Centre No.						Paper Reference (complete below)							Surname	Initial(s)
Candidate No.										/	4	B	Signature	

Paper Reference(s)

5628/4B 5658/4B

Edexcel GCSE

Science: Single Award B (5658)
Science: Double Award B (5658)
Biology B (5628)

(Modules 1 and 2)

Paper 4B

Higher Tier

Monday 6 June 2005 – Afternoon

Time: 30 minutes

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname and initials, signature, and complete the paper reference.
Answer ALL questions in the spaces provided in this question paper.
Show all stages in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for the various parts of questions are shown in round brackets: e.g. (**2**).
There are 8 questions in this question paper. The total mark for the paper is 30.
There are 8 pages in this question paper. Any blank pages are indicated.

Advice to Candidates


This symbol shows where the quality of your written answer will also be assessed.

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
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Total	

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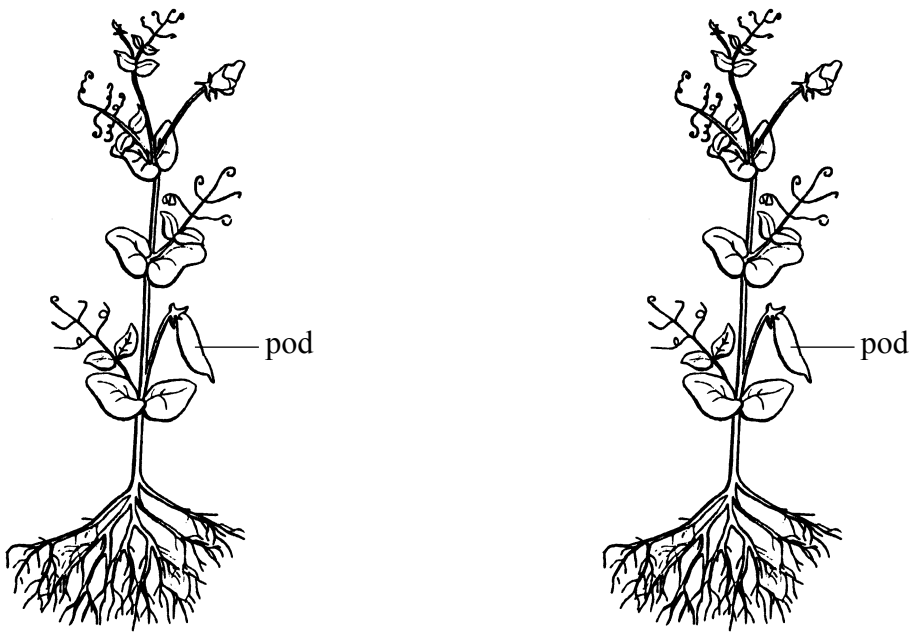
Answer ALL the questions. Write your answers in the spaces provided.

1. In the nineteenth century Gregor Mendel investigated inheritance in pea plants. He chose parent plants showing certain features and crossed them.



He noted the features shown in the offspring.
The table shows some of his results.

feature of parent	appearance of the two parent plants	number of plants produced and their appearance
length of stem (either long or short)	long and long	787 long; 277 short
colour of pods (either green or yellow)	green and green	428 green; 152 yellow

(a) In Mendel's time, many scientists thought that features of offspring were a blend of features from both parents.
How do Mendel's results disprove this idea?

.....

.....

(1)

(b) State **two** reasons why the design of Mendel's experiment produced reliable data from which he could make valid conclusions about inheritance in pea plants.

1 .....

2 .....

(2)

Leave blank

(c) Mendel's work showed that inheritance was to do with units of information, now called genes.
Complete the following sentence.

Genes are part of a long chain molecule called .....

(1)

(d) In the first experiment, the two alleles were for long and short stems.
What is meant by the term allele?

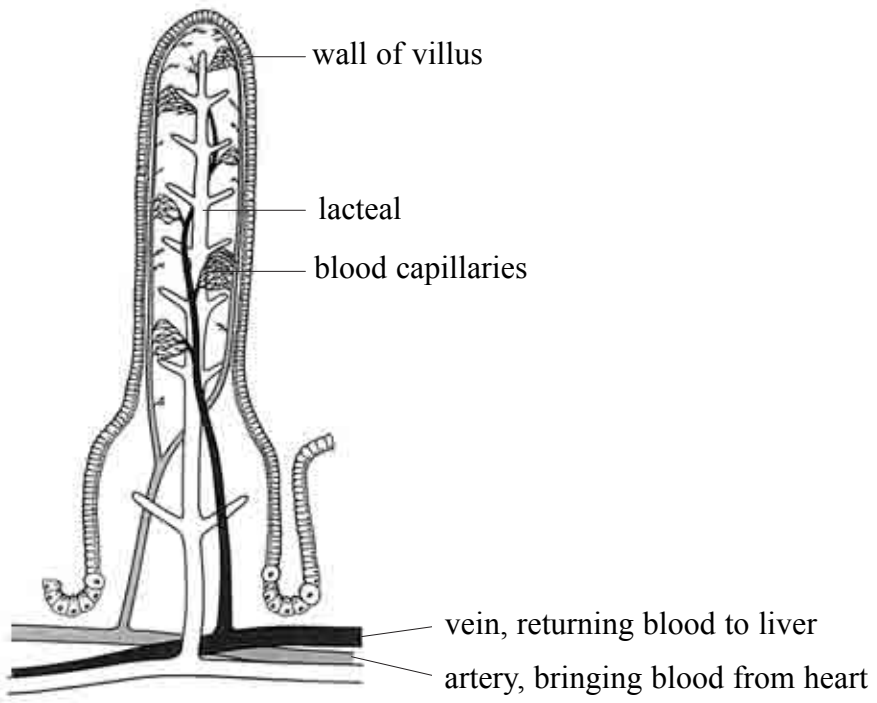
.....

(1)

Q1

(Total 5 marks)

2. The diagram shows a villus from the small intestine.



Explain how the villus is adapted to absorb food.

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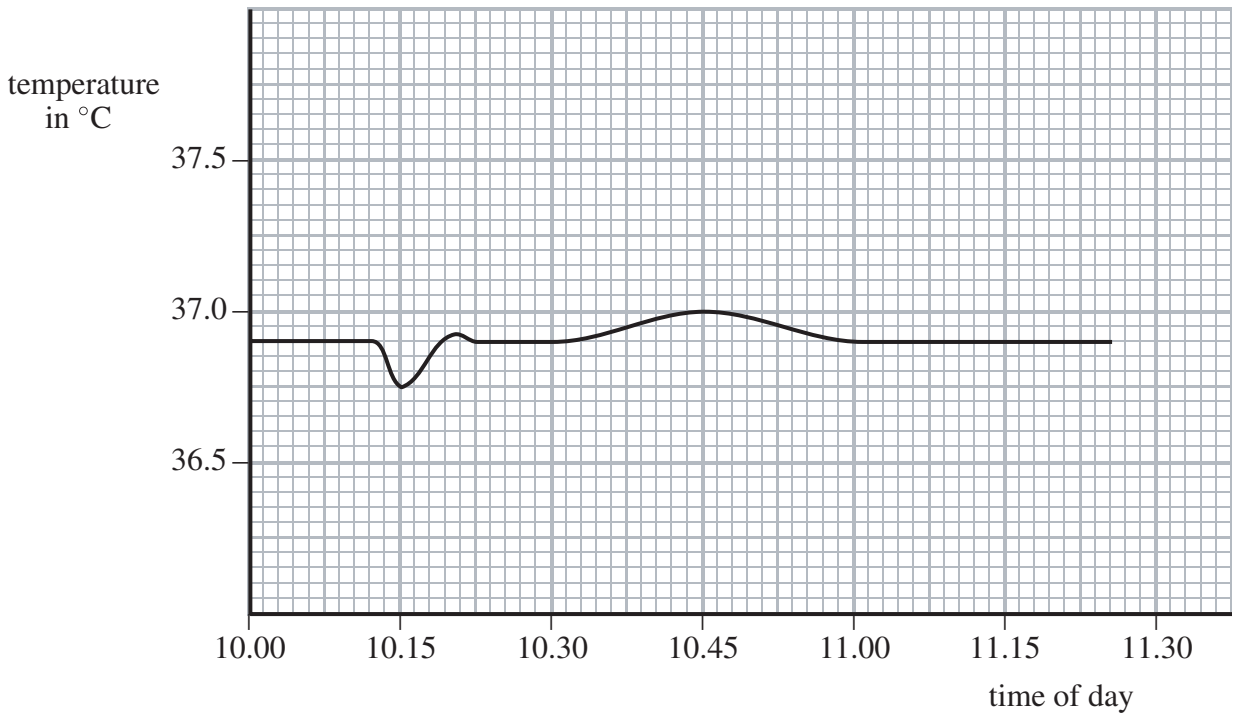
Q2

(Total 4 marks)

Leave blank

3. Jim measured his body temperature during part of one day.



(a) At 10.15 Jim started to shiver.
Explain how shivering caused the change in his body temperature over the next few minutes.

.....

.....

.....

.....

(2)

(b) (i) At 10.45 Jim was too hot.
Name one process in Jim's body that could bring down his temperature.

.....

(1)

(ii) State how heat energy is lost from Jim's body in this process.

.....

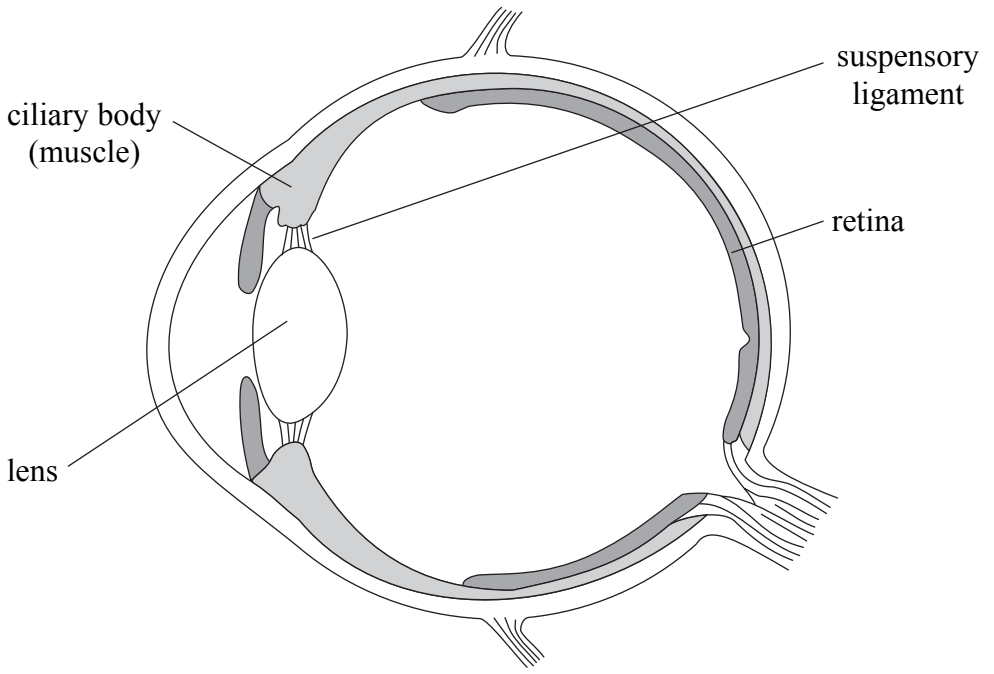
(1)

Q3

(Total 4 marks)

Leave blank

4. The diagram shows an eye. The eye is focused on a near object.



The object is moved away from the eye but the image stays in focus on the retina.
State what happens to the following parts of the eye as this happens.

(a) Ciliary body (muscle)

.....

(1)

(b) Suspensory ligaments

.....

(1)

(c) Lens

.....

(1)

(d) The lens refracts (bends) light to a focus on the retina.
Name **one** other part of the eye that refracts light.

.....

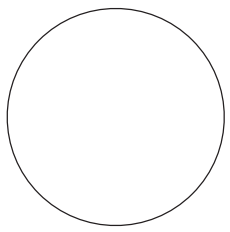
(1) **Q4**

(Total 4 marks)

Leave blank

5. The diagram shows two stages in mitosis in an organism with a diploid number of six chromosomes.

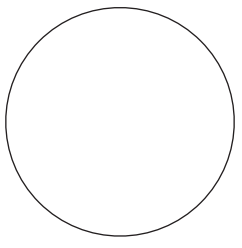
(a) Complete the diagram below by drawing the chromosomes present in one of the two cells produced by mitosis.



(1)

(b) In meiosis one cell divides to produce four cells.

Complete the diagram by drawing the chromosomes present in one of the four cells produced by meiosis in the same organism.



(1)

(c) Give **one** reason why meiosis is necessary for sexual reproduction.

.....

(1)

Q5

(Total 3 marks)

Leave blank

6. Fat (lipid) is digested in the small intestine.

(a) Give the name of the **two** products of fat digestion.

..... and .....

(1)

(b) (i) Fat digestion is helped by bile.
Bile neutralises stomach acid.
Explain how this helps the digestion of fat (lipid).

.....

.....

(1)

(ii) Explain **one** other way that bile helps the digestion of fat (lipid).

.....

.....

.....

(2)

(Total 4 marks)

Q6

7. Scientists in California have produced a genetically modified tomato plant that grows well in polluted soil. They used a gene from another species, *Arabidopsis thaliana*, to produce the new type of tomato plant.

Using your understanding of genetic modification, describe the stages involved in producing the new type of tomato plant.

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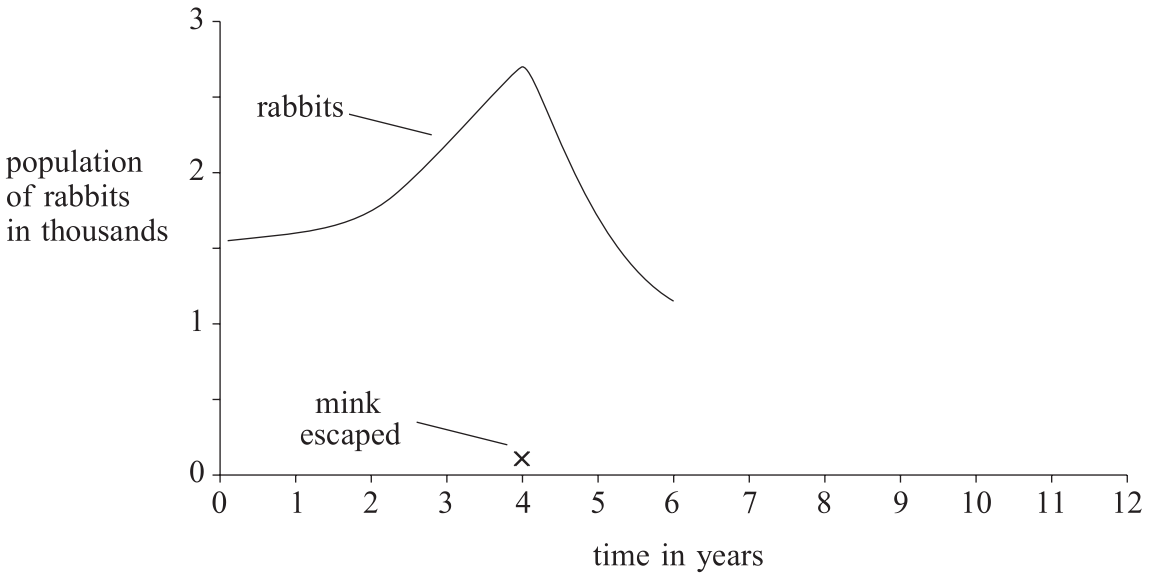
(Total 4 marks)

Q7

Leave blank

8. The graph shows how the population of rabbits on an island changed over six years.



After four years, 50 mink escaped from a farm on the island.
Mink are predators which feed on rabbits.

(a) On the graph continue the line to show the likely changes in the population of rabbits over the next six years.

(1)

(b) Starting at ×, sketch a line to show the likely changes in the population of mink from year 4 to year 12.

(1) **Q8**

(Total 2 marks)

TOTAL FOR PAPER: 30 MARKS

END