

GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
ADDITIONAL APPLIED SCIENCE A
Agriculture and Food (Foundation Tier)

A334/01

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)

Monday 24 January 2011
Afternoon

Duration: 45 minutes



Candidate forename		Candidate surname	
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Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. 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.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

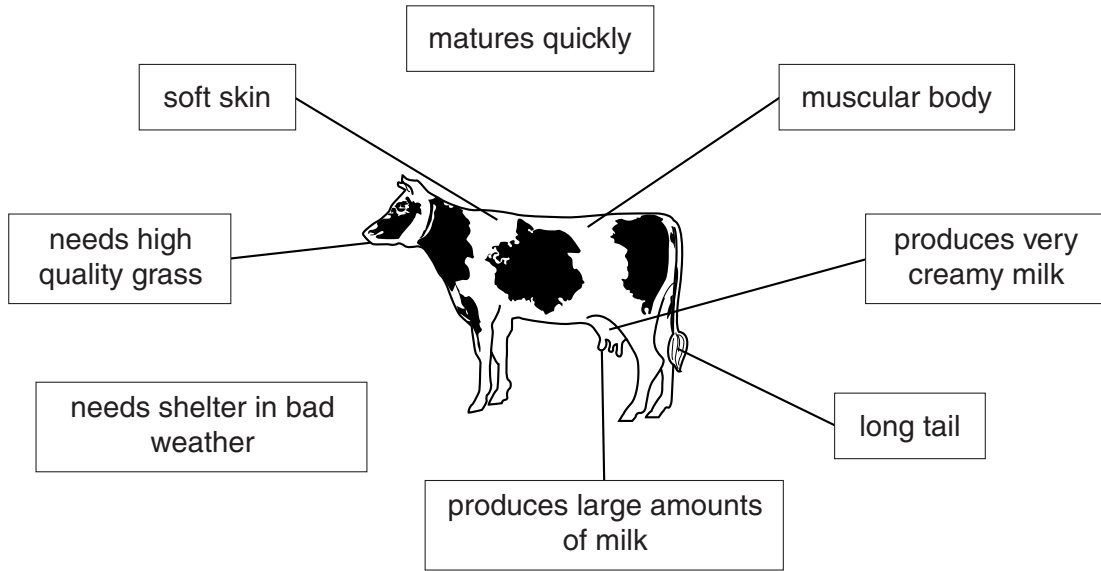
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **36**.
- This document consists of **12** pages. Any blank pages are indicated.

Answer **all** the questions.

1 Ben is a dairy farmer.

He keeps cows.

(a) Look at the diagram showing features of cows.



He wants to develop the “perfect **milk producing** cow”.

Write down three of **these features** that Ben would choose.

- 1
- 2
- 3 [3]

(b) Ben makes a list of stages in **selective breeding**.

They are in the wrong order.

One stage is not correct.

- A allow the young to mature
- B select only male animals
- C repeat the breeding over many generations
- D select the animals with the best characteristics
- E breed from these animals

Choose the correct stages.

Write the letters in the correct order in the boxes.

One stage has been done for you.

		A	
--	--	---	--

[2]

(c) Ben can use artificial insemination to develop a “perfect milk producing cow”.

(i) What is the correct sequence of **sexual reproduction**?

Put a tick (✓) in the box next to the correct sequence.

fertilisation → formation of gametes → embryo development → birth

formation of gametes → fertilisation → embryo development → birth

birth → embryo development → formation of gametes → fertilisation

embryo development → birth → fertilisation → formation of gametes

[1]

(ii) What are the advantages of **artificial insemination**?

Put a tick (✓) in the boxes next to the **two** correct answers.

The time of birth can be planned.

There is a better chance of pollination.

There is a better chance of fertilisation.

The parents are chosen at random.

No males or sperm are required.

[2]

(d) In some breeding programmes, embryos are transplanted.

Complete the sentences about transplanting embryos in cows.

Use words from this **list**.

born eaten healthy pregnant special stomach surrogate uterus

The cow is made by artificial insemination.

After about 7 days, the embryos are removed from the

The embryos are put into another cow called a mother.

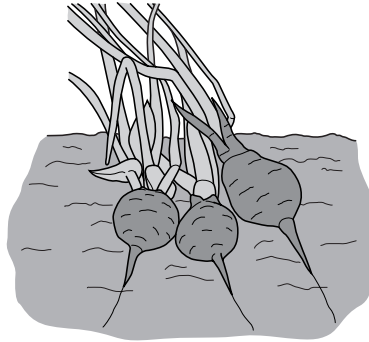
About 40 weeks later, calves are

[4]

[Total: 12]

2 Emma plants some radish seeds.

The seeds germinate and grow into radish plants.



(a) Which conditions are needed for **germination**?

Put a tick (✓) in the boxes next to the **two** correct answers.

temperature below 5 °C

carbon dioxide present

bright light

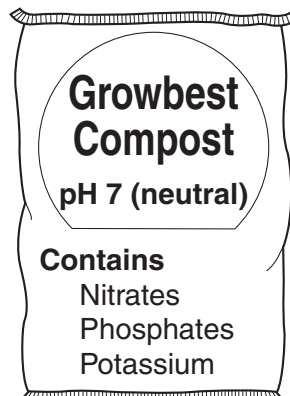
oxygen present

water present

[2]

(b) Emma decides to grow the radishes in compost from a garden centre.

The label on the compost bag is shown below.



Radishes need an **acid** soil.

Explain why radishes will not grow well in Growbest compost.

..... [1]

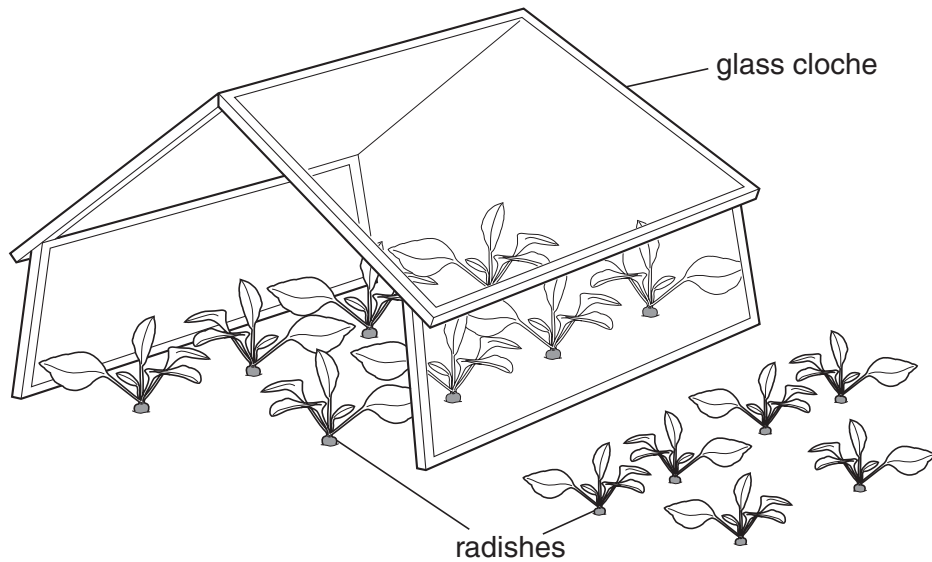
(c) Plants usually grow better in compost rather than in garden soil.

Write down **one** reason why they grow better in compost.

..... [1]

(d) Emma grows the radishes under a glass cloche.

The cloche is like a mini greenhouse.



The radish plants under the glass cloches grow better than the plants outside.

Write down two reasons why.

1

2 [2]

(e) Emma uses a chemical insecticide.

What does an insecticide do?

Put a tick (✓) in the box next to the **best** answer.

attracts insects

kills insects

protects insects

provides minerals

[1]

(f) The root of a radish plant is used in salads.

Emma wants to measure the crop yield of her radish roots.

Explain how she could do this using the **wet mass** method.

.....

.....

.....

..... [3]

[Total: 10]

PLEASE DO NOT WRITE ON THIS PAGE

3 (a) The life cycle of a flowering plant has many stages.

What is the correct sequence of these stages?

Put a tick (✓) in the box next to the correct sequence.

- fertilisation → pollination → seed dispersal → seed production → germination
- pollination → fertilisation → seed production → seed dispersal → germination
- germination → fertilisation → pollination → seed production → seed dispersal
- seed dispersal → germination → fertilisation → pollination → seed production

[1]

(b) Honey bees are very important in the pollination of flowering plants.

Look at the information showing how useful they are.

crop plant	market value of crop each year in the UK	percentage of pollination due to honey bees	value of honey bee pollination
apple	£94 million	90	£84.6 million
oilseed rape	£404 million	8	£32.3 million
pear	£2 million	30	£0.6 million
raspberry	£26 million	30	£7.8 million
strawberry	£15 million	12	

(i) Calculate the value of honey bee pollination to the UK strawberry crop each year.

Show your working.

£ million [2]

(ii) Scientists are very concerned about the rapid decrease in honey bee numbers in recent years.

Fewer honey bees will result in less pollination of crops.

Which crop plants in the table will be the **most** and **least** affected by this?

most affected crop

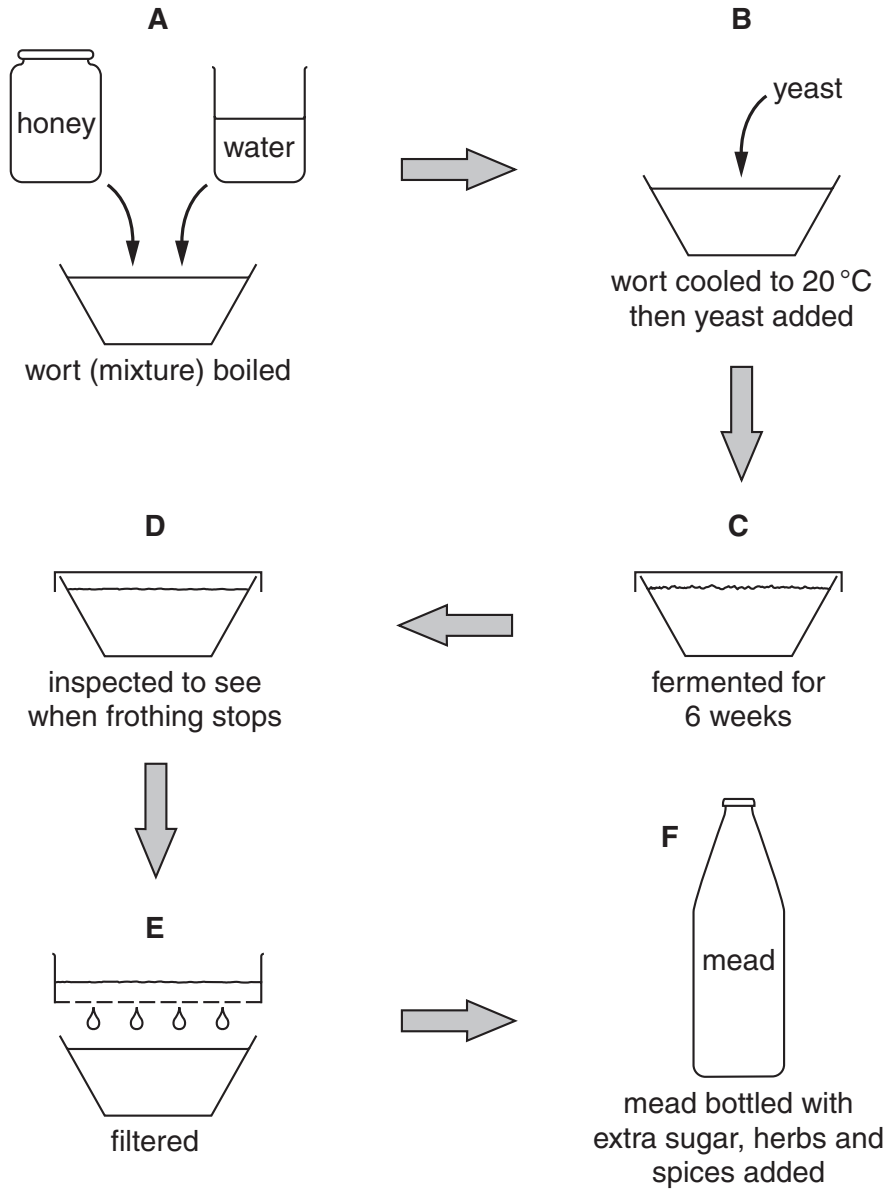
least affected crop

[1]

(c) Honey bees collect nectar from flowers and make it into honey.

The honey can be made into an alcoholic drink called mead.

Look at the diagram showing how mead is made.



(i) Yeast uses anaerobic respiration to carry out this fermentation.

Write down the word equation for **anaerobic** respiration in yeast.



[2]

(ii) Explain why the wort is boiled in stage A.

..... [1]

(iii) Explain why the wort must then be cooled down in stage B.

..... [1]

(iv) Which stage uses a **qualitative** method of testing?

..... [1]

[Total: 9]

4 (a) Read the newspaper story about sheep farming.

EASYCARE SHEEP

Some sheep farmers are now keeping sheep which have very little wool.

These Easycare sheep do not need their fleeces to be cut off. The sheep have fewer problems with ticks and fleas.



Cutting off a fleece costs £1 per sheep. The fleeces sell for 70 pence each.

One farmer said “Synthetic fibres are now used instead of wool. I don’t like shearing the wool from sheep, it’s too stressful for them. They lose all their wool in one minute instead of shedding it naturally over 6 weeks”.

(i) Suggest why Easycare sheep have fewer problems with ticks and fleas.

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

(ii) Describe two **other** advantages of keeping Easycare sheep.

1
2 [1]

(b) The newspaper story continued.

A spokesperson for the British Wool Marketing Board said, “There is a swing towards keeping sheep that don’t grow wool. Meat is now more important. We are trying to find new markets for wool such as using it for insulation”.

(i) Name a gathered harvest and a whole organism harvest from sheep.

gathered harvest

whole organism harvest

[1]

(ii) The British Wool Marketing Board supports the sheep farming industry.

Write down the name of a different organisation which supports a part of the food industry.

Explain what support it provides.

name of organisation

what support it provides

[2]

[Total: 5]

END OF QUESTION PAPER



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