Candidate forename		Candidate surname	

Centre number						Candidate number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

A334/02

TWENTY FIRST CENTURY SCIENCE
ADDITIONAL APPLIED SCIENCE A

Agriculture and Food (Higher Tier)

WEDNESDAY 15 JUNE 2011: Morning
DURATION: 45 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

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

OCR SUPPLIED MATERIALS:

Loose sheets for question 1

OTHER MATERIALS REQUIRED:

Pencil
Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

DC (LEO/CGW) 11MEP06201 46846/3

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. Pencil may be used for graphs and diagrams only.**
- **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).**
- **Answer ALL the questions.**

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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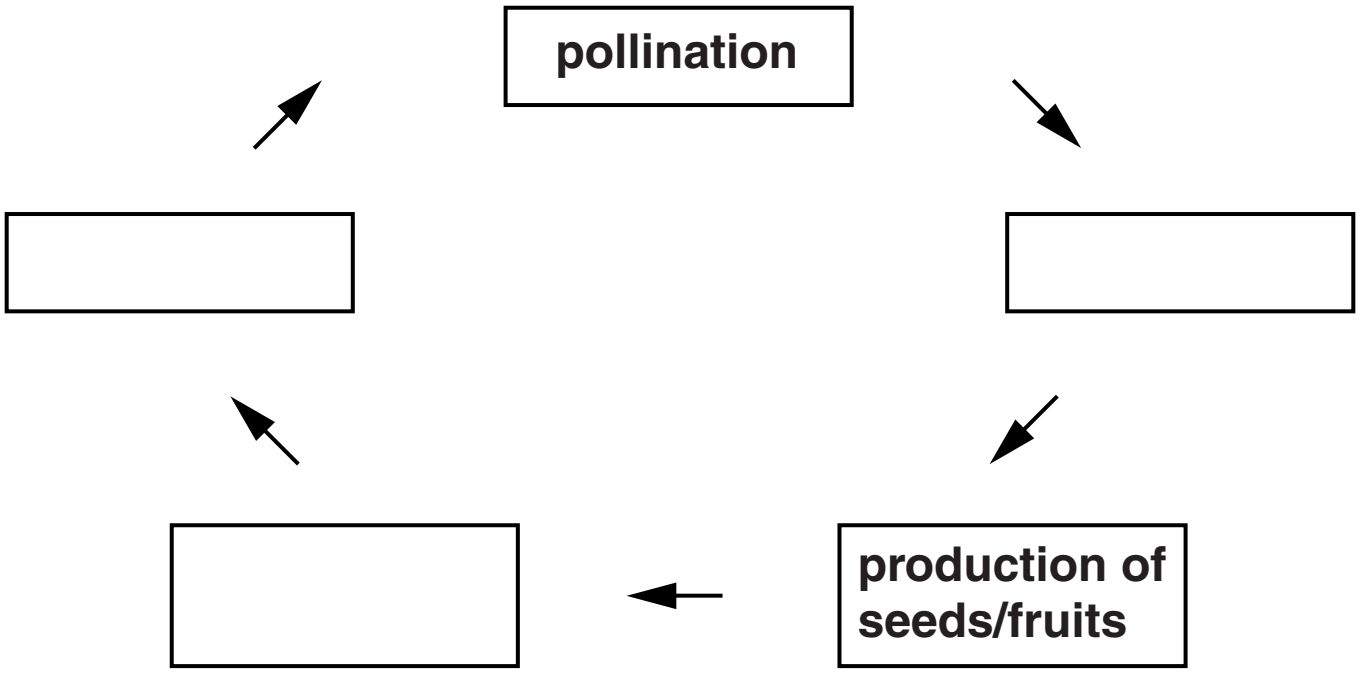
Answer ALL the questions.

1 Luke works for the Forestry Commission.
He studies the life cycle of flowering plants such as trees.

(a) Complete the sequence of the life cycle of trees.
(Use the boxes in the circle)
Write the missing stages in the boxes.



[2]

Luke records the height of ash and beech trees.

Use the two graphs on separate sheets to answer the following questions.

(b) Luke compares the growth rates of ash and beech trees.

Put ticks (✓) in the boxes next to TWO correct statements.

After 50 years beech is taller than ash. ☐

During the last 50 years the ash increased in height more than the beech. ☐

At 50 years of age, ash is about 25 m tall. ☐

In the first 25 years, ash grows more quickly than beech. ☐

[2]

(c) The average growth rate of ash for the first 100 years is 0.45 m per year.

Use the graphs to work out the average growth rate of beech for the first 100 years.

answer _____ m per year [1]

(d) Luke decides to harvest beech trees when they are 50 years old.

Use the graph to explain why.

_____

_____ **[1]**

(e) Luke finds that, in some forests, the tree harvest is less than expected.

Suggest TWO reasons why.

1 _____

2 _____ **[2]**

[Total: 8]

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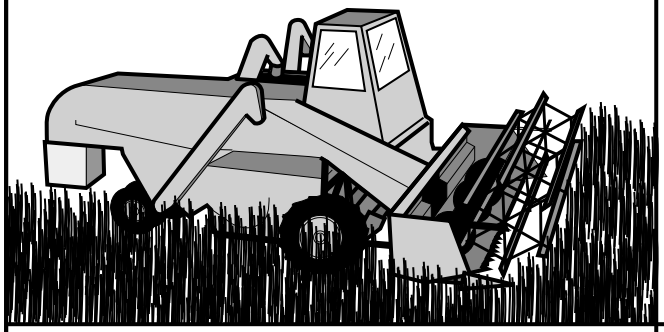
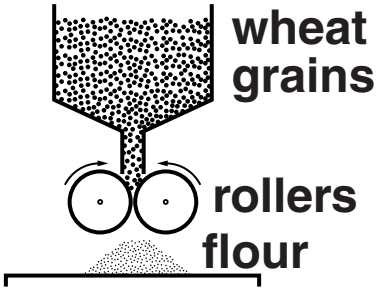
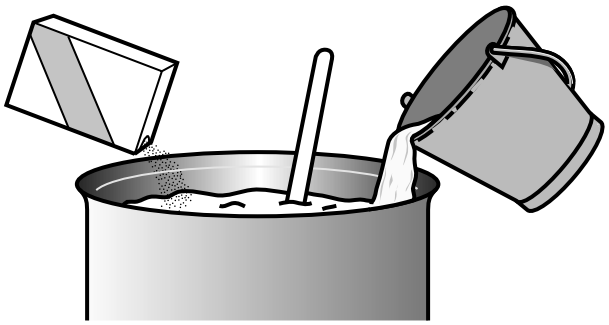
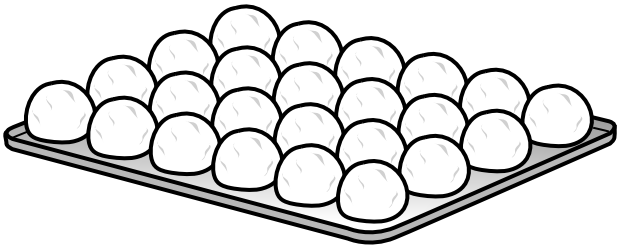
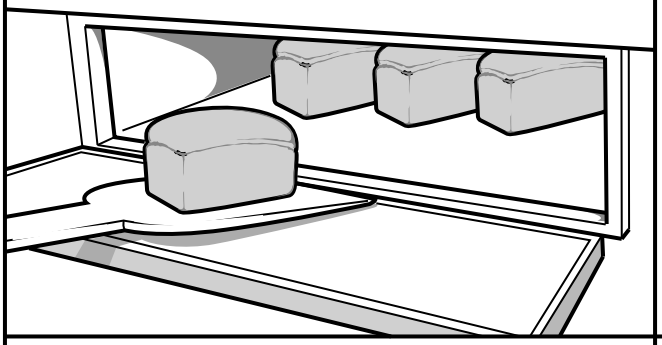
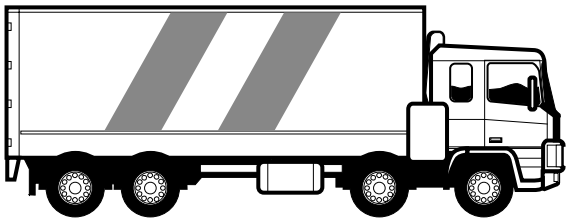
PLEASE TURN OVER FOR QUESTION 2

2 These are some of the steps in bread making.

Step 1 	**Wheat is grown and harvested.** **Wheat needs sunlight, water and carbon dioxide.**
Step 2 	**Wheat grains are ground down to flour.**
Step 3 	**Yeast, salt and water are added.**

Step 4 	**Dough is kept at 25°C.**
Step 5 	**Dough is baked at 200°C.**
Step 6 	**Bread is taken to shops.**

(a) Wheat plants use sunlight, water and carbon dioxide to make food.

(i) Write down the name of this process.

_____ **[1]**

(ii) Complete the word equation for this process.

	+		→	
	+			

[2]

(b) Yeast is a microorganism.
It is added to dough to make it rise.

Explain how the yeast makes dough rise.

_____

_____

_____ **[2]**

(c) The price of bread can change during the year.

Suggest why.

_____

_____

_____ **[2]**

[Total: 7]

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PLEASE TURN OVER FOR QUESTION 3

3 Read the newspaper story about "mini-cattle" in America.

SIZE MATTERS!

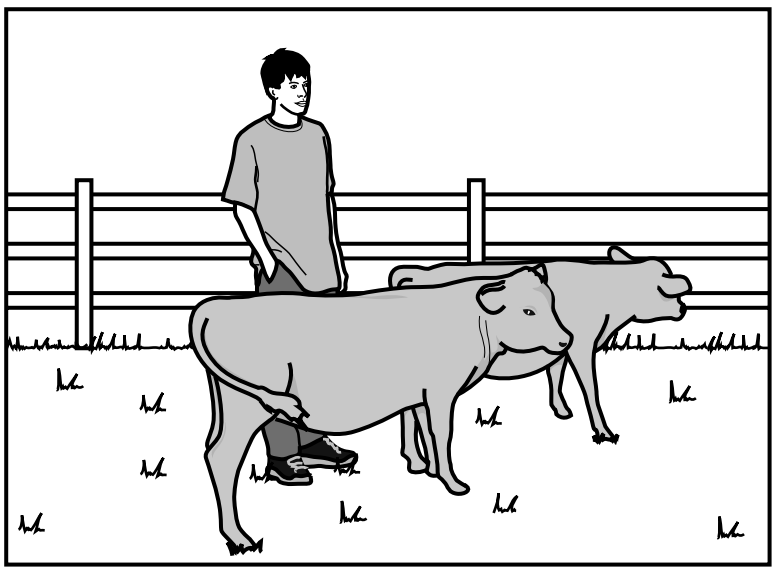
Many American farmers are keeping mini-cattle which are about half the size of normal cattle.

The farmers say that the mini-cattle eat about half the amount of food that normal cattle eat.
Smaller and leaner joints of meat are produced.

The mini-cows produce a smaller amount of milk than a normal cow. This makes it a perfect "family cow".

However, some farmers have reported problems with altering the milking machines and putting up different fencing.

Some British farmers think that the mini-cattle may not be a success in Britain.



(a) Flo is a farmer.
She reads the story and thinks about keeping mini-cattle.

Write down TWO advantages and TWO disadvantages of keeping mini-cattle instead of normal sized cattle.

advantages _____

_____

disadvantages _____

_____ **[2]**

(b) Flo does not know how quickly mini cattle grow.

Write down TWO factors that could affect the growth rate of animals such as cattle.

1 _____

2 _____ **[2]**

(c) Write down the two methods of farming that can be used to rear cattle.

1 _____

2 _____ **[1]**

(d) Flo thinks that selective breeding was used to produce the mini-cattle.

(i) Describe how selective breeding can be used to produce mini-cattle.

_____

_____

_____

_____

_____ **[3]**

(ii) Suggest one DISADVANTAGE of using selective breeding.

_____

_____ **[1]**

(e) Hormones can be used to help in the successful fertilisation of cattle.

Explain the action of these hormones.

Include in your answer

- **which cycle is affected by the hormones**
- **what effect the hormones have**
- **why the technique is useful to the farmer.**

_____

_____

_____

_____

_____ **[3]**

[Total: 12]

4 Read the newspaper story about tomatoes.

PURPLE CANCER-FIGHTING TOMATOES.

Scientists have studied common garden plants called snapdragons. These plants produce high levels of anthocyanins which give them a deep purple colour.

Research suggests that the anthocyanins protect mice against certain types of cancer.
British scientists have genetically modified tomato plants to produce purple tomatoes which contain anthocyanins.

snapdragon plant

purple tomatoes

However, it will probably take a number of years before the purple tomatoes are on sale. European Union (EU) rules state that all genetically modified foods must first pass rigorous safety tests.

(a) Name the chemical that forms the genetic material in organisms.

_____ **[1]**

(b) Name the two organisms used in PRODUCING the purple tomatoes.

1 _____

2 _____ **[1]**

(c) Describe how the tomato plants with purple tomatoes were produced.

Include in your answer

- **what was transferred**
- **how the transfer took place.**

_____

_____

_____

_____ **[3]**

(d) Explain how the genetically modified (GM) tomato plants produce anthocyanins.

_____

_____ **[2]**

(e) The purple tomatoes have to pass safety tests before they can be sold as food.

Suggest one OTHER reason why these tomato plants need to be tested.

_____

_____ **[1]**

(f) Genetic modification is an example of biotechnology.

Write down ONE OTHER example of biotechnology being used to produce food.

_____ **[1]**

[Total: 9]

END OF QUESTION PAPER

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