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Centre number						Candidate number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

A334/01

**TWENTY FIRST CENTURY SCIENCE
ADDITIONAL APPLIED SCIENCE A**

Agriculture and Food (Foundation Tier)

MONDAY 24 JANUARY 2011: Afternoon

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:

None

OTHER MATERIALS REQUIRED:

Pencil

Ruler (cm/mm)

READ INSTRUCTIONS OVERLEAF

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.**

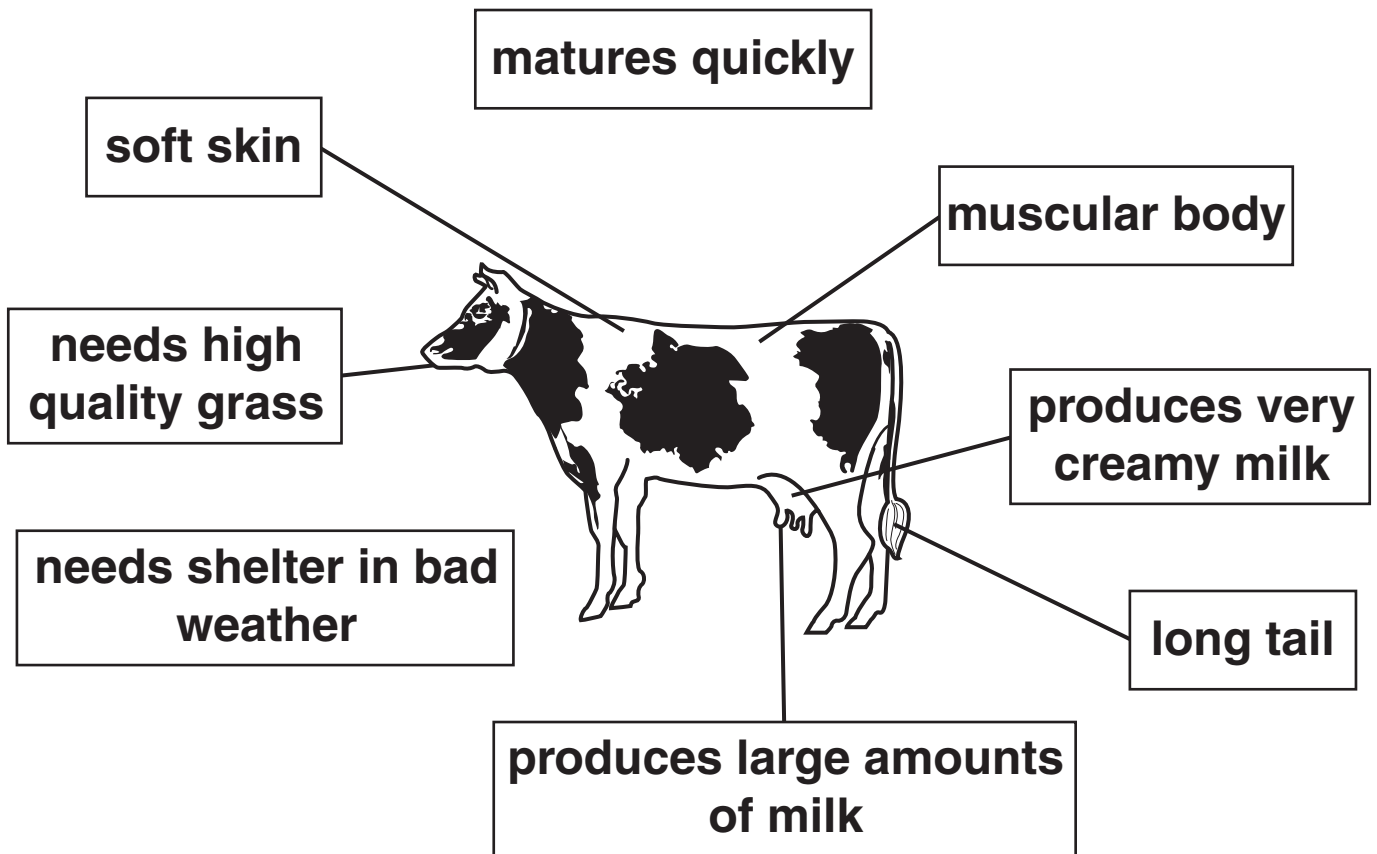
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Answer ALL the questions.

1 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

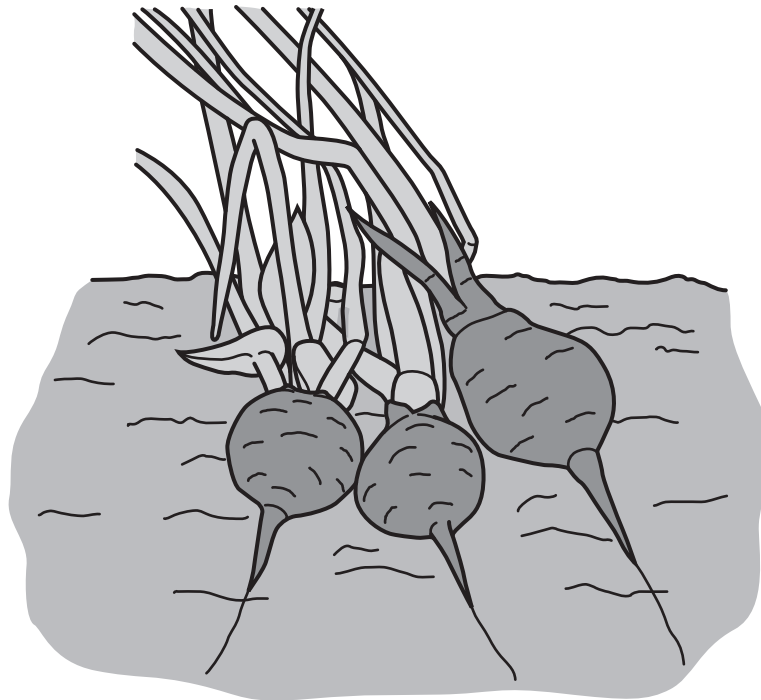
_____ .

[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

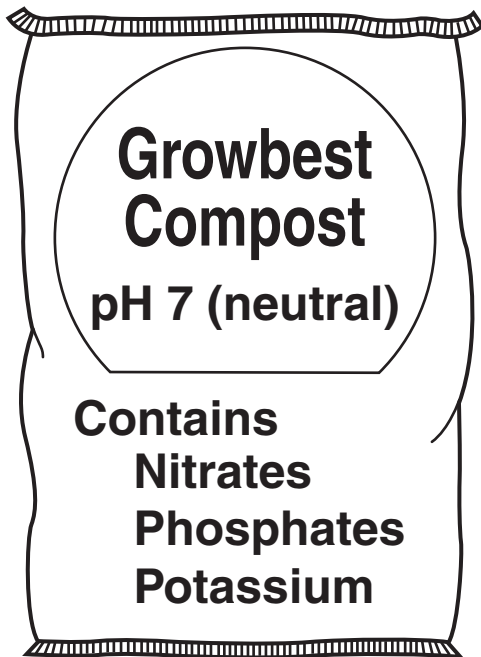
oxygen present

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]

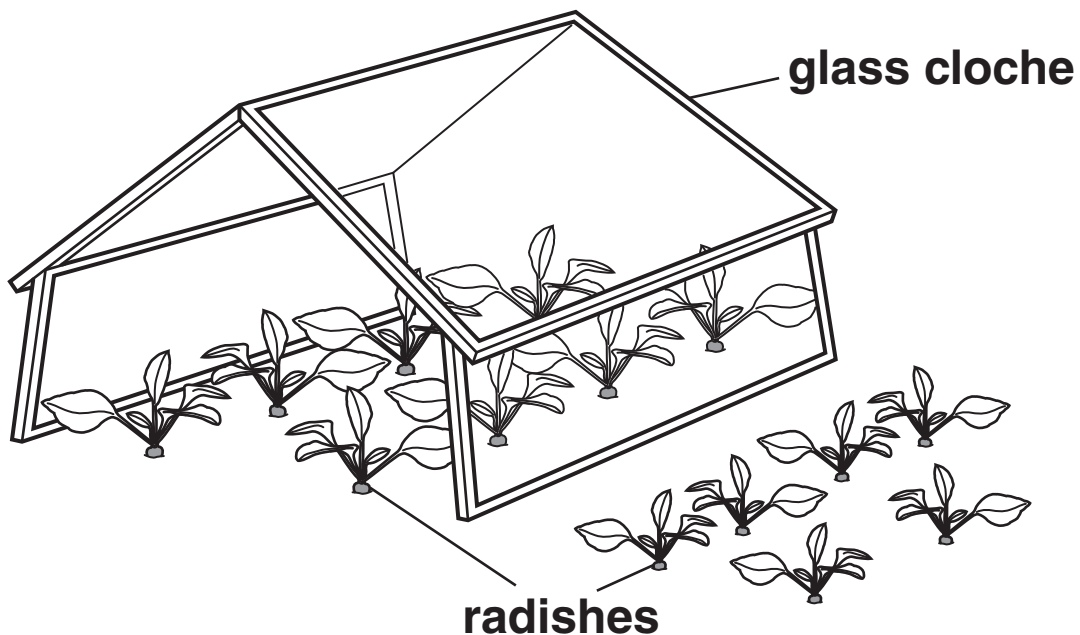
(c) Plants usually grow better in compost rather than in garden soil.

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]

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- 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.

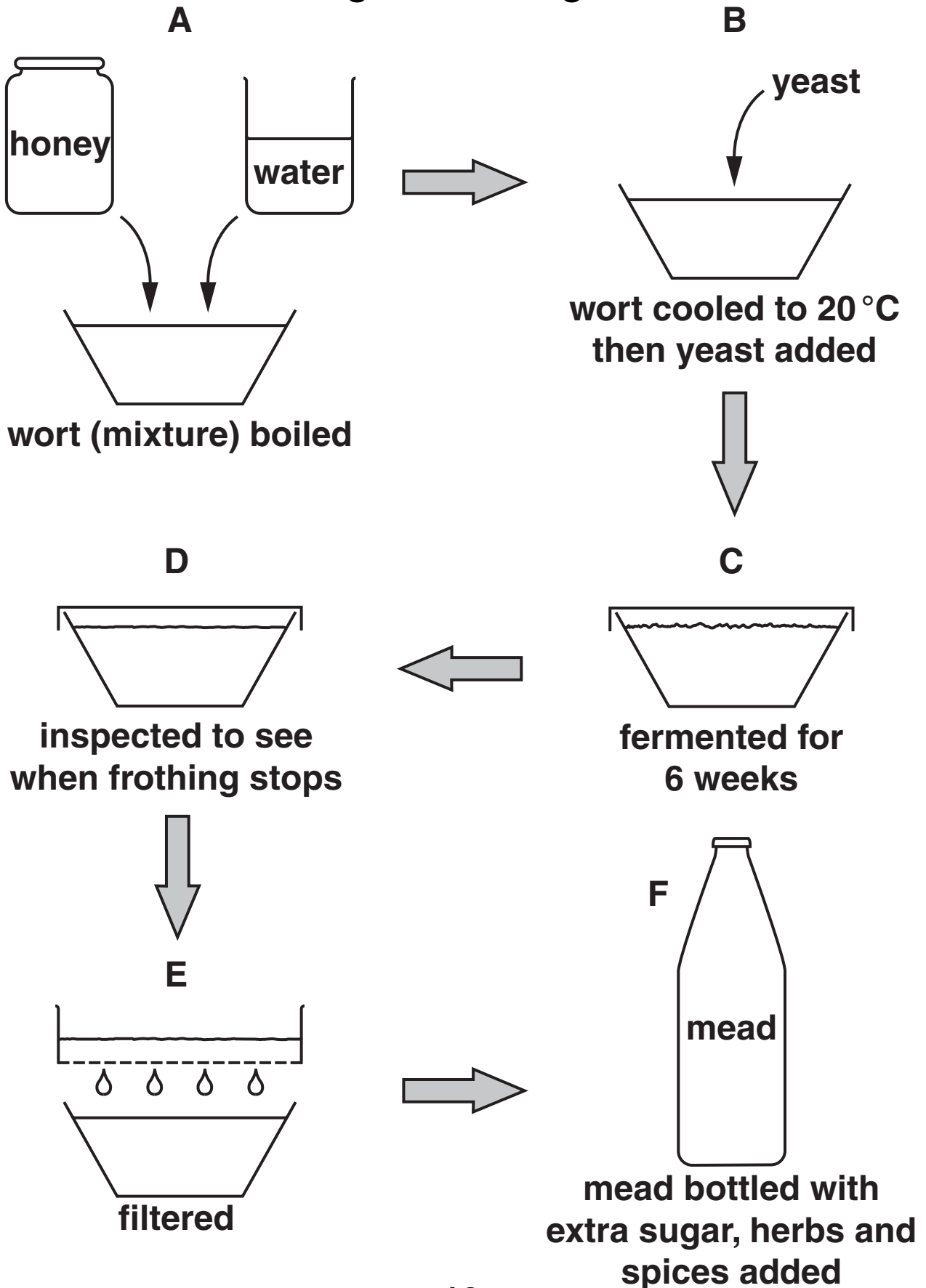
Which crop plants in the table will be the MOST and LEAST affected by this?

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.



- (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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