

**GCSE**

**ADDITIONAL APPLIED SCIENCE A**

AP2 Agriculture and Food

**Specimen Paper**

Candidates answer on the question paper:  
Additional materials: ruler (cm/mm), calculator

**F** **A334/01**

45 mins

Candidate  
Name

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Centre  
Number

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Candidate  
Number

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**TIME** 45 mins

**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers on the dotted lines unless the question says otherwise.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- There is a space after most questions. Use it to do your working. In many questions marks will be given for a correct method even if the answer is incorrect.
- Do not write in the bar code. Do not write in the grey area between the pages.
- **DO NOT WRITE IN THE AREA OUTSIDE THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.**

**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**.

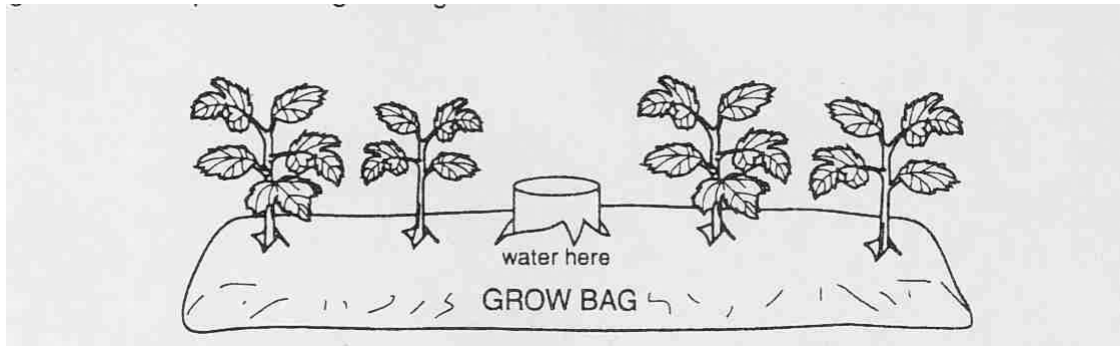
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**This specimen paper consists of 17 printed pages.**

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**Answer all questions.**

1. Ruby grows tomato plants in a grow bag.



- (a) Complete the following sentences about using a grow bag. Choose words from this list.

**hormones      light      minerals      photosynthesis      respiration      wind**

Do not add fertiliser because the soil in the grow bag contains .....

The grow bag should be placed in plenty of .....

Add water every day because plants need water for .....[3]

- (b) Which temperature is **best** for growing tomatoes?

Draw a **ring** around the correct temperature.

**-5°C**

**0°C**

**5°C**

**25°C**

**45°C**

[1]

(c) Two of Ruby's friends also grow tomatoes. They use the same variety as Ruby.

Frank grows his tomatoes in a greenhouse.

Joe grows his tomatoes on his window sill.

They have a competition to find out who grows the best crop.

crop	mass of tomatoes in kg					
	week 1	week 2	week 3	week 4	week 5	total
<b>Ruby</b>	0.1	0.9	3.0	2.5	1.0	7.5
<b>Frank</b>	0.5	1.1	1.4	1.5	1.0	
<b>Joe</b>	0.2	0.8	0.6	0.5	0.4	

(i) Complete the table of results by working out Frank's and Joe's total crop. [1]

(ii) Using only this data, who has the best crop? Write down a reason for your choice.

The best crop is produced by .....

.....[2]

[Total: 7]

2. The Patagonian toothfish is a rare fish.

It is found in the South Atlantic Sea near Antarctica.

The fish can be sold to restaurants for a high price.

(a) Which **two** factors can affect its rate of growth?

Tick (✓) **two** correct boxes.

amount of food

amount of rainfall

temperature

rate of reproduction

[2]

(b) Scientists have found this information about the Patagonian toothfish.

- It lives at a depth of 3500 m.
- It can live for 50 years.
- The catch from one fishing boat can sell for £2 million.
- Sperm whales eat many Patagonian toothfish.
- It is expensive to buy.
- Total catches in the world are limited to 10 500 tonnes per year

(i) Suggest **two** reasons why the total catch is limited to 10 500 tonnes per year.

1. ....  
.....

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

(ii) Scientists have suggested breeding the fish in Scottish sea lochs.

The fish could be kept in cages fixed to the sea floor and fed with food pellets.

Suggest **two** advantages of this method.

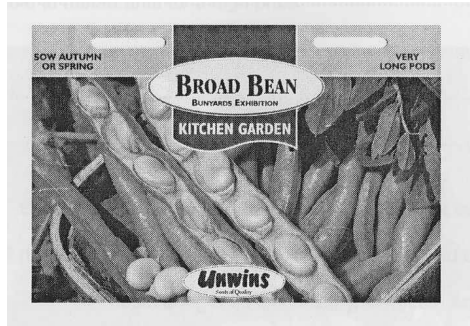
1. ....  
.....

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

[Total: 6]

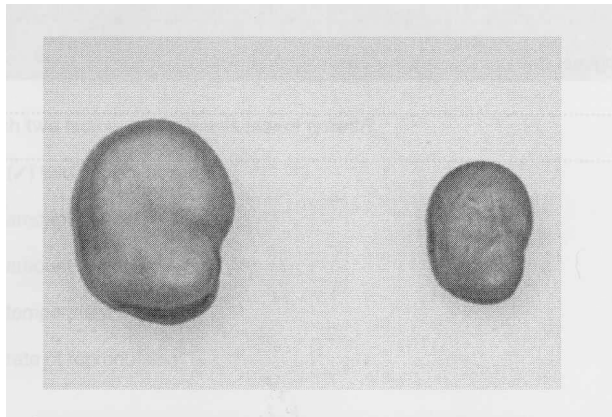
3. Charlotte is a gardener.

She buys a packet of broad bean seeds.



(a) Charlotte soaks a broad bean seed in water.

She compares it to a dry broad bean seed.



Write down **two** ways in which the soaked seed is different from the dry seed.

- 1. ....
- 2. .... [2]

(b) Finish the sentences on the growth of the seeds.

Choose from these words.

**carbon dioxide**  
**fertilisation**  
**germination**  
**oxygen**

The growth of seeds is called.....

To grow, the seeds need the gas .....[2]

(c) These sentences describe the growth of the broad bean plant.

They are in the wrong order.

Fill in the boxes to show the right order. The first one has been done for you.

- A radicle grows and splits outer coat
- B leaves produced and start photosynthesis
- C seeds absorb water
- D plumule grows up through soil

C			
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[2]

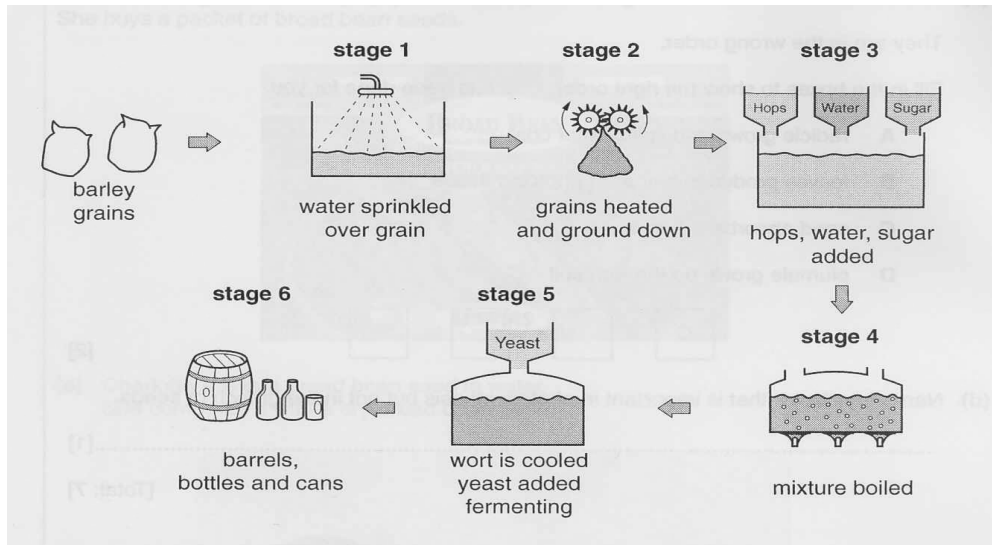
(d) Name **one** factor that is important in photosynthesis but **not** in the growth of seeds.

.....[1]

[Total: 7]



4. Look at the diagram showing stages in brewing beer.



- (a) In stage 1, water is added to the barley grains.

The water is needed by enzymes inside the barley grains.

Describe what the enzymes do to the starch inside the barley grains.

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

- (b) (i) Suggest why the mixture is boiled in **stage 4**.

.....[1]

(ii) Why is the yeast added after the wort is cooled?

.....[1]

(c) Fermentation is a result of anaerobic respiration of yeast.

Finish the word equation for anaerobic respiration.

Use words from the list.

- alcohol
- carbon dioxide
- oxygen
- starch

sugar    ⇒    \_\_\_\_\_ + \_\_\_\_\_

[2]

(d) A brewer needs to know when the fermentation has stopped.

Describe one simple qualitative way and one accurate (quantitative) way of finding out.

simple way.....

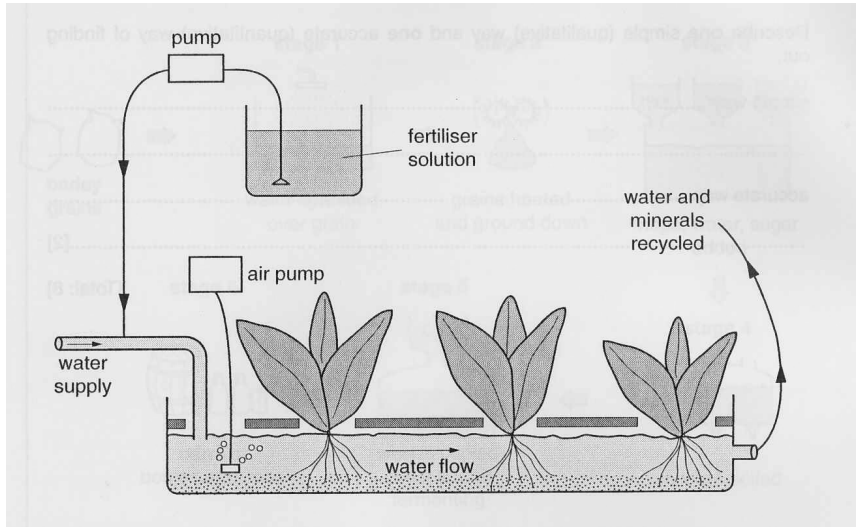
.....

accurate way .....

.....[2]

[Total: 8]

5. Charlie uses a hydroponic technique to grow lettuce.



(a) Lettuce can be grown either by using a hydroponic technique or in soil.

Write down **one** advantage and **one** disadvantage of using a **hydroponic** technique.

advantage.....

.....

disadvantage .....

.....[2]

(b) Explain how the air pump helps the lettuce to grow.

.....

.....

.....

.....[2]

(c) The lettuce plants carry out photosynthesis.

The faster the rate of photosynthesis, the faster the lettuce will grow.

Name **two** environmental factors that will increase the rate of photosynthesis.

- 1. ....
- 2. ....[2]

(d) Scientists are interested in using hydroponics in space craft.

Suggest why.

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

[Total: 8]

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**GCSE**

**ADDITIONAL APPLIED SCIENCE A**

AP2 Agriculture and Food

**Specimen Mark Scheme**

Maximum mark for this paper is [36]

**F** **A334/01**

45 mins

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**This specimen mark scheme consists of 4 printed pages.**

Question Number	Answers	Max Mark
<p>1(a)</p> <p>1(b)</p> <p>1(c)i</p> <p>1(c)ii</p>	<p>Minerals;</p> <p>Light;</p> <p>Photosynthesis;</p> <p>25 °C</p> <p>Frank's total crop = 5.5 kg</p> <p>Joe's total crop = 2.5 kg</p> <p><b>Both correct for one mark</b></p> <p>Ruby;</p> <p>Best growing conditions;</p> <p>Biggest yield</p> <p style="text-align: right;"><b>Total marks</b></p>	<p>[3]</p> <p>[1]</p> <p>[1]</p> <p>[2]</p> <p>[7]</p>
<p>2(a)</p> <p>2(b)i</p> <p>2(b)ii</p>	<p>amount of food;</p> <p>temperature</p> <p>Stops catching too many/overfishing;</p> <p>Conserves stocks;</p> <p>Rare;</p> <p>Biodiversity argument;</p> <p>Whales will have lack of food and die</p> <p><b>any two</b></p> <p>Good idea:</p> <p>Produce lot of fish quickly;</p> <p>Cost argument explained;</p> <p>Easier than going to Antarctica</p> <p>Might not work:</p> <p>Fish used to deep water;</p> <p>Fish used to cold water;</p> <p>May not eat pellet food;</p> <p>May not breed</p> <p><b>any one, accept diseases, pests</b></p> <p style="text-align: right;"><b>Total marks</b></p>	<p>[2]</p> <p>[2]</p> <p>[2]</p>

Question Number	Answers	Max Mark
3(a)	Bigger/fatter/broader; Smoother/filled out; <b>any two</b>	[2]
3(b)	Germination; Oxygen	[2]
3(c)	(C)ADB A before D = 1; D before B = 1	[2]
3(d)	Light/carbon dioxide	[1]
<b>Total marks</b>		<b>[7]</b>
4(a)	Break it down; Digest it; To simple sugars; Make soluble <b>any two</b>	[2]
4(b)i	sterilise	[1]
4(b)ii	boiling would kill the yeast	[1]
4(c)	Alcohol; Carbon dioxide	[2]
4(d)	Simple: Seeing when bubbling stops; Accurate:	
<b>Total marks</b>		<b>[8]</b>
<b>Total marks</b>		<b>[8]</b>



Question Number	Answers	Max Mark
5(a)	Advantage: Does not depend on soil/more productive/uniform results/easier to control pests/diseases/fertilisers; Disadvantage: Plants need support/setting up costs/running costs e.g. pumps	[2]
5(b)	Provide oxygen; For respiration (of roots); Releases energy; To make new cells <b>any two</b>	[2]
5(c)	Light; Carbon dioxide; temperature; water/humidity <b>any two</b>	[2]
5(d)	Can be automated; Doesn't need soil; Recycles water/excess minerals; Supplies oxygen to the crew; Uses up carbon dioxide from the crew <b>any two</b>	[2]
	<p style="text-align: right;"><b>Total marks</b></p> <p style="text-align: right;"><b>Overall marks</b></p>	<p style="text-align: center;">[8]</p> <p style="text-align: center;">[36]</p>