

Reproduction

Question Paper 1

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.6 Inheritance Variation and Evolution
Sub-Topic	Reproduction
Difficulty Level	Bronze Level
Booklet	Question Paper 1

Time Allowed: 57 minutes

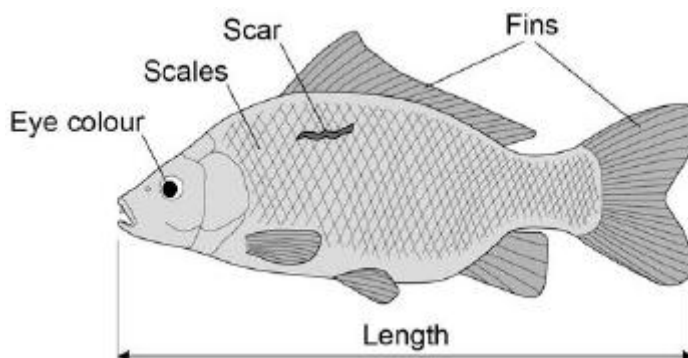
Score: / 56

Percentage: /100

Grade Boundaries:

Q1.Figure 1 shows a fish called a carp.

Figure 1



The characteristics of an animal can be a result of:

- only genetic causes
- only environmental causes
- both genetic **and** environmental causes.

(a) Give **one** characteristic shown in **Figure 1** for each different cause.

Only genetic causes

Only environmental causes

Both genetic **and** environmental causes

(3)

(b) Two alleles control the body colour of carp:

- brown (**B**)
- blue (**b**).

The brown allele is dominant to the blue allele.

The genetic cross from breeding two carp is shown in **Figure 2**.

Figure 2

	B	b
b	Bb	
b		

Complete **Figure 2**.

(2)

- (c) Draw a ring around **one** blue offspring shown in **Figure 2**.

(1)

- (d) What is the probability that the offspring from this genetic cross will be brown?

Tick **two** boxes.

0

☐

0.25

☐

0.5

☐

1.0

☐

(1)

- (e) Carp can produce large numbers of offspring.

The two carp crossed in **Figure 2** had 260 000 offspring.

Approximately how many offspring are expected to be brown?

.....

Brown carp offspring =

(1)

- (f) A pond contains carp used for breeding.

The carp for breeding are brown or blue.

A red carp has been seen.

The red carp was **not** added to the pond.

Suggest what might have caused the red carp to appear.

.....
.....

(1)
(Total 9 marks)

Q2. Sexual reproduction in humans involves the joining together of an egg cell and a sperm cell.

The sex of an embryo is decided by the chromosomes they inherit from their mother and father.

- (a) Where in the cell are the chromosomes?

Tick **one** box.

Cell membrane

☐

Cytoplasm

☐

Nucleus

☐

Ribosomes

☐

(1)

- (b) Draw **one** line from each type of cell to the number of chromosomes in the cell.

**Type of
cell**

**Number of
chromosomes**

	23
Sperm cell	26
	46
Embryo cell	52
	69

(2)

- (c) A man and a woman decide to have a child.

Complete the genetic diagram in the figure below.

		Parent	
		X	X
Parent	X	XX	
	Y		

(2)

- (d) On the figure above, circle a male child.

(1)

- (e) What is the chance of the man and woman having a boy?

Tick **one** box.

1 in 2

☐

1 in 3

1 in 4

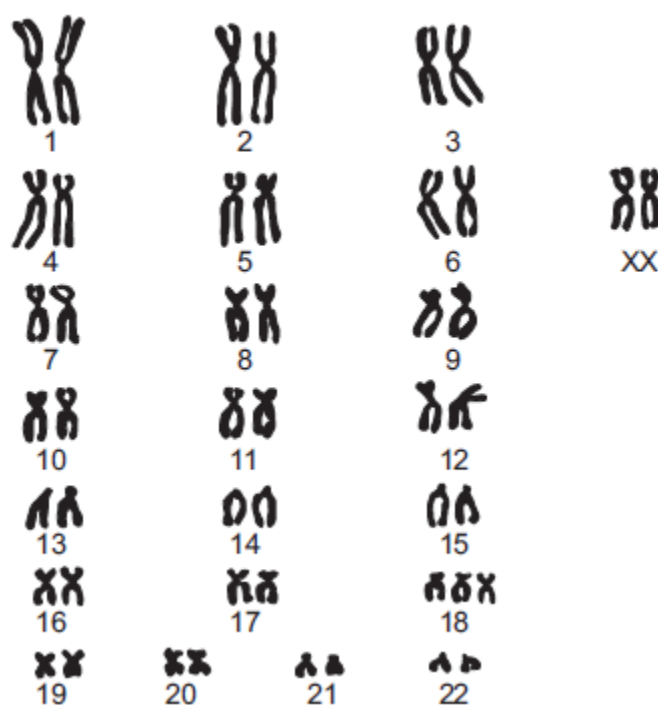
1 in 8

(1)
(Total 7 marks)

Q3. Genetic disorder **E** is a condition caused by a change in the chromosomes.

- (a) **Figure 1** shows the chromosomes from one cell of a person with genetic disorder **E**.

Figure 1



- (i) How do you know this person is female?

Use information from **Figure 1**.

.....

.....

(1)

- (ii) Describe how the chromosomes shown in **Figure 1** are different from the chromosomes from a person who does not have genetic disorder **E**.

.....

.....

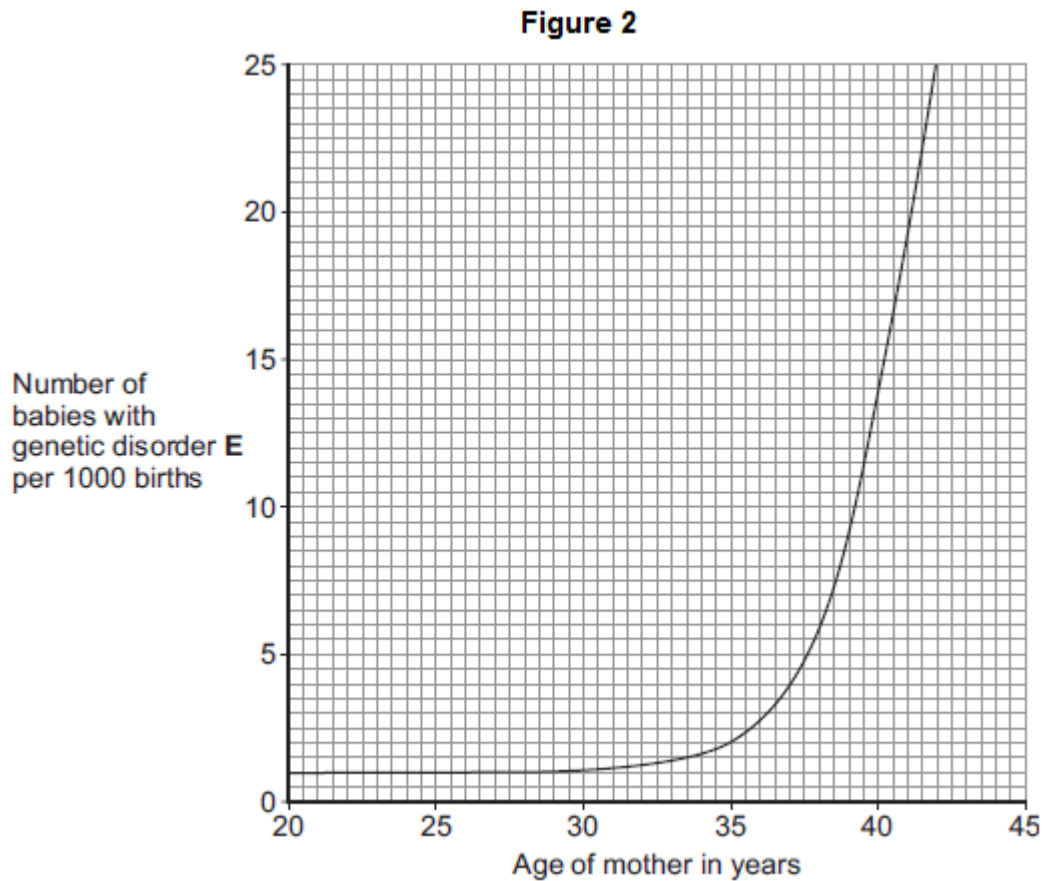
.....

.....

(2)

- (b) As a woman gets older, the chance of her having a baby with genetic disorder **E** increases.

Figure 2 shows this.



- (i) The chance of a 35-year-old woman having a baby with genetic disorder **E** is 2 per 1000 births.

What is the chance of a 40-year-old woman having a baby with genetic disorder **E**?

..... per 1000 births

(1)

- (ii) A 40-year-old woman is more likely than a 35-year-old woman to have a baby with genetic disorder **E**.

How many times more likely?

..... times

(1)

- (c) A 41-year-old woman wants to have a baby. A 41-year-old woman has an increased chance of having a baby with genetic disorder **E**.

Doctors can screen embryos for genetic disorder **E**.

The table gives some information about two methods of embryo screening.

Method 1	Method 2
1. The woman is given hormones to cause the release of a few eggs. The eggs are taken from her body in a minor operation. The eggs are fertilised in a glass dish.	1. The woman gets pregnant in the normal way.
2. One cell is taken from each embryo when the embryo is 3 days old.	2. Cells are taken when the embryo is 10 weeks old.
3. Cells are screened for genetic disorder E .	3. Cells are screened for genetic disorder E .
4. An unaffected embryo is placed in the woman's uterus. Embryos that are not used are destroyed or used in medical research.	4. An unaffected fetus is allowed to develop. If the fetus has genetic disorder E , the woman can choose to have an abortion.
5. This method costs about £6000.	5. This method costs about £600.

Use information from the table to give **two** advantages and **one** disadvantage of **Method 1** compared with **Method 2** for detecting genetic disorder **E**.

Advantages of **Method 1**:

1.....

.....

2.....

.....

Disadvantage of **Method 1**:

.....

.....

(3)
(Total 8 marks)

Q4.In sexual reproduction, an egg fuses with a sperm.

- (a) (i) Draw a ring around the correct answer to complete the sentence.

An egg and a sperm fuse together in the process of

cloning.
fertilisation.
mitosis.

(1)

- (ii) Egg cells and sperm cells each contain the structures given in the box.

chromosome	gene	nucleus
------------	------	---------

List these three structures in size order, starting with the smallest.

1 (smallest)

2

3 (largest)

(2)

- (iii) The egg and the sperm contain genetic material.

Draw a ring around the correct answer to complete the sentence.

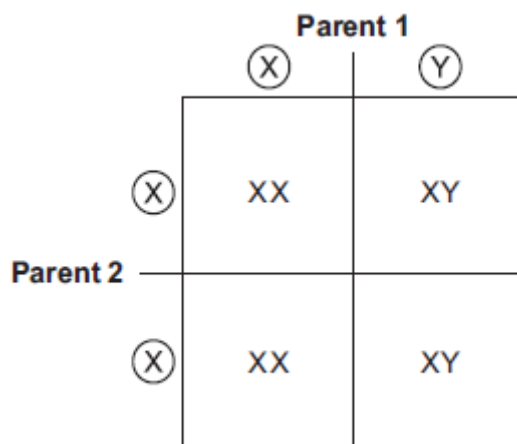
The genetic material is made of

carbohydrate.
DNA.

protein.

(1)

- (b) The diagram below shows the inheritance of **X** and **Y** chromosomes.



- (i) Draw a tick (✓) on the part of the diagram that shows a sperm cell.

(1)

- (ii) What is the chance of having a female child?

Give the reason for your answer.

.....

.....

.....

.....

(2)

(Total 7 marks)

Q5.When humans reproduce, chromosomes and genes are passed on to the next generation.

In each of the following questions, draw a ring around the correct answer to complete the

sentence.

(a) A gene is a small section of

cellulose.
DNA.
protein.

(1)

(b) The sex chromosomes in the human male are

X and X.
X and Y.
Y and Y.

(1)

(c) (i) Most human body cells contain

23 chromosomes.
46 chromosomes.
92 chromosomes.

(1)

(ii) The number of chromosomes in a human gamete (sex cell)

the same number as
is half the number in body cells.
twice the number

(1)

(d) Gametes are produced by

fertilisation.
meiosis.
mitosis.

(1)
(Total 5 marks)

Q6. In each question, draw a ring around the correct answer to complete the sentence.

- (a) Our understanding of how genes are inherited is mostly because of

the work of

Darwin.

Lamarck.

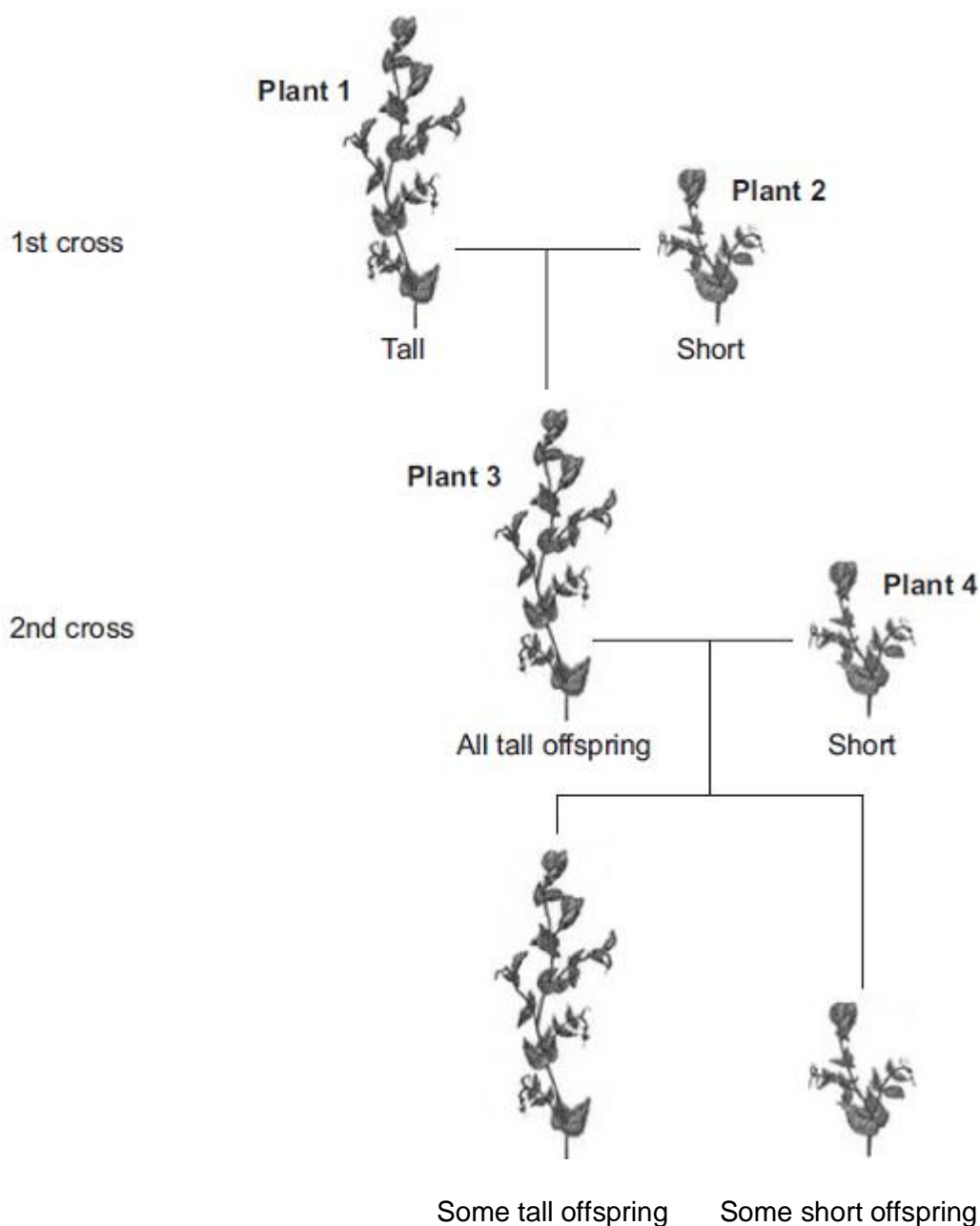
Mendel.

(1)

- (b) A scientist investigated inheritance in pea plants.

The scientist crossed tall pea plants with short pea plants. **Diagram 1** shows the results.

Diagram 1



In the rest of this question, the following symbols are used to represent alleles.

T = allele for tall
t = allele for short

- (i) The 1st cross in **Diagram 1** produced 120 offspring. All of these offspring were tall.

This shows that **plant 1** contained the alleles

TT.
Tt.
tt.

(1)

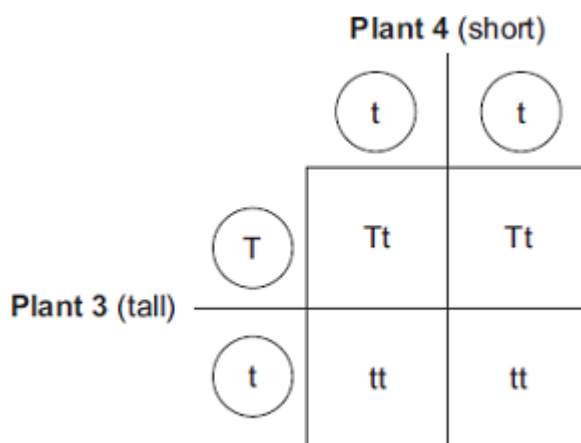
(ii) **Plant 3** is tall because of

a dominant allele.
the environment.
a recessive allele.

(1)

(c) **Diagram 2** gives more information about the cross between **plant 3** and **plant 4**.

Diagram 2



This cross produced some tall offspring and some short offspring.

The ratio of tall to short offspring in **Diagram 2** is

1:1.
2:1.
3:1.

(1)

(d) Two short plants were crossed. This cross produced 100 offspring.

The expected offspring would be

100 short plants.
50 tall plants and 50 short plants.

75 tall plants and 25 short plants.

(1)
(Total 5 marks)

Q7. Humans reproduce sexually.

(a) Draw a ring around the correct answer to complete each sentence.

(i) At fertilisation

chromosomes
genes
gametes

join together.

(1)

(ii) At fertilisation a single cell forms. The cell has new pairs of

chromosomes.
nuclei.
gametes.

(1)

(b) A child inherits cystic fibrosis. The child's parents do **not** have cystic fibrosis.

(i) What does this information tell us about the cystic fibrosis allele?

Tick (✓) **one** box.

The allele is dominant.

☐

The allele is recessive.

☐

The allele is strong.

☐

(1)

(ii) How many copies of the cystic fibrosis allele does the child have?

Draw a ring around your answer.

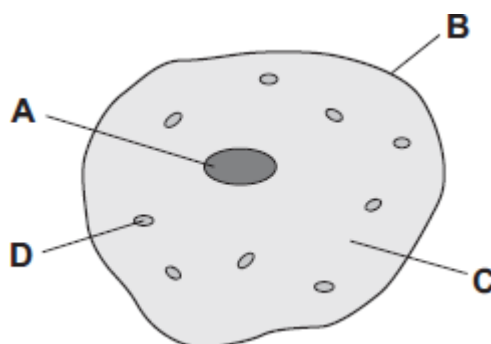
one

two

four

(1)

(c) The diagram shows a human body cell.



Which part of the cell, **A**, **B**, **C** or **D**:

(i) contains the allele for cystic fibrosis

☐

(1)

(ii) is affected by cystic fibrosis?

☐

(1)

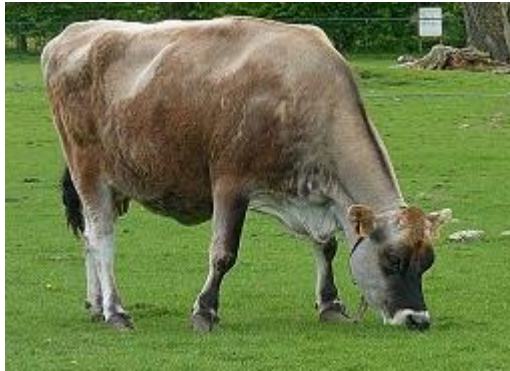
(Total 6 marks)

Q8. The photographs show two breeds of cow.

Friesian cow Jersey cow



By Keith Weller/USDA (www.ars.usda.gov: Image Number K5176-3) [Public domain], via Wikimedia Commons



By Jamain (Own work) [CC-BY-SA-3.0-2.5-2.0-1.0], via Wikimedia Commons

In parts (a) and (b) draw a ring around the correct answer to complete each sentence.

- (a) Cows produce their young (calves) by

asexual reproduction.
cloning.
sexual reproduction.

(1)

- (b) Cows and their calves have many similar characteristics.

- (i) The information for characteristics is carried by

clones.
embryos.
genes

(1)

- (ii) The information for characteristics is passed to the next generation in cells

called

body cells.
gametes.

neurones

(1)

- (c) Friesian and Jersey cows can both be used for meat or to produce milk.

The information shows features of Friesian and Jersey cows.

Friesian cows	Jersey cows
Body mass up to 600 kg	Body mass up to 400 kg
Milk contains 3.4% protein	Milk contains 3.8% protein
Can be milked for 325 days after giving birth	Can be milked for 250 days after giving birth
Produce no milk for 55 days before having a calf	Produce no milk for 45 days before having a calf
Produce > 30 litres of milk per day	Produce < 30 litres of milk per day

Use **only** the information above to answer these questions.

In your answers you must make comparisons between the two breeds of cow.

- (i) Give **two** advantages of a farmer keeping Friesian cows and **not** Jersey cows.

1.....

 2.....

(2)

- (ii) Give **two** advantages of a farmer keeping Jersey cows and **not** Friesian cows.

1.....

2.....
.....

(2)

- (d) Cow's milk is different from human milk. Cow's milk should **not** be given to young human babies.

Scientists in China have *genetically engineered* cows to produce human milk. Milk from these cows can be fed to young human babies.

- (i) What is *genetic engineering* ?

Tick (✓) **one** box.

Genes from one organism are transferred to a different organism

☐

Cells are separated from an embryo and are transferred to host mothers

☐

The nucleus from a body cell is transferred to an egg cell

☐

(1)

- (ii) Some people are worried about using milk from genetically engineered cows, to feed human babies.

Give **one** reason why.

.....
.....

(1)

(Total 9 marks)