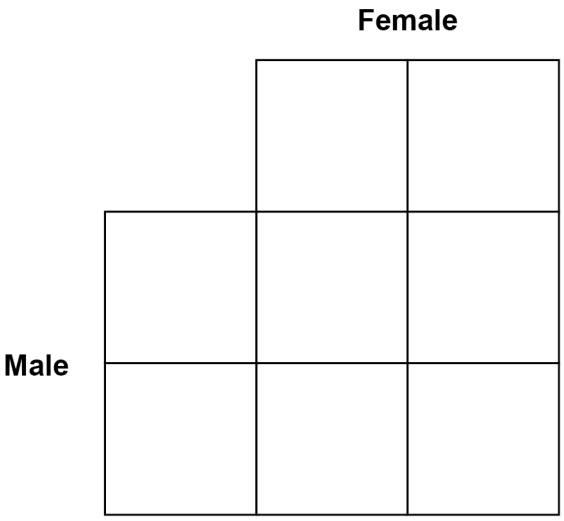
- complete **Figure 4**
- identify the phenotype of each offspring genotype
- use the symbols:

  A = dominant allele

  a = recessive allele.

[5 marks]

Figure 4



Probability that the child will have AKU = _____

Question 3 continues on the next page

4.6.1.1 Sexual and asexual reproduction

Question 07 · continued

0 3 . 4 A mutation is a change in a gene.

People who have AKU have a mutation that causes the production of a non-functioning enzyme.

Enzymes are proteins.

Suggest how a mutation can result in the production of a non-functioning enzyme.

[2 marks]

0 3 . 5 Some people have In Vitro Fertilisation (IVF) treatment to increase the chance of becoming pregnant.

Describe how the process of IVF can result in pregnancy.

[4 marks]

4.6.1.1 Sexual and asexual reproduction

Question 07 · continued

0 3 . 6 Embryos can be screened to detect inherited disorders.

Give **two** arguments **against** embryo screening.

Do **not** refer to religion in your answer.

[2 marks]

1 _____

_____

2 _____

_____

15

Turn over for the next question