

**GENERAL CERTIFICATE OF SECONDARY EDUCATION
TWENTY FIRST CENTURY SCIENCE
ADDITIONAL APPLIED SCIENCE A**

A334/02

Agriculture and Food (Higher Tier)

**Monday 24 January 2011
Afternoon**

Duration: 45 minutes

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)



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.

PLEASE DO NOT WRITE ON THIS PAGE

Answer **all** the questions.

- 1 (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 bees 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 food crops will be the **most** and **least** affected by this?

most affected crop

least affected crop

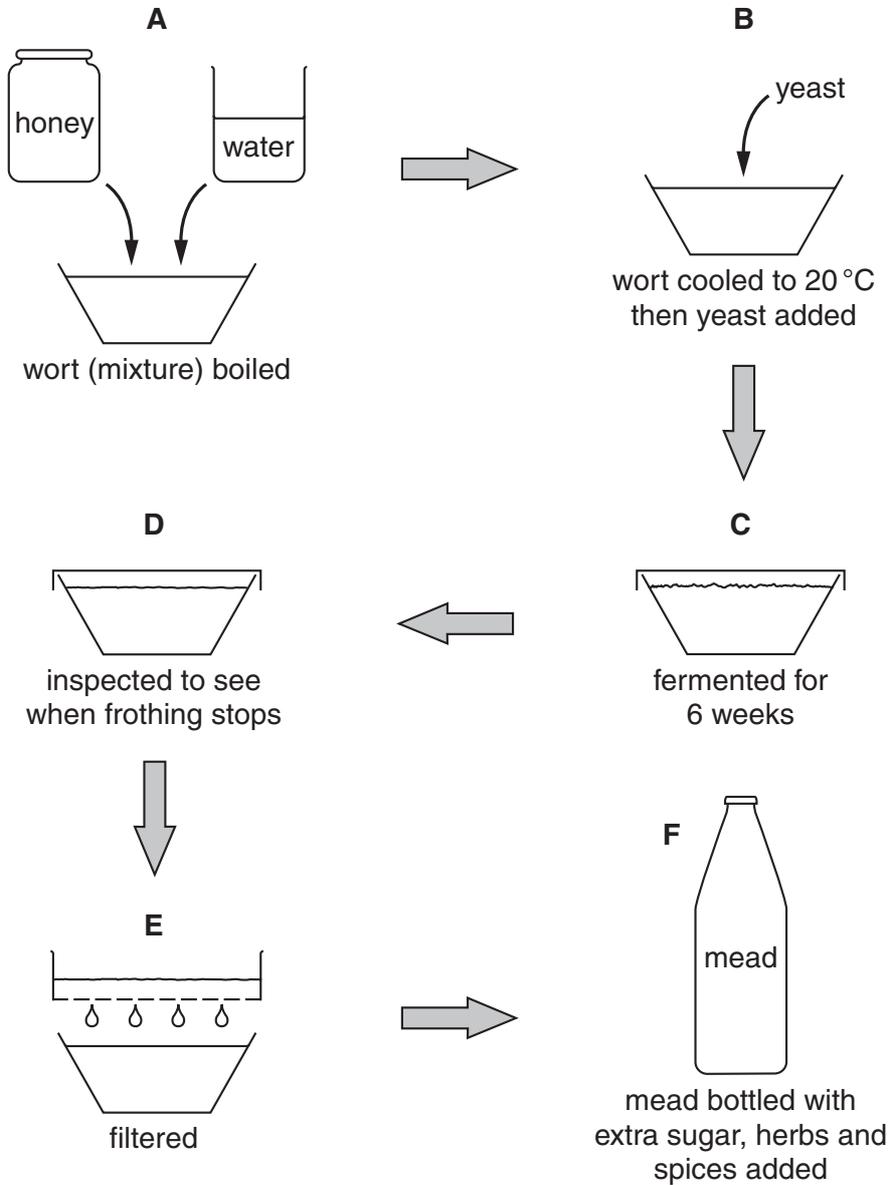
[1]

Turn over

(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 use 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 on stage **B**.

..... [1]

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

..... [1]

(v) Suggest why adding extra sugar to the bottles of mead could be dangerous.

.....
..... [2]

[Total: 11]

2 (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) Easycare sheep have fewer problems with ticks and fleas.

Describe two **other** advantages of keeping Easycare sheep.

- 1
- 2 [1]

(ii) Suggest and explain one **disadvantage** of keeping Easycare sheep.

-
- [2]

(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”.

The Easycare breed is a cross between Wiltshire Horn sheep and the Welsh Mountain sheep.

Artificial insemination was used in the cross breeding.

(i) 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]

(ii) Write down two **advantages** of using artificial insemination instead of natural sexual reproduction.

1

2 [2]

(iii) Describe the process of artificial insemination in animals.

.....

.....

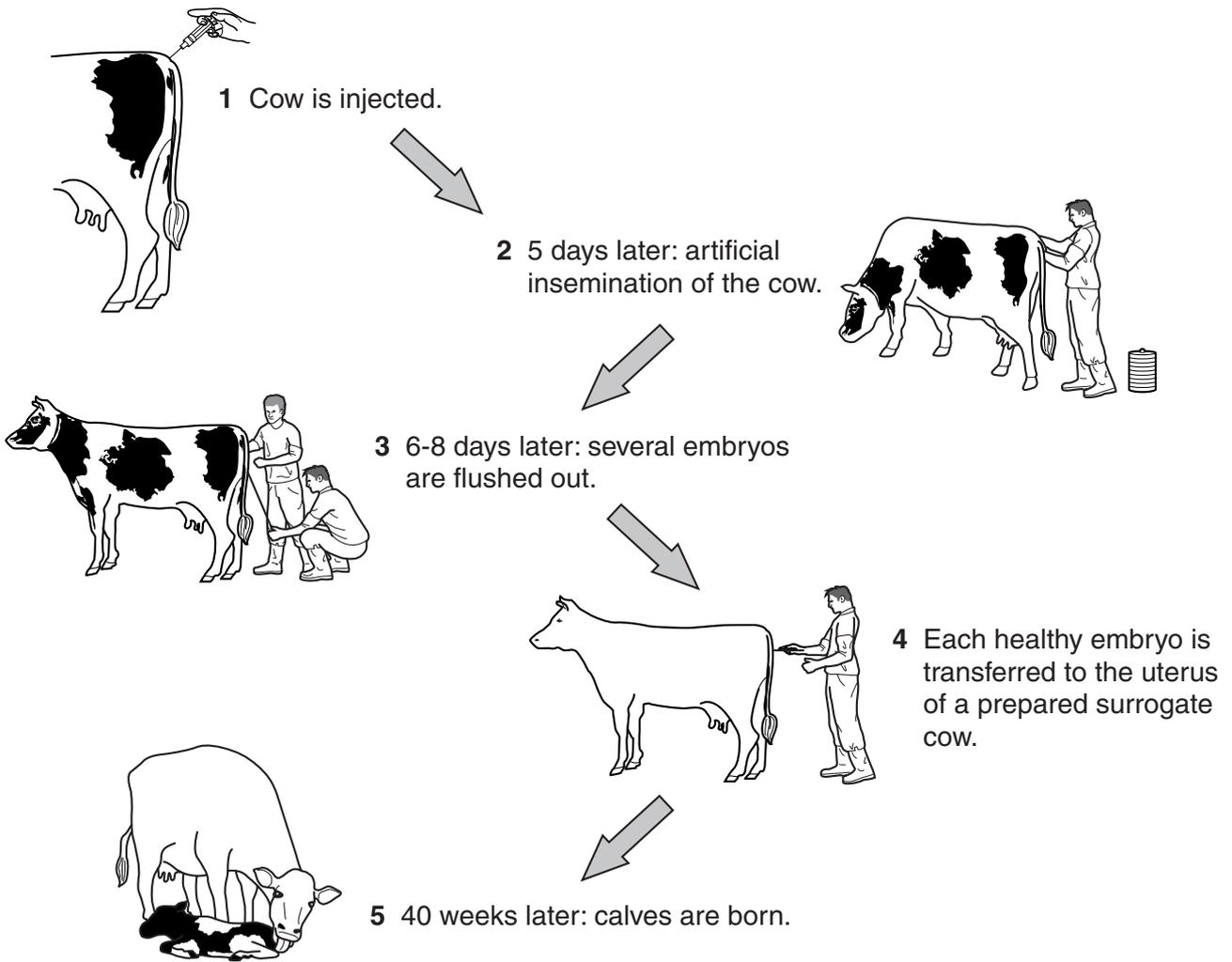
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..... [3]

[Total: 10]

3 This question is about embryo transfer in cattle.

Look at the diagrams showing embryo transfer.



(a) (i) What type of chemical is injected into the cow to start this process?

..... [1]

(ii) Explain the importance of this chemical in the process.

.....
..... [2]

(b) In which part of the cow's body do the embryos develop?

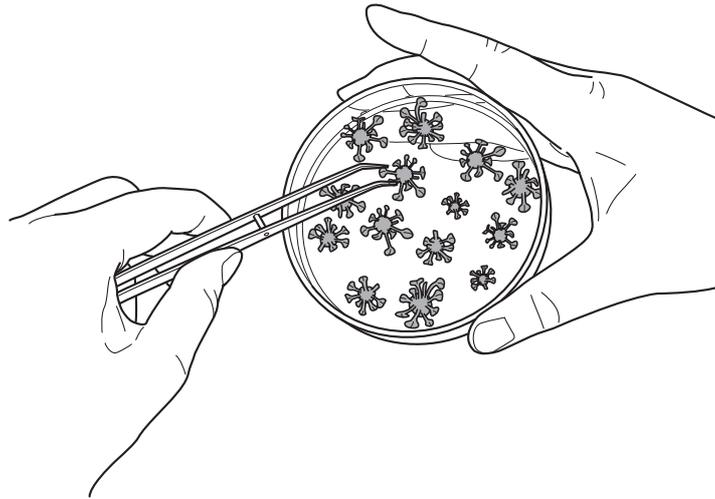
..... [1]

(c) Suggest two characteristics the surrogate cow should have.

.....
..... [2]

[Total: 6]

4 Large numbers of plants can be produced by tissue culture.



(a) Describe the process of tissue culture in plants.

Include in your answer

- what type of plant cells are suitable
- what treatment is given to the plant cells
- contents of the growing medium.

.....

.....

.....

.....

.....

..... [3]

(b) The plants produced by tissue culture are **genetically identical**.

(i) Explain why the plants produced by tissue culture are genetically identical.

.....

..... [2]

(ii) Write down a different method of producing large numbers of genetically identical plants.

..... [1]

(c) (i) Growth of the new plants will be controlled by the rate of photosynthesis.

Write down two **limiting factors** in photosynthesis.

1 2 [2]

(ii) Explain what is meant by the term **limiting factor**.

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

[Total: 9]

END OF QUESTION PAPER

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