

GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
ADDITIONAL APPLIED SCIENCE A
 Agriculture and Food (Higher Tier)
TUESDAY 17 JUNE 2008

Morning
 Time: 45 minutes

Candidates answer on the question paper.

Additional materials (enclosed):
 None

Calculators may be used.

Additional materials: Pencil
 Ruler (cm/mm)



* C U P / T 4 3 9 6 5 *

Candidate Forename

Candidate Surname

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks for each question is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **36**.

FOR EXAMINER'S USE		
Qu.	Max	Mark
1	10	
2	9	
3	8	
4	9	
TOTAL	36	

This document consists of **8** printed pages.

Answer **all** the questions.

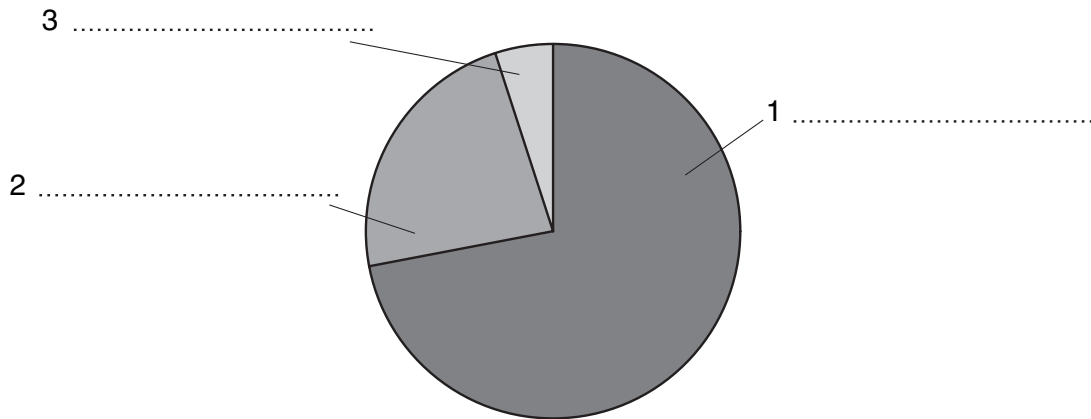
1 Chickens produce eggs. They can be farmed in three different ways:

- cages
- barn
- free range.

(a) The percentage of eggs produced by the UK is:

- 72% by a cage system
- 5% by a barn system
- 23% by a free range system.

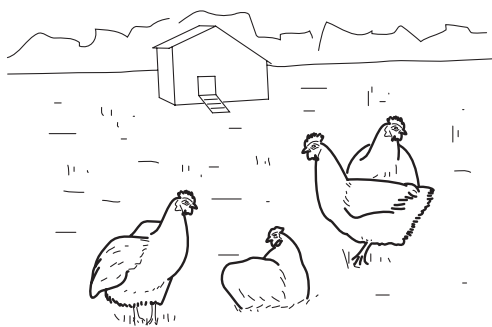
Complete the labels on the pie chart to show this information.



[1]

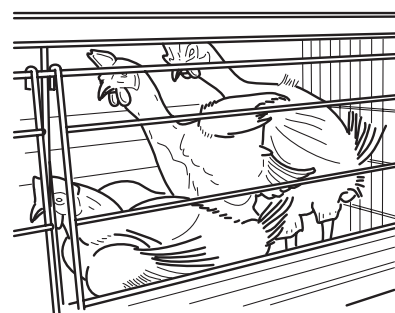
(b) Mannie and Sami are egg farmers.

Mannie uses a free range system.



Mannie's hens
 are kept in a field
 have plenty of space to move around
 behave normally
 have a varied diet

Sami uses a cage system.



Sami's hens
 are kept in cages
 have a limited area to move around
 are in a controlled environment
 have a less varied diet

- (i) Some people think that free range hens have better care than hens kept in cages. State and explain one advantage and one disadvantage of **free range** egg farming. Use **ideas about animal welfare** in your answer.

advantage.....

explanation

.....

disadvantage

explanation

..... [4]

- (ii) Mannie’s free range eggs cost more than Sami’s cage eggs. Suggest why.

.....

.....

..... [2]

- (c) Mannie and Sami put the Lion Quality mark on their hens’ eggs.



What does this mark tell you?

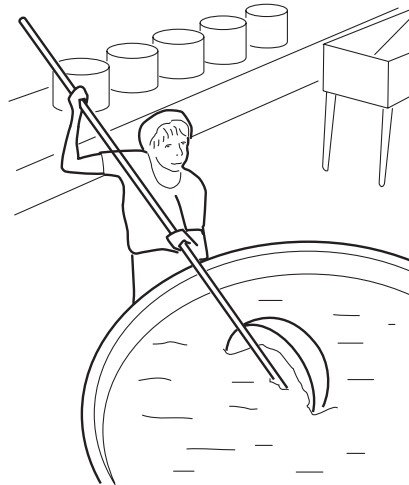
..... [1]

- (d) The British Egg Marketing Board is an organisation that supports egg farmers. Explain how they do this.

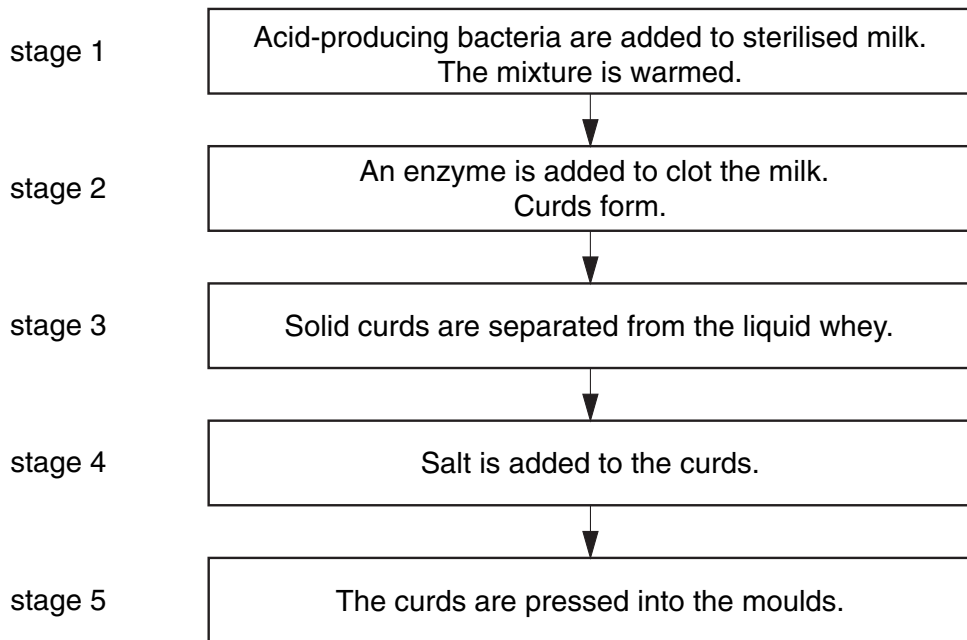
..... [2]

[Total: 10]

2 Jasmine works in a creamery. She makes cheese.



This flow diagram shows the stages in making cheese.



(a) Visitors ask Jasmine about the process.

Use your scientific knowledge to answer these questions.

(i) Why is **sterilised** milk used in stage 1?

..... [1]

(ii) What will happen to the pH of the milk between stage 1 and stage 2?

..... [1]

(iii) How will removing water, in stages 3 to 5, help to **preserve** the cheese?

.....
..... [1]

(b) The enzyme used in cheese making is called chymosin.

Chymosin is obtained from cows.

It can also be obtained from genetically modified yeast.

Describe how a yeast cell could be genetically modified to make chymosin.

Your answer should include information about:

- the genetic material used
- the transfer of genetic material
- the production of chymosin.

.....
.....
.....
.....
.....
..... [4]

(c) Food from genetically modified organisms must be labelled to inform the customer.

Cheese made using the enzyme chymosin from genetically modified yeast does not need to be labelled.

Explain why.

.....
..... [1]

(d) Explain how the price of cheese is determined by 'supply and demand'.

.....
..... [1]

[Total: 9]

3 Many strawberry growers in the UK use polytunnels.

Polytunnels increase the yield of strawberries by 35%.



(a) A strawberry grower produces a crop yield of 1000kg of strawberries **without** using polytunnels.

Calculate the strawberry crop yield if polytunnels are used.

answer kg [1]

(b) Strawberry crop yields are affected by the rate of photosynthesis of the strawberry plants.

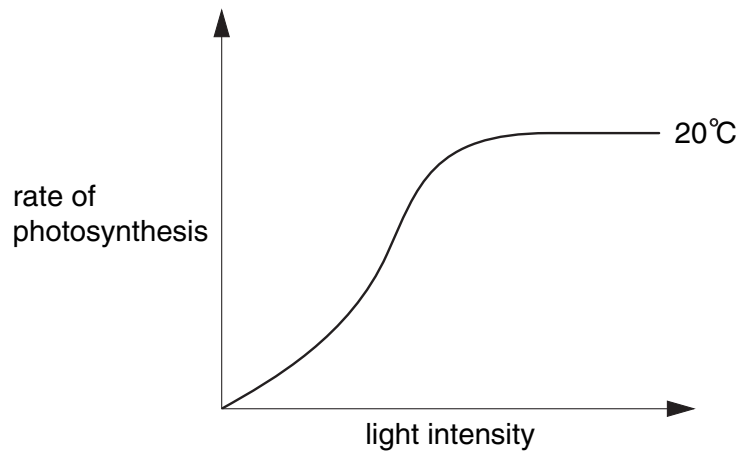
Explain why.

.....

.....

..... [2]

(c) The graph shows how the rate of photosynthesis at 20 °C is affected by light intensity.



(i) What pattern is shown by the graph?

.....

 [2]

(ii) Draw a curve on the graph to show the effect of raising the temperature to 30 °C. [2]

(d) Temperature is a limiting factor for photosynthesis.

Write down **one other** limiting factor for photosynthesis.

..... [1]

[Total: 8]

4 Many farmers use chemicals to control the timing of reproduction in their cows.

(a) Describe how the chemicals control the timing of reproduction.

Your answer should include information about:

- the type of chemical used
- which body organs are affected
- which body cycle is altered.

.....

.....

.....

.....

..... [3]

(b) Explain the **advantages** of controlling the timing of reproduction in animals such as cows.

.....

.....

..... [2]

(c) Farmers can use artificial insemination to fertilise their cows.

(i) Describe the process of artificial insemination.

.....

.....

..... [3]

(ii) Write down **one** advantage of artificial insemination.

..... [1]

[Total: 9]

END OF QUESTION PAPER

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