

B13- Reproduction Exam Practice 2

Name:

Score:

Q1.

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.

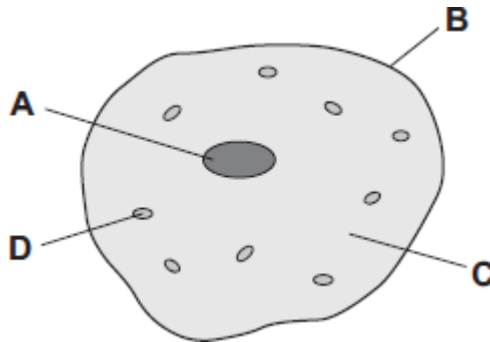
one

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)

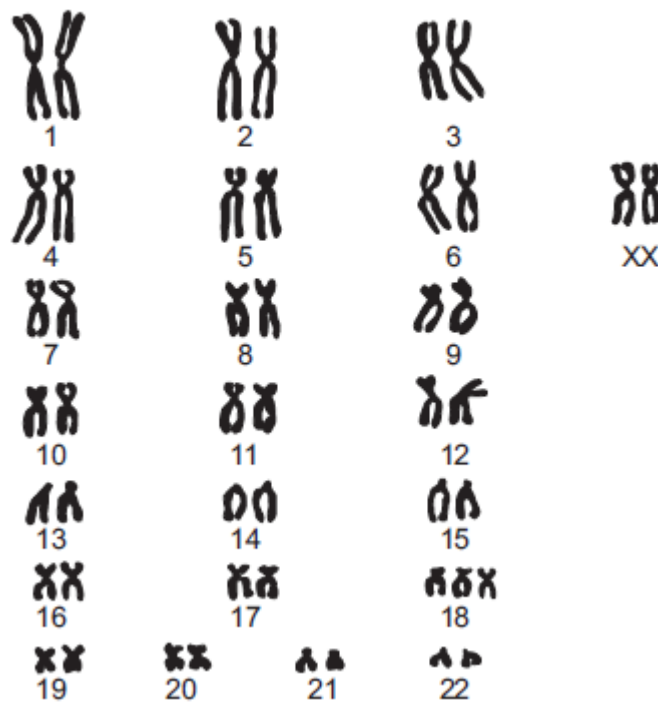
(Total 6 marks)

Q2.

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**.

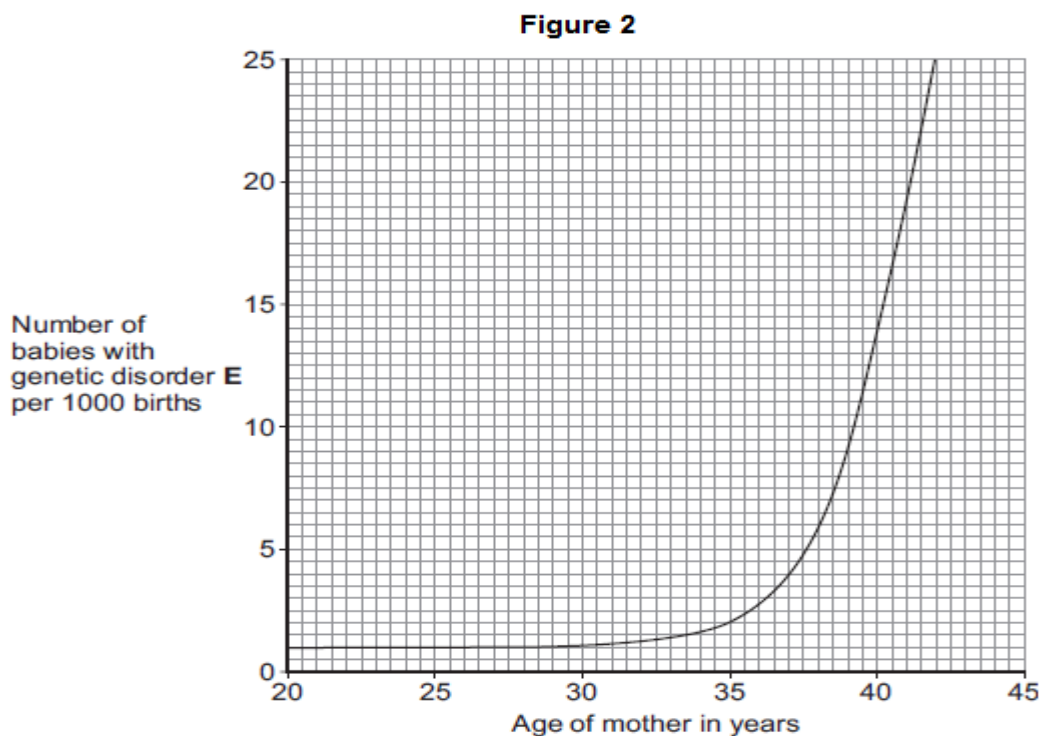
(1)

(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. _____

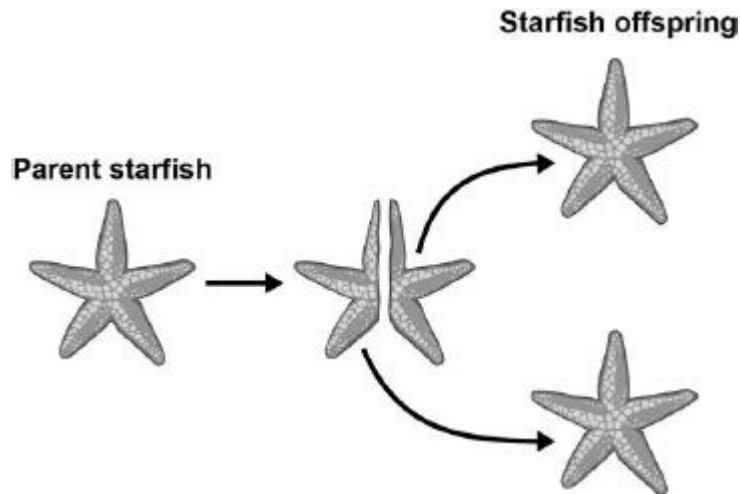
2. _____

Disadvantage of **Method 1**:

Q3.

Starfish can split in half. Each half can then grow new arms to form offspring.

This process is shown in the figure below.



(a) What process produces the starfish offspring?

Tick **one** box.

- | | |
|----------------------|--------------------------|
| Asexual reproduction | <input type="checkbox"/> |
| Fertilisation | <input type="checkbox"/> |
| Selective breeding | <input type="checkbox"/> |
| Sexual reproduction | <input type="checkbox"/> |

(1)

(b) More cells are produced as the starfish grows more arms.

What process will produce more cells in the starfish as they grow?

(1)

(c) All the offspring produced are genetically identical.

What name is given to genetically identical organisms?

(1)

(d) Each body cell of the parent starfish contains 44 chromosomes.

How many chromosomes are in each body cell of the offspring?

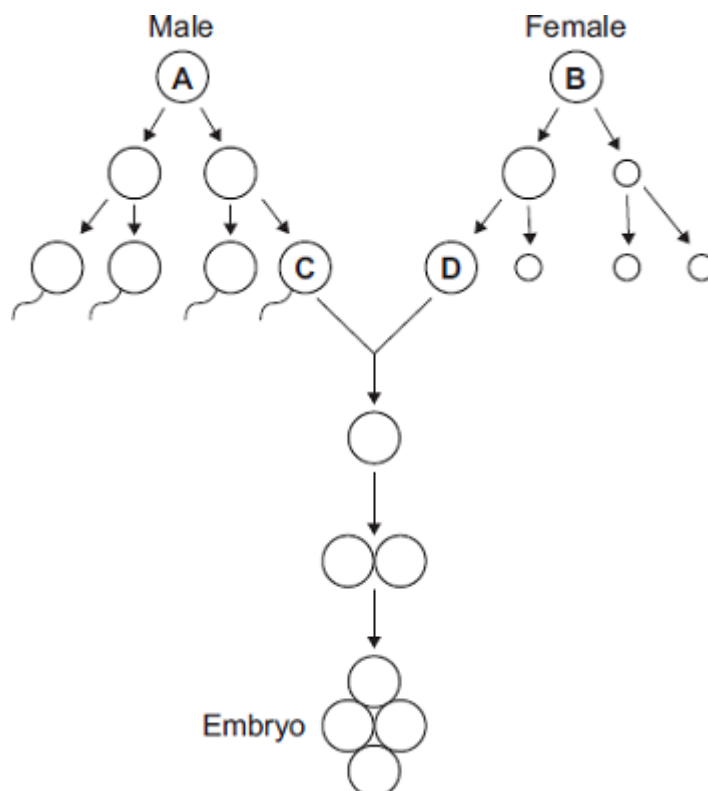
(1)

(Total 4 marks)

Higher Tier Questions

Q4.

The diagram shows some of the cell divisions that occur during human reproduction.



- (a) (i) Name the type of cell division that produces cell **D** from cell **B**.

(1)

- (ii) Which organ in the male body produces cell **C** from cell **A**?

(1)

- (b) (i) Cells **A** and **B** each contain 46 chromosomes.

How many chromosomes would there be in the nucleus of cell **C**?

(1)

- (ii) Why is it important that cell **C** has this number of chromosomes?

Q5.

Polydactyly is an inherited condition caused by a dominant allele.

- (a) The figure below shows the hand of a man with polydactyly. The man has an extra finger on each hand.

The man's mother also has polydactyly but his father does not.



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- (i) The man is **heterozygous** for polydactyly.

Explain how the information given above shows that the man is **heterozygous** for polydactyly.

(3)

- (ii) The man marries a woman who does **not** have polydactyly.

What is the probability that their first child will have polydactyly?

(1)

(b) The man has red hair. His sister has brown hair.

Both of their parents have brown hair.

Brown hair is caused by the dominant allele, **B**.

Red hair is caused by a recessive allele, **b**.

Complete the genetic diagram below to show how the man's parents were able to have some children with red hair and some with brown hair.

	Father	Mother
Parental phenotypes	_____	_____
Parental Genotypes	_____	_____
Gametes	_____	_____

Offspring genotypes: _____

Offspring phenotypes: _____

(5)

(Total 9 marks)

Mark schemes

Q1.

- (a) (i) gametes
apply list principle 1
- (ii) chromosomes
apply list principle 1
- (b) (i) The allele is recessive
no mark if more than one box is ticked 1
- (ii) two
apply list principle 1
- (c) (i) **A**
apply list principle 1
- (ii) **B**
apply list principle 1

[6]

Q2.

- (a) (i) (female) has XX / only X's / no Y
allow has X chromosomes
ignore ref to genes / cells 1
- (ii) extra chromosome / has 47 chromosomes / one set has 3 copies
ignore reference to chromosome numbers other than 47 or no. 18 1
- no. 18 1
- (b) (i) 14
allow in range of 13.5 to 14.5 1
- (ii) 7
allow in range of 6.75 to 7.25
accept ecf from 5bi 1
- (c) Advantages:
any **two** from:

- more than 1 embryo (so more chance of success)
allow method 2 may cause a miscarriage
- tested at 3 days of 10 weeks **or** tested earlier
tested when only 3 days old
- tested before pregnancy
- no termination / abortion
- spare embryos have a potential use.

2

Disadvantages:

any **one** from:

- needs an operation
accept described hazard of operation
- (spare) embryos / human life destroyed / harmed
must be comparative
- higher cost
- embryos might not implant / might not develop.

1

[8]

Q3.

(a) asexual reproduction

1

(b) mitosis

1

(c) clones

1

(d) 44

1

[4]

Higher Tier Questions

Q4.

(a) (i) meiosis

allow mieosis

1

(ii) testis / testes

allow testicle

1

(b) (i) 23

1

(ii) fuses / joins with cell D / with egg cell **or** used in fertilisation

allow fuse with another cell

1

prevents doubling of chromosome number / restores original no. / 46 /
diploid no. / normal no. / full no.

accept 23 from each parent / from each gamete

1

[5]

Q5.

(a) (i) man has (inherited) polydactyly (PD) allele (from mother)

1

man has (inherited) other / normal / recessive allele from father

1

because father does not have PD allele **or** if father had it father would have had PD **or** father only has normal allele **or** father is homozygous recessive

1

allow gene for allele

(ii) 0.5 / 1/2 / 1 in 2 / 1:1 / 50%

do not allow 1:2 or 50/50

allow 50:50

1

(b) parental phenotypes: both brown

1

parental genotypes: both **Bb**

1

gametes: **B b** and **B b**

1

allow only on gametes answer line

allow ecf from genotypes

offspring genotypes: **BB (2)Bb bb**

allow ecf from gametes

1

offspring phenotypes correctly assigned to genotypes:

BB & Bb = brown **bb** = red

do not penalise confusion of 'phenotypes' & 'genotypes' here

1

[9]