

Candidate forename		Candidate surname	
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Centre number						Candidate number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GCSE**

**A334/01**

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

**Agriculture and Food (Foundation Tier)**

**TUESDAY 31 JANUARY 2012: 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:**

**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. 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.**

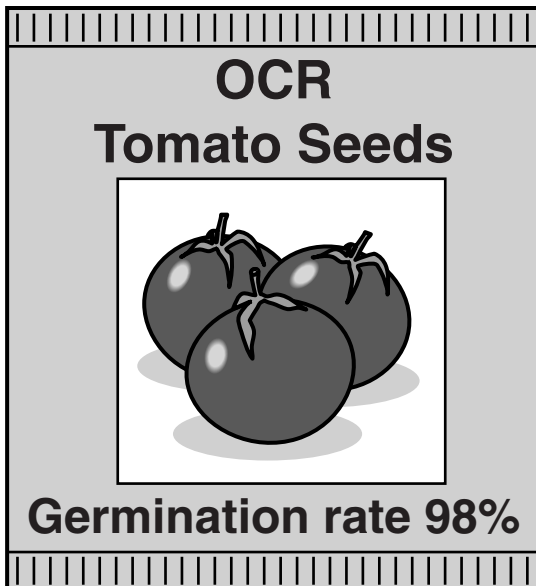
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**Answer ALL the questions.**

**1 Alan wants to grow tomato plants.**

**He buys a packet of tomato seeds.**

**The packet is sealed.**



**(a) Why is the packet of seeds sealed?**

**Put a tick (✓) in the box next to the TWO correct answers.**

**The packet is sealed so that the seeds cannot ...**

**... be fertilised.**

**... be pollinated.**

**... germinate.**

**... photosynthesise.**

**... rot.**

**[2]**

**(b) The label on the packet states**

**“Germination rate is 98%”**

**If Alan plants 1000 seeds, how many seeds should germinate?**

\_\_\_\_\_ [1]

**(c) Write down TWO conditions needed for germination.**

1 \_\_\_\_\_

2 \_\_\_\_\_ [2]

**(d) Alan grows his tomato plants using three different growing media.**

**Draw a straight line from each GROWING MEDIUM to its correct ADVANTAGE.**

**Then draw a straight line from each GROWING MEDIUM to its correct DISADVANTAGE.**

**ADVANTAGE**

**GROWING MEDIUM**

**DISADVANTAGE**

**automatic control of water**

**compost from a garden centre**

**contains many pests**

**free**

**soil from his garden**

**expensive to buy in sacks**

**contains correct minerals at correct pH**

**hydroponics system**

**difficult to support tall plants**

**[4]**

**(e) Alan decides to grow his tomato plants in a glasshouse.**

**Alan needs to make sure they get enough light and carbon dioxide.**

**Explain why getting enough light and carbon dioxide is important to produce a good crop of tomatoes.**

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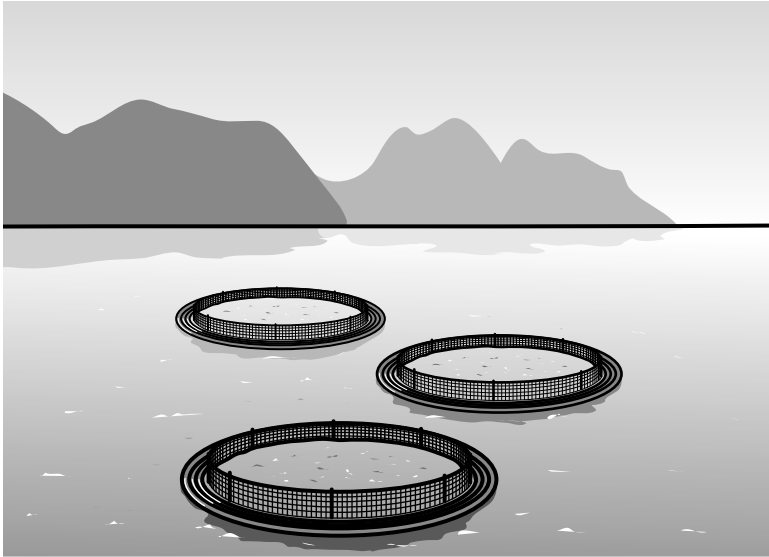
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[2]

[Total: 11]

**2 Salmon are kept in cages in sheltered sea bays.**



**This is called fish farming.**

**The salmon are fed a high protein diet so they grow quickly.**

**(a) What type of farming is this?**

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

**dairy**

**horticulture**

**intensive**

**arable**

**[1]**



**(b) Some people OBJECT to this type of farming.**

**Suggest why.**

\_\_\_\_\_ [1]

**(c) Write down TWO factors, apart from food, which affect the growth of fish such as salmon.**

1 \_\_\_\_\_

2 \_\_\_\_\_ [2]

**(d) The types of salmon used in fish farming were developed by selective breeding.**

**Describe the main stages in selective breeding.**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [3]

**[Total: 7]**

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**3 Rosie is a fruit farmer.**

**(a) What type of harvest will Rosie produce?**

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

**aseptic**

**gathered**

**microorganisms**

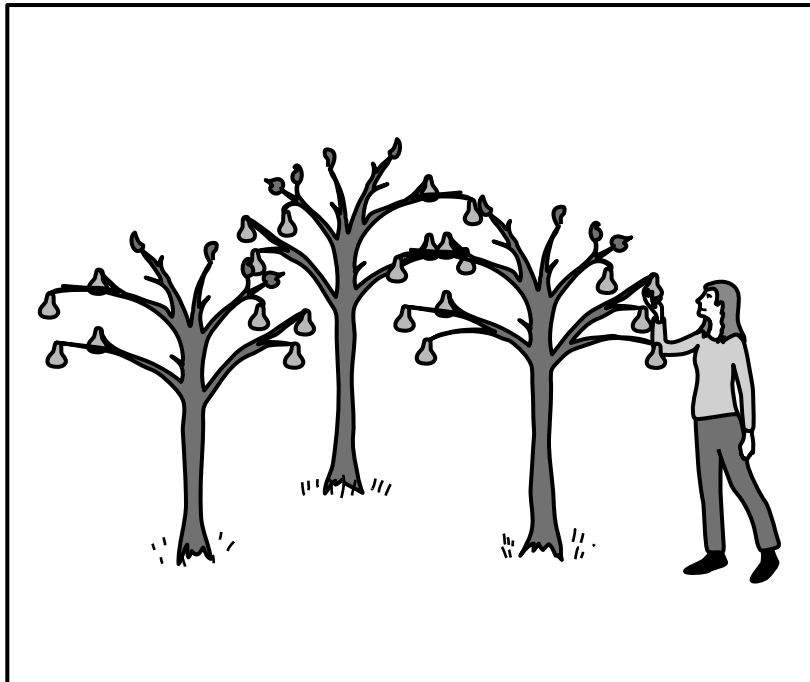
**whole**

**[1]**

(b) Rosie wants to grow pear trees in a large field.

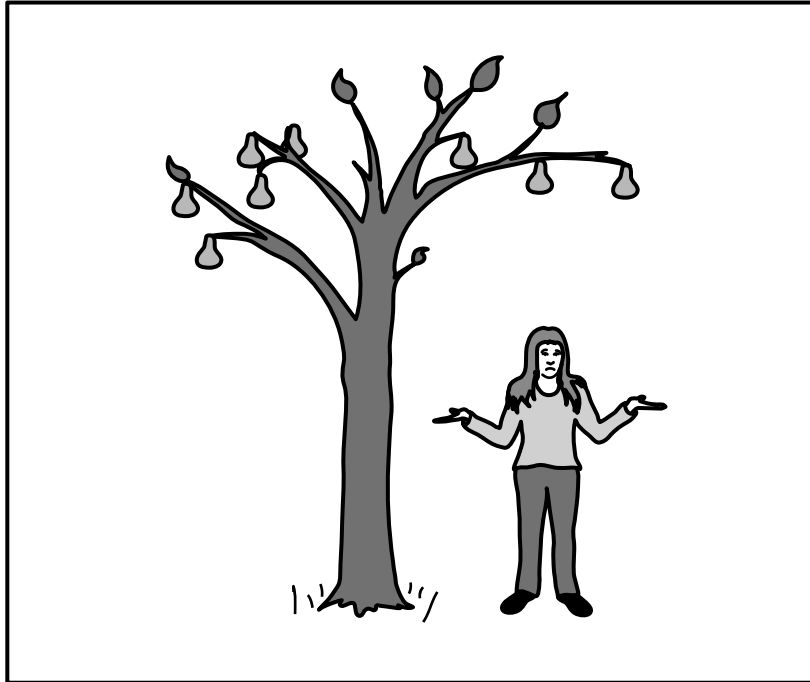
She can grow either dwarf trees (**2 m** tall) or tall trees (**6 m** tall).

using dwarf trees



- **500** trees used
- each tree produces **15 kg** pears/year
- total crop = **7500 kg/year**

## using tall trees



- **40** trees used
- each tree produces **80 kg** pears/year
- total crop = \_\_\_\_\_ kg/year

(i) Work out the total crop from tall pear trees.  
Complete the box above.

[1]

- (ii) Rosie decides to use dwarf pear trees.  
She thinks they will produce the larger crop.  
Suggest TWO other advantages of growing  
dwarf trees in a large field.**

---

---

**[1]**

- (c) Rosie will make pear cider with her pears.**

**Complete the sentences about this process.**

**Use words from this list.**

**ALCOHOL**

**CARBON DIOXIDE**

**FERMENTATION**

**GERMINATION**

**NITROGEN**

**OXYGEN**

**POLLINATION**

**The pears are squashed to make pear juice.**

**Yeast and sugar are then added.**

**The yeast produces \_\_\_\_\_**

**and \_\_\_\_\_ .**

**This process is called**

\_\_\_\_\_ .

**[2]**

**(d) Rosie hopes her pears will get a quality mark.**

**What does a quality mark mean?**

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

**The product has ...**

**... been grown by intensive farming.**

**... been grown for a long time.**

**... reached a certain standard.**

**... reached a maximum size.**

**[1]**

**(e) Rosie is worried that microorganisms may damage her stored pears.**

**(i) Name a type of MICROORGANISM that could damage the pears.**

\_\_\_\_\_ [1]

**(ii) Explain how microorganisms damage foods such as pears.**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ [2]

**[Total: 9]**



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#### 4 Read the information on a new fuel.

### A clean biofuel?

The first commercial crop of *Jatropha curcas* has been harvested in Africa.

It is a fast growing plant, producing seeds containing **45%** oil.

The wild variety of *Jatropha* requires little water and can grow in poor soil. However, the crop yield and the flowering time of each wild plant varies from year to year.

The commercial crop of *Jatropha* is much better than the wild type. Each plant regularly produces about **3 kg** of seed each year, resulting in **3 tonnes** per hectare. This is six times the crop produced by wild plants.

- (a) How much seed is produced by wild *Jatropha* plants per hectare in a year?

answer = \_\_\_\_\_ tonnes per hectare [1]

- (b) Suggest TWO ways, apart from a higher crop yield, in which the commercial *Jatropha* plants have been improved.

\_\_\_\_\_  
\_\_\_\_\_ [2]

**(c) Which technique would have been used to develop the new commercial *Jatropha* plants?**

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

- |                                |                          |            |
|--------------------------------|--------------------------|------------|
| <b>artificial insemination</b> | <input type="checkbox"/> |            |
| <b>food processing</b>         | <input type="checkbox"/> |            |
| <b>selective breeding</b>      | <input type="checkbox"/> |            |
| <b>surrogate parents</b>       | <input type="checkbox"/> | <b>[1]</b> |

**(d) New *Jatropha* plants can be grown in different ways.**

- A ... from seeds**
- B ... from cuttings**
- C ... by tissue culture**

**Answer the questions below using the letters A, B and C.**

**More than one letter can be used for each answer.**

- (i) Which method(s) depends on pollination? \_\_\_\_\_ [1]**
- (ii) Which method(s) depends on sterile conditions? \_\_\_\_\_ [1]**
- (iii) Which method(s) produce identical plants? \_\_\_\_\_ [1]**

- (e) Some farmers in the UK are thinking about growing *Jatropha* plants.

They would use polytunnels to control the growing conditions.

Name ONE condition they would control and explain how it could be controlled.

condition \_\_\_\_\_

how it could be controlled \_\_\_\_\_

\_\_\_\_\_ [2]

[Total: 9]

## END OF QUESTION PAPER



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