Candidate forename		Candidate surname	

Centre number						Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

GCSE

A334/02

TWENTY FIRST CENTURY SCIENCE

ADDITIONAL APPLIED SCIENCE A

Agriculture and Food (Higher Tier)

TUESDAY 12 JUNE 2012: Morning

DURATION: 45 minutes
plus your additional time allowance

MODIFIED ENLARGED

Candidates answer on the Question Paper.
A calculator may be used for this paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Pencil
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

DC (NH/JG) 12MEP06095 62446/1

INSTRUCTIONS TO CANDIDATES

- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. HB pencil may be used for graphs and diagrams only.**
- **Answer ALL the questions.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**

INFORMATION FOR CANDIDATES

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

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Answer ALL the questions.

1 Read the information about Angora goats.

ARE GOATS BETTER THAN SHEEP?

The Angora Goat Society is encouraging farmers to keep goats.

Mohair, which comes from Angora goats, is now worth £6 per kg, while sheep's wool is only worth £0.70 per kg. Each year an Angora goat will produce mohair worth £24, while a sheep will produce wool worth £1.40.

A goat's carcase (dead body) is worth less than a sheep's carcase. However, more people in the world eat goat meat than any other red meat.

Angora goats are more likely to suffer than sheep in areas of high rainfall because they have fine hair. However, they eat a larger variety of plants than sheep.

Use this information to answer the following questions.

(a) What mass of mohair does one Angora goat produce each year?

mass = _____ kg

What mass of wool does one sheep produce each year?

mass = _____ kg [1]

(b) (i) Some people keep Angora goats because their wool is more valuable than sheep's wool.

Suggest TWO other reasons for keeping Angora goats instead of sheep.

1 _____

2 _____ [2]

(ii) Suggest ONE reason, apart from profit, for keeping sheep rather than Angora goats.

_____ [1]

(c) Write down THREE factors which could affect the growth of animals such as Angora goats and sheep.

1 _____

2 _____

3 _____ **[3]**

(d) The process of artificial insemination can be used with Angora goats.

(i) Describe the main stages in artificial insemination.

_____

_____

_____

_____

_____ **[3]**

(ii) One advantage of artificial insemination is that the timing of the animal's birth can be controlled.

Explain why this is an advantage.

_____

_____ **[1]**

(e) The Meat and Livestock Commission is an organisation that supports goat and sheep farmers.

Explain how such organisations support the food industry.

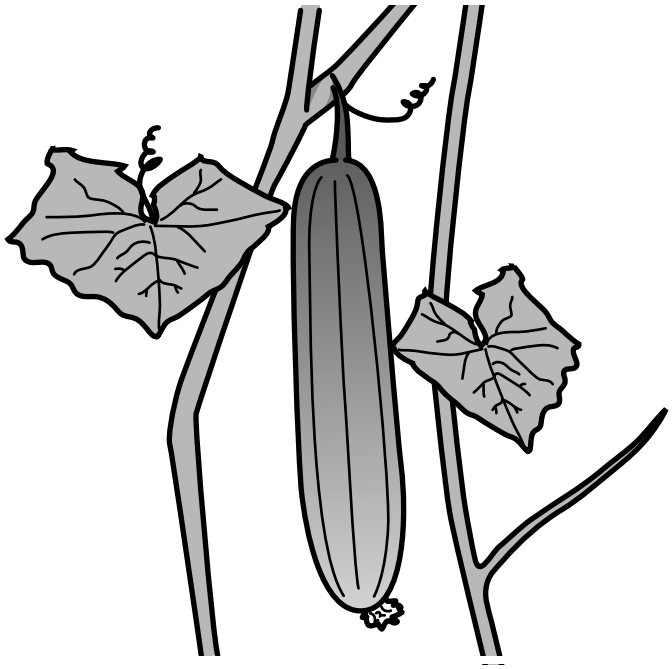
_____

_____ **[2]**

[Total: 13]

2 Elsie grows cucumber plants in polytunnels.

She harvests the cucumbers.

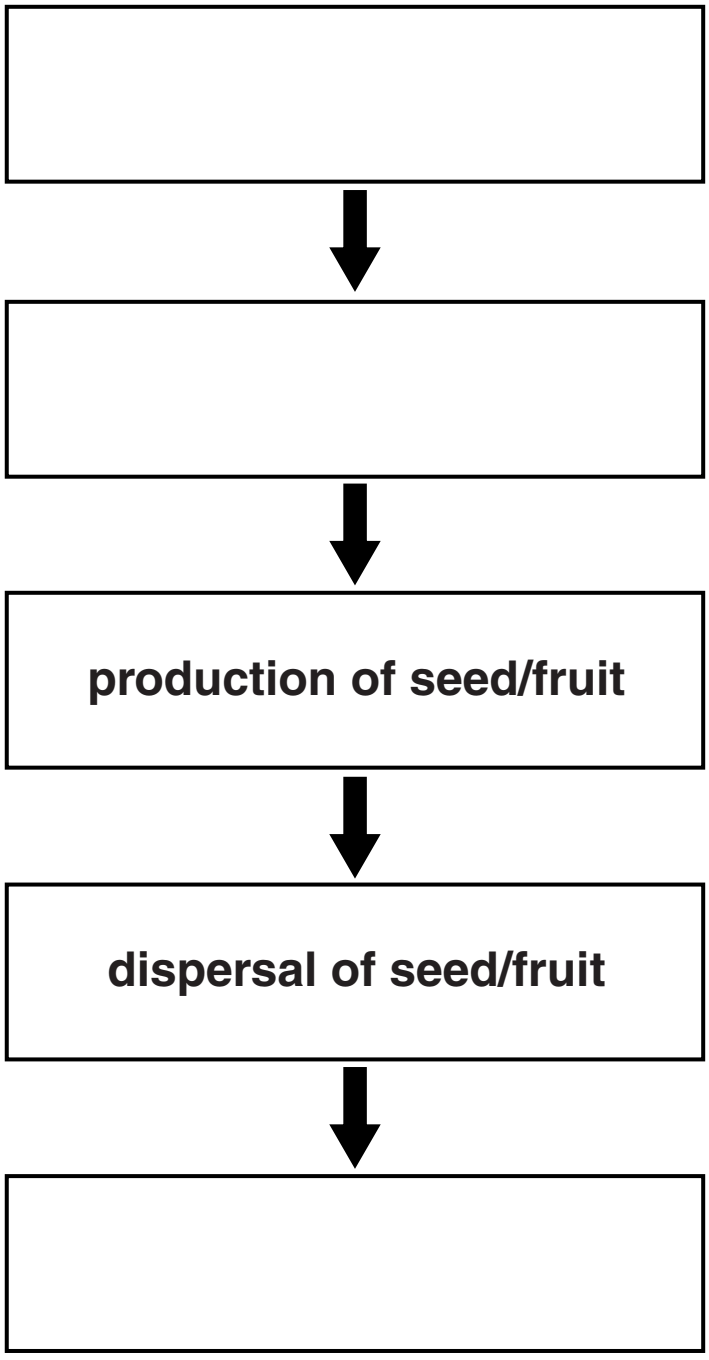


(a) A cucumber is a fruit that contains seeds.

It develops from a flower on a cucumber plant.

Complete the main stages in the life cycle of a flowering plant such as a cucumber plant.

Two stages have been done for you.



[3]

(b) Elsie grows one type of cucumber plant.

Some of the cucumber plants were grown in a polytunnel WITH extra lighting.

Other cucumbers were grown in a polytunnel WITHOUT extra lighting.

She measures the length of a sample of cucumbers from each polytunnel.

length of cucumber WITH extra light in cm	length of cucumber WITHOUT extra light in cm
40	38
42	36
41	37
41	37
43	36
39	38
average length = 41	average length = 37

(i) Calculate the percentage increase in length of cucumbers grown in extra light compared to those grown without extra light.

Show your working.

percentage increase = _____ % [2]

(ii) The average length of the cucumbers grown with extra light is more than those grown without extra light.

Explain why.

_____

_____

_____ **[2]**

(c) The next year Elsie gave her cucumbers even more light.

She found that there was no further increase in cucumber length.

What more could Elsie do to increase the length of her cucumbers?

_____

_____

_____ **[2]**

[Total: 9]

3 Read the information about nettle plants.

WILL IT STING?

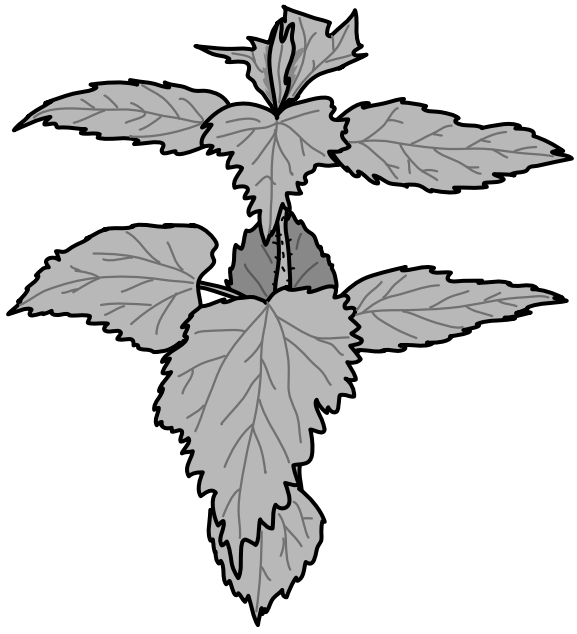
A company has developed a new fabric.

It is made of nettle fibres and wool. The fabric is used instead of polyester to make seat covers.

The company says that crude oil, which is used to make polyester fibres, will become more expensive as supplies run out. Crude oil is a non-renewable resource.

Nettles can be grown on poor land not suitable for food production. Nettles grow very quickly and are easy to harvest. Nettles provide a good habitat for a wide range of wildlife and don't need the use of pesticides or herbicides.

In the World Wars, both German and British soldiers wore uniforms made from plant material such as nettle fibres and cotton.



Use this information to answer the following questions.

(a) Describe how growing nettles is an example of SUSTAINABLE AGRICULTURE.

_____

_____

_____

_____ **[2]**

(b) The company is hoping for a government subsidy since the price of the new fabric will be determined by supply and demand.

Explain how the price is affected by SUPPLY AND DEMAND.

_____

_____

_____ **[2]**

(c) The company thinks that it could have a problem with MARKETING the new fabric made from nettles.

Suggest why.

_____ **[1]**

[Total: 5]

4 Yeast cells can be genetically modified to produce the enzyme chymosin.

Chymosin is used in cheese making.

In 1988, chymosin was the first enzyme from a genetically modified (GM) source to be approved for use in food production.

(a) Look at the diagram opposite showing the stages in producing chymosin.

(i) What is the name of the genetic material being transferred?

_____ **[1]**

(ii) How is the genetic material isolated?

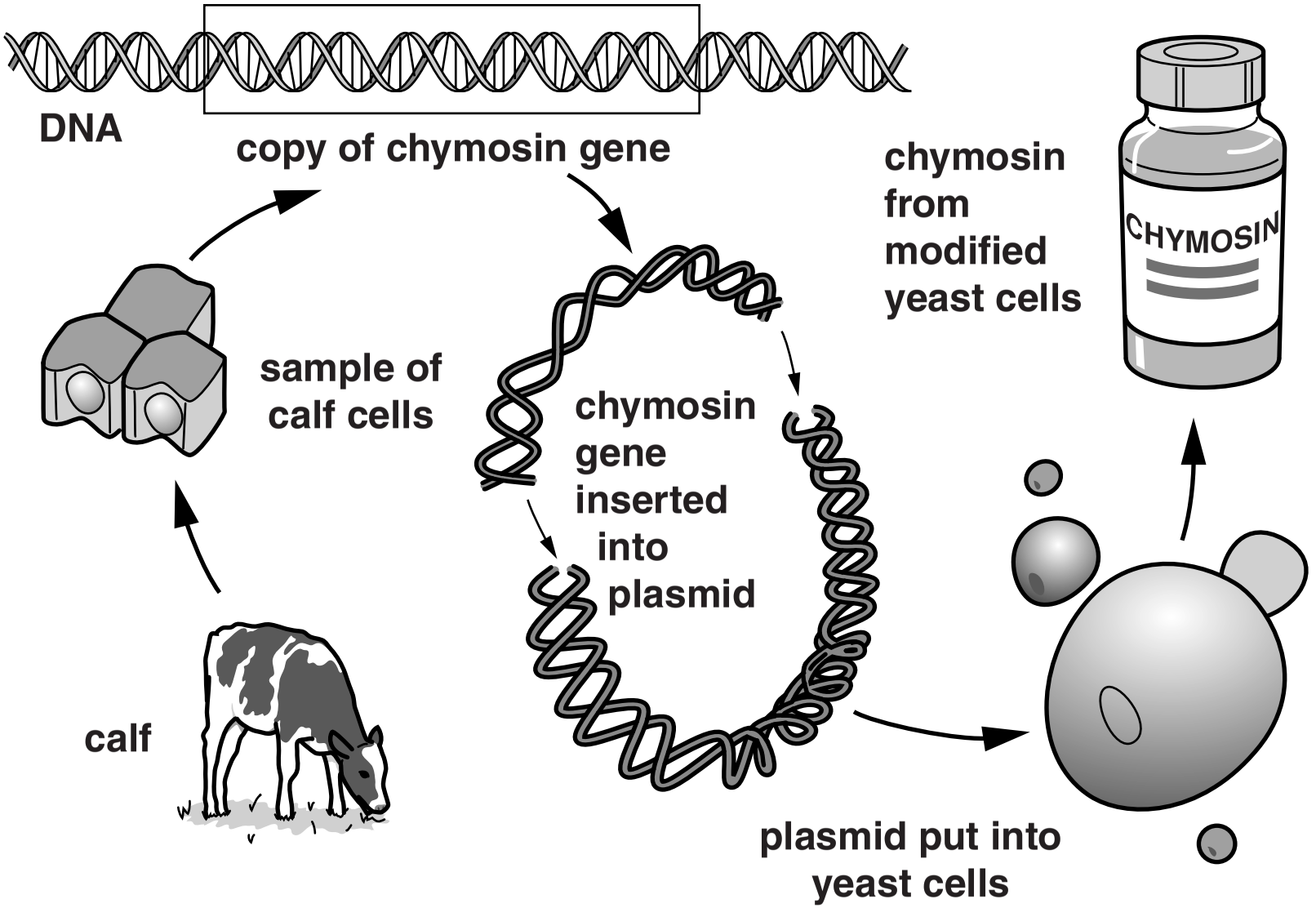
_____ **[1]**

(iii) Explain why the modified yeast cells produce chymosin.

_____

_____

_____ **[2]**


DNA
copy of chymosin gene
chymosin from modified yeast cells
CHYMOSIN
sample of calf cells
chymosin gene inserted into plasmid
calf
plasmid put into yeast cells

(iv) There are strict rules controlling the use of GM material in food.

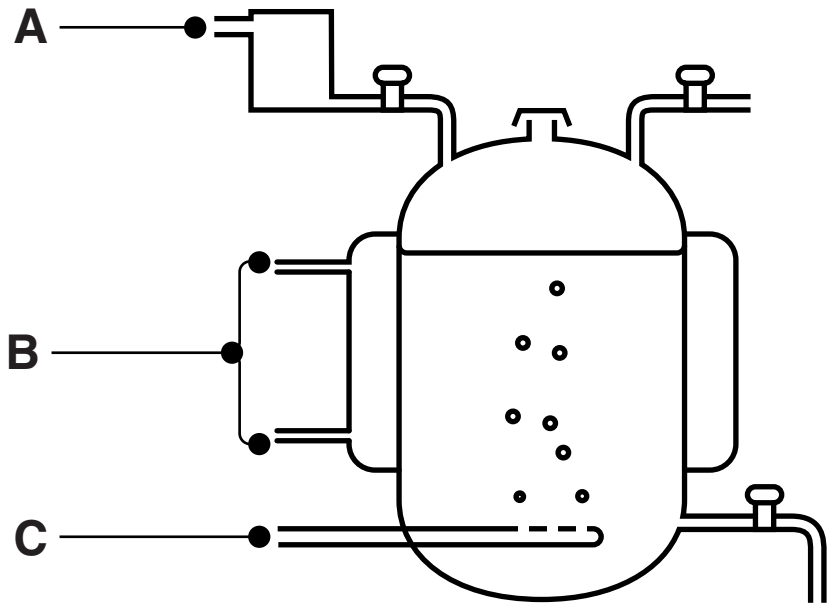
Why is chymosin produced in this way allowed in food?

_____

_____ **[1]**

(b) Large quantities of microorganisms such as yeast can be produced using a fermenter.

(i) Look at the diagram of a fermenter.



Explain what happens at A, B and C.

A _____

_____

B _____

_____

C _____

_____

[3]

(ii) Microorganisms can be grown using a batch or continuous culture system.

Yeast is usually grown using a batch culture system.

Describe ONE advantage of a BATCH CULTURE SYSTEM.

_____

_____ **[1]**

[Total: 9]

END OF QUESTION PAPER

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