

Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

For Examiner's Use	
Examiner's Initials	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	



General Certificate of Secondary Education
Higher Tier
June 2012

Additional Applied Science **AASC/2H**

Unit 2 Science at Work

Written Paper

Wednesday 30 May 2012 1.30 pm to 2.30 pm

H

For this paper you must have:

- a ruler
- a calculator.

Time allowed

- 1 hour

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

Advice

- In all calculations, show clearly how you work out your answer.



J U N 1 2 A A S C 2 H 0 1

Answer **all** questions in the spaces provided.

1 Health campaigners warn about the danger of eating too much food from the fast food industry.

These foods usually have a high fat content.

1 (a) (i) Give **two** dangers of eating too much fat.

1

2

(2 marks)

1 (a) (ii) Name the **two** other nutrients that cause most damage to our health if eaten in large amounts.

1

2

(2 marks)

1 (b) Suggest how the fast food industry may encourage people to eat unhealthy food.

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(1 mark)

1 (c) Our bodies need energy to work.

Give **three** reasons why two sixteen year olds of the same weight might need different amounts of energy.

1

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2

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(3 marks)



- 1 (d)** Drinks can provide energy. A new brand of bottled water also provides vitamins.

The table shows part of the nutritional information on the label of the new brand of bottled water.

The bottle contains 500 ml of water.

Other nutrients	Typical values in mg per 100 ml	% Recommended daily amount per 100 ml
Vitamin C	18.0	150
Niacin B3	1.8	50
Vitamin B6	0.2	50
Vitamin B5	0.6	50

Use the information in the table to answer the following questions.

- 1 (d) (i)** An advertisement for the bottled water claims that it helps prevent illness.

What evidence is there to support this claim?

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(1 mark)

- 1 (d) (ii)** How many milligrams of Niacin B3 are needed to give us 100% of our daily recommended amount?

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..... mg

(1 mark)

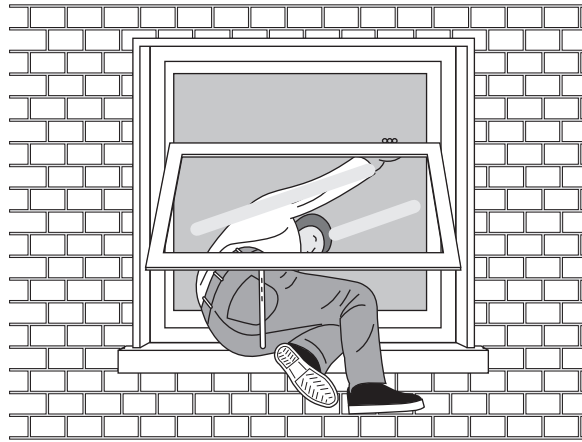
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Turn over for the next question

Turn over ►



2 A burglar entered a house through an open window.
A shoeprint was found in the soil below the window.



2 (a) Describe how a Scenes of Crime Officer (SOCO) would make a plaster cast of the shoeprint.

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(3 marks)

2 (b) Damage and wear marks on a shoeprint are very useful in helping to prove that the shoe was worn at a crime scene.

Give **one** reason why.

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(1 mark)



2 (c) Samples of soil were taken from the crime scene.

A forensic scientist tested the soil to find out the moisture content and pH of the sample.

He left one sample in a drying oven at 100°C for 24 hours.

The table shows his results.

Mass of soil and container before drying	11.36g
Mass of soil and container after drying	10.83g
Mass of container	7.15g
pH of sample	

2 (c) (i) The soil sample was slightly acidic. Suggest a pH for this soil sample and write your answer in the table.

(1 mark)

2 (c) (ii) Calculate the percentage of water in the soil.

$$\text{Percentage of water in the soil} = \frac{\text{mass of water in the soil (g)}}{\text{mass of soil (g)}} \times 100$$

Show your working.

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..... %
(3 marks)

8

Turn over ►



3 Sailing is one of the events to be held in the London Olympics.

A materials scientist tested some natural and synthetic materials to see how suitable they would be to make a waterproof jacket. He stretched a sample of material over a beaker and poured on 50cm^3 of water. He measured the volume of water collected in the beaker after 10 minutes.



The table shows his results.

Table 1

Material	Amount of water let through the material (in cm^3)			
	Test 1	Test 2	Test 3	Average
Cotton	33	35	40	
Nylon	0	0	0	0
Polyester	45	47	40	44
Polyester fleece	12	10	8	10

3 (a) (i) Calculate the average amount of water let through the cotton material.

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..... cm^3
(1 mark)



3 (a) (ii) Choose **one synthetic** material and **one natural** material from **Table 1** and, using information in **Table 1**, decide whether each material is suitable for making a waterproof jacket.
Use your answers to complete **Table 2** and give a reason for each of your choices.

Table 2

	Material	Suitability (✓ or ×)	Reason
Natural		
Synthetic		

(4 marks)

3 (b) Marathon running is another event in the London Olympics.
Running generates heat in the body.

Describe how the marathon runner's body temperature will be kept constant whilst running the race.

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(4 marks)

Question 3 continues on the next page

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3 (c) The marathon runner should drink a sports drink throughout the race.

Explain why.

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(3 marks)

12



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ANSWER IN THE SPACES PROVIDED**

Turn over ►



4 A forensic scientist is sent some chemical substances from a crime scene to identify. One of the tests he uses for identifying the metal ions in the chemicals is called a flame test.

4 (a) Complete the table to show which metal ions produce the colours given in a flame test.

Metal ion	Flame colour
	Yellow
Potassium	Lilac
	Blue / green

(2 marks)

4 (b) Another substance found at the crime scene was thought to be ethanol, an alcohol. Give the chemical test for ethanol and describe the result.

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(2 marks)

4 (c) The samples sent for analysis were also tested for negatively charged ions.

Complete the table to show the test reagents used and the result that you would see if the negative ion was present in the sample.

Negative ion	Test reagent	Result
Carbonate	Dilute hydrochloric acid	
Chloride		White precipitate forms
Sulfate	Barium chloride solution	

(3 marks)



4 (d) Sodium chloride is a typical ionic compound.
Describe the structure of an ionic compound.

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(3 marks)

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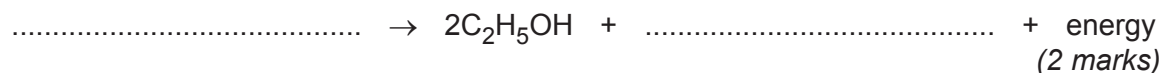


- 5 (a)** Microorganisms are used in the food industry. Wine is made when yeast ferments the sugars in fruit to produce alcohol.

A word equation for this reaction is:



- 5 (a) (i)** Complete and balance the chemical equation to show this reaction.



- 5 (a) (ii)** What type of microorganism is yeast?

.....
(1 mark)

- 5 (a) (iii)** What type of respiration is fermentation?

.....
(1 mark)

- 5 (b)** It is important **not** to allow bacteria to grow in the wine that has been produced.

What type of additive could be added to the wine to prevent the growth of bacteria?

.....
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(1 mark)



5 (c) A bottle of wine tasted like vinegar. This was because bacteria had changed the alcohol to acetic acid (vinegar).

Describe how to grow bacteria using agar plates so that you could find out what type of bacteria was in the wine.

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(5 marks)

5 (d) Some microorganisms are harmful.

Foods such as meat can be frozen to prevent the growth of bacteria.

Give **two** other ways that meat could be preserved.

1

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(2 marks)

12

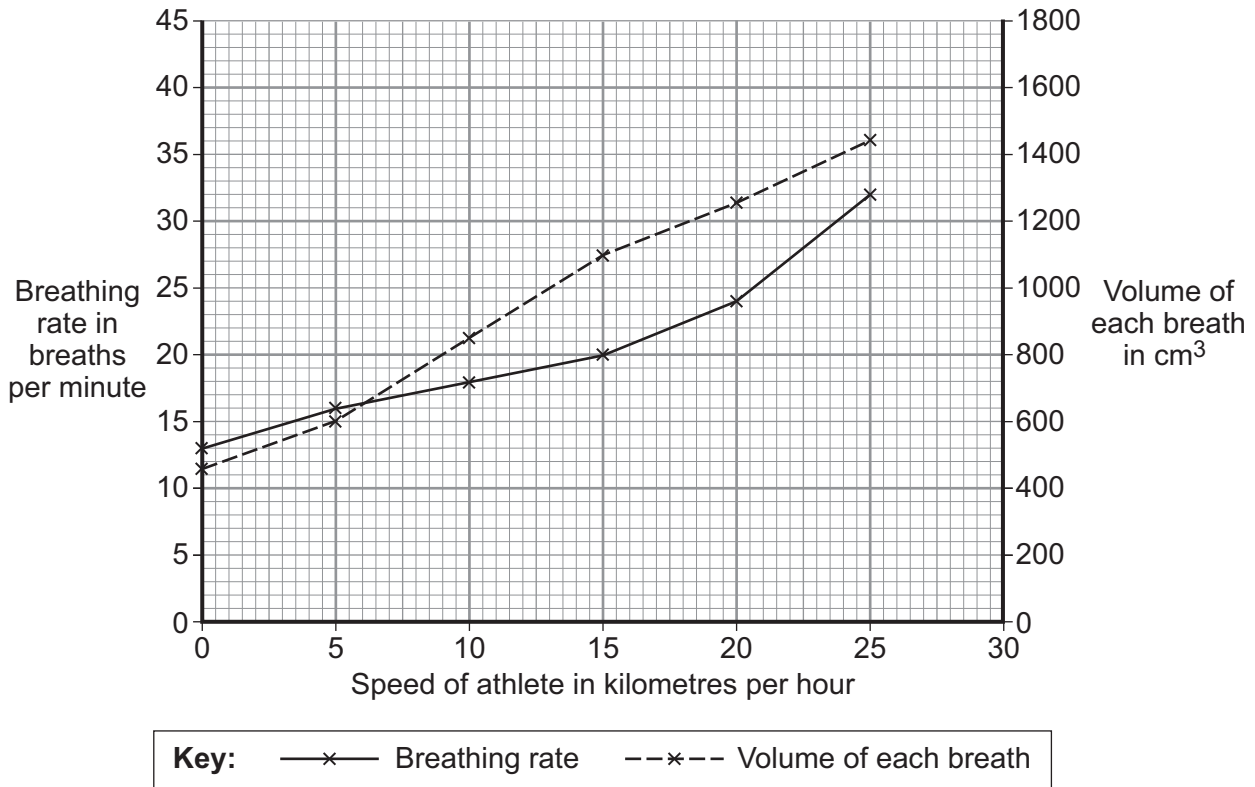
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6 An athlete's breathing rate and the volume of each breath were recorded as the athlete increased his speed during a run.

The graph shows the results.



6 (a) How many breaths per minute were taken when the person was at rest?
 breaths per minute
 (1 mark)

6 (b) What was the volume of each breath when the person was running at 25 kilometres per hour?
 cm³
 (1 mark)



6 (c) Describe and explain why the changes shown on the graph occur during the run.

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(6 marks)

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END OF QUESTIONS



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