1 The photograph shows a breed of dog called a Border Collie.

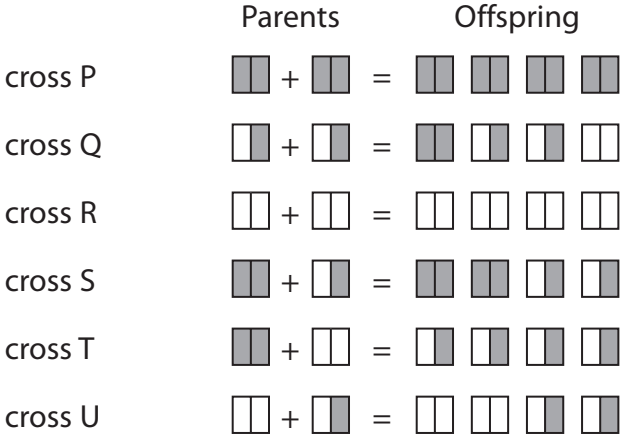


©Robb

Border Collies can inherit an eye defect called CEA (Collie Eye Anomaly).

The dominant allele D produces good vision but the recessive allele d produces poor vision.

(a) The diagram shows the possible offspring from parents with different genotypes.



Key

homozygous dominant	(DD)	
homozygous recessive	(dd)	
heterozygous	(Dd)	

(i) All the offspring from cross R have good vision.

Give the letters of the other crosses where all the offspring have good vision.

(2)

.....

(ii) Give the phenotype of each parent used in cross P.

(1)

.....

(iii) Which cross has a 50% probability of producing offspring with good vision?

(1)

.....

(iv) Give the genotype of each of the offspring produced in cross T.

(1)

.....

(b) The crosses between the dogs are examples of sexual reproduction.

(i) Name the gametes produced by males in sexual reproduction.

(1)

.....

(ii) Name the gametes produced by females in sexual reproduction.

(1)

.....

(iii) Give the term used to describe the fusion of gametes.

(1)

.....

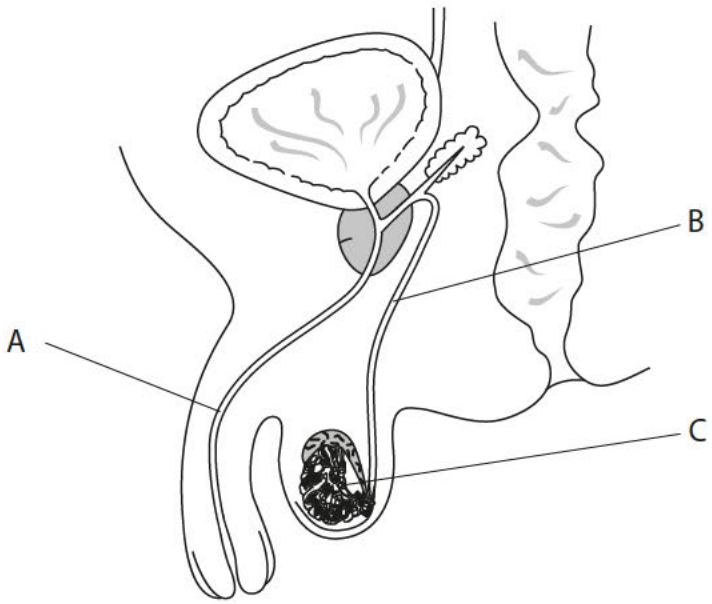
(iv) In which organ of a female parent do offspring develop?

(1)

.....

(Total for Question = 9 marks)

2 The diagram shows the male reproductive organs.



(a) Name the structures labelled A, B and C.

(3)

A .....

B .....

C .....

(b) A couple want to control their fertility.

The man has an operation to cut tube B.

Explain how this operation would prevent his partner from becoming pregnant.

(2)

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(c) The woman could also have an operation to cut her oviducts to prevent pregnancy.

Suggest why the operation to cut tube B in males is much more common than the operation to cut the oviducts in females.

(2)

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(d) Structure C produces a hormone.

Name this hormone and describe its functions.

(3)

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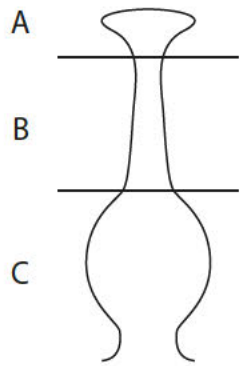
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(Total for Question = 10 marks)

3 The drawing shows part of a flower involved in sexual reproduction.
The drawing has been separated into three sections A, B and C.



(a) Complete the table by giving the correct letter for the section that matches each statement.

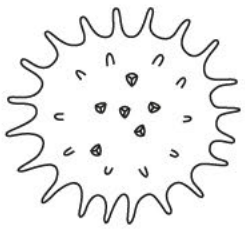
Each letter may be used once, more than once or not at all.

The first one has been done for you.

(4)

Statement	Section letter
This is the stigma	A
This is where fertilisation occurs	
This is where the pollen grains land at pollination	
This is where most pollen tube growth occurs	
This is where a seed will develop	

(b) The drawing shows a pollen grain from an insect-pollinated flower as seen using a microscope.



Suggest how the structure of this pollen grain shows it is from an insect-pollinated flower.

(2)

.....

.....

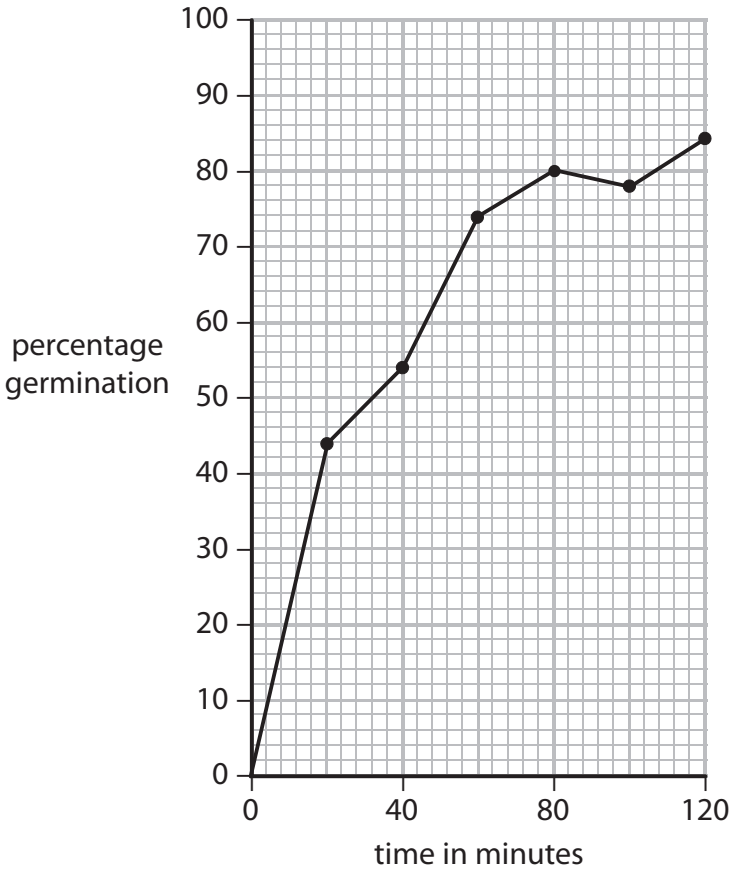
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(c) Pollen grains were placed in a solution that helps them to germinate (grow a pollen tube). A microscope was used to observe the pollen grains for two hours.

The percentage of pollen grains that had started to germinate was measured during the two-hour period.

The graph shows the results.



(i) Describe how the percentage germination changed during the two-hour period.

(2)

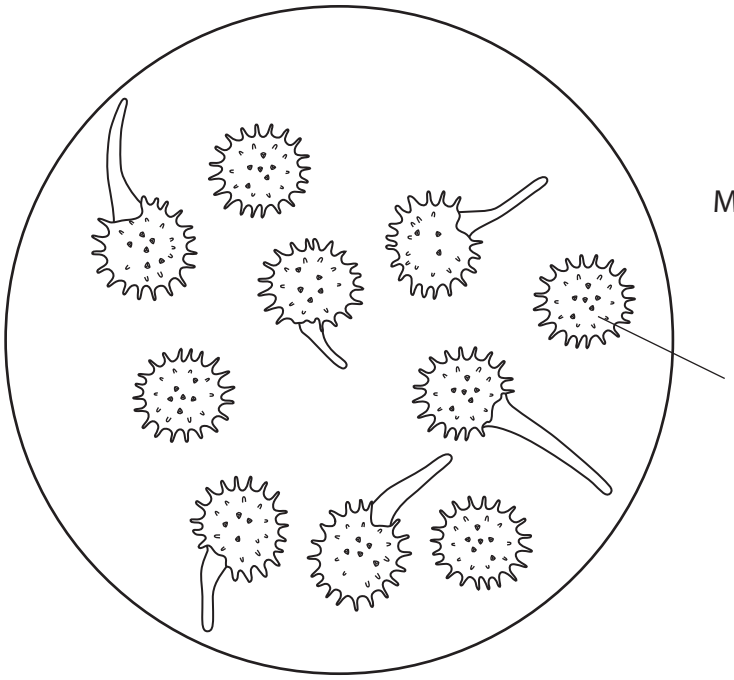
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(ii) The drawing shows pollen grains seen using the microscope at one time during the two hours.



Use the drawing and the graph to determine the time when these pollen grains were observed.

Show your working.

(2)

Answer ..... minutes

(iii) Calculate the actual size of the pollen grain labelled A. Show your working.

(2)

Answer ..... mm

(d) Explain the benefit to the plant of producing offspring by sexual reproduction rather than by asexual reproduction.

(2)

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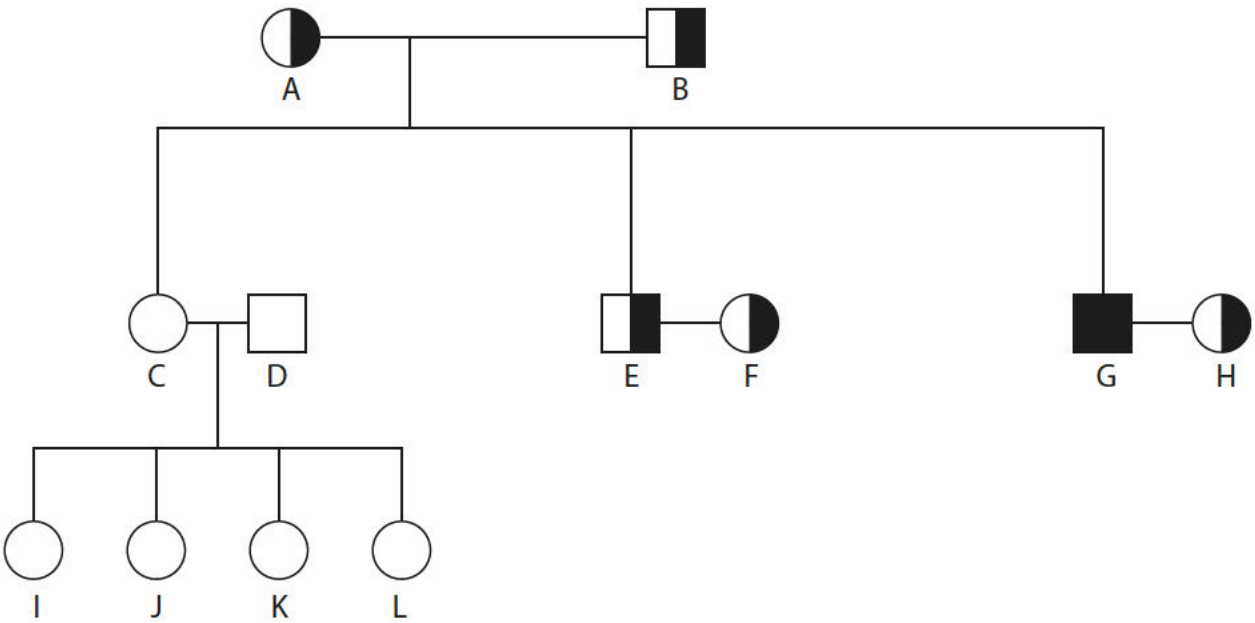
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(Total for Question = 14 marks)

4 Cystic fibrosis is an inherited condition. It is caused by a recessive allele (d).

The non-cystic fibrosis allele is dominant (D).

The diagram shows how cystic fibrosis was inherited in a family.



key

○	homozygous dominant female
◑	heterozygous female
●	homozygous recessive female
□	homozygous dominant male
◧	heterozygous male
■	homozygous recessive male

(a) Use letters D and d to give the genotype of person A and person L in the table.

(2)

Person	Genotype
A	
L	

(b) How many people in this family do **not** have cystic fibrosis?

(1)

.....

(c) (i) Complete the table to show the probability of each set of people having a child with cystic fibrosis. One has been done for you.

(2)

People	Probability as a %
C and D	
E and F	25
G and H	

(ii) Parents E and F have four children. None of them have cystic fibrosis although the probability shown in the table is 25%.

Suggest why they did not have a child with cystic fibrosis.

(1)

.....

.....

.....

(Total for Question = 6 marks)

5 The passage describes cell division and reproduction in humans.

Complete the passage by writing a suitable word or words in each of the spaces.

Fully grown adults can produce sex cells or ..... called sperm and eggs.

The ..... cells are much smaller than the ..... cells

and have a powerful ..... to enable them to swim.

The cell division used to make sex cells is called ..... and in males this

takes place in the ..... .

The sperm cells pass out of the male along a tube called the ..... and

into the female's body, then through the cervix and into the ..... in

which fertilisation takes place.

(Total for Question 5 = 8 marks)