

Surname		Other Names	
Centre Number		Candidate Number	
Candidate Signature			

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General Certificate of Secondary Education  
January 2008

**ADDITIONAL APPLIED SCIENCE**  
**Unit 2 Science at Work**  
**Foundation Tier**

**AASC/2F**  
**F**



Friday 18 January 2008 1.30 pm to 2.30 pm

<p><b>For this paper you must have:</b></p> <ul style="list-style-type: none"> <li>a ruler.</li> </ul> <p>You may use a calculator.</p>
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Time allowed: 1 hour

**Instructions**

- Use blue or black ink or ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- Answer the questions in the spaces provided.
- Do all rough work in this book. Cross through any work you do not want to be marked.

**Information**

- The maximum mark for this paper is 60.
- The marks for questions are shown in brackets.
- 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.

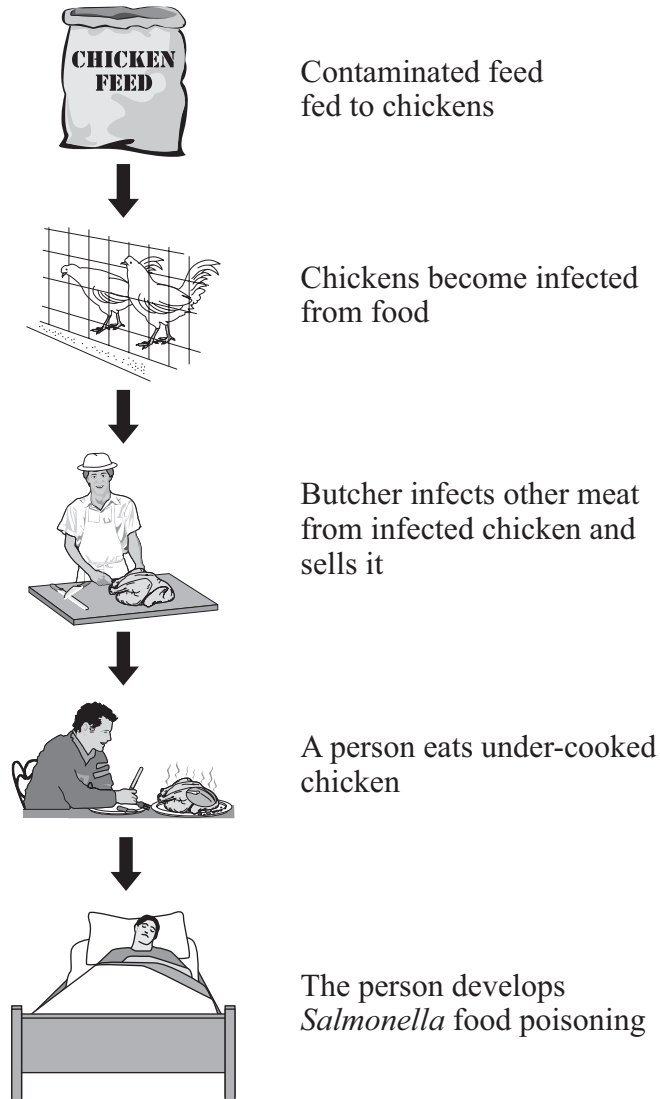
For Examiner's Use			
Question	Mark	Question	Mark
1		6	
2		7	
3			
4			
5			
Total (Column 1)		→	
Total (Column 2)		→	
TOTAL			
Examiner's Initials			



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

1 A public health inspector is responsible for keeping our food safe to eat.

The diagram shows how a person may develop food poisoning.



(a) What is the name of the organism in this example that causes food poisoning?

.....  
(1 mark)



(b) What **two** pieces of advice would the public health inspector give to the butcher to make sure that he did not pass on the infection to other meats?

1 .....

.....

2 .....

.....

*(2 marks)*

(c) Give **two** symptoms of food poisoning.

1 .....

2 .....

*(2 marks)*

5

**Turn over for the next question**

**Turn over ►**



2 Chemicals are added to some foods. These chemicals are called additives.

Food scientists are concerned about some additives in children's food.

(a) Match the example of the food additive to its function by drawing a line between them.

**Food additive**

**Function**

Vitamin C

Colouring

Tartrazine

Sweetener

Aspartame

Antioxidant

Flavouring

(3 marks)

(b) (i) Why is colouring added to children's food?

.....  
.....

(1 mark)



(ii) Why are food scientists worried about the use of colourings in children's food?

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

Poisonous to children	<input type="checkbox"/>
Cause hyperactivity	<input type="checkbox"/>
Slow down growth	<input type="checkbox"/>

(1 mark)

5
---

**Turn over for the next question**

**Turn over ►**



- 3 A sports physiologist needs a good understanding of the body to help a cyclist to improve his fitness.

Photograph of a cyclist undergoing fitness endurance testing is not reproduced here due to third-party copyright restrictions

The table shows some of the measurements taken before and during exercise.

Measurement	Before exercise	During exercise
Breathing rate in breaths per minute	14	21
Heart rate in beats per minute	60	98
Units of carbon dioxide in the blood	4.7	6.0
Units of oxygen used up per minute	360	3600

- (a) (i) By how much did the cyclist's breathing rate increase during exercise?

..... breaths per minute  
(1 mark)

- (ii) What was the percentage increase in the cyclist's breathing rate?

Use the formula to work out your answer.

$$\text{Percentage} = \frac{\text{Increase in breathing rate}}{\text{Breathing rate at rest}} \times 100$$

.....  
= ..... %  
(2 marks)



- (iii) Use the information in the table to describe **two** other changes that occur in the cyclist's body during exercise.

1 .....

.....

2 .....

.....

*(2 marks)*

- (iv) Why does the cyclist's heart rate change during exercise?

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

To transport more oxygen to the lungs	<input type="checkbox"/>
To transport more oxygen to the cells	<input type="checkbox"/>
To transport food to the stomach	<input type="checkbox"/>

*(1 mark)*

- (v) Name the system in the body that transports oxygen to the place where it is needed.

.....

*(1 mark)*

**Question 3 continues on the next page**

**Turn over ►**



(b) The sports physiologist explains the changes that are taking place in the cyclist's body during exercise.

(i) Draw a ring around the correct word or phrase in each box to complete the sentences.

During exercise, the heat produced in the cyclist's muscles

increases
decreases
stays the same

This causes the amount of blood that flows to the surface of his

skin to

increase
decrease
stay the same

This will help to cool the cyclist down.

(2 marks)

(ii) Give **one** other way the body can cool itself down.

.....  
(1 mark)

(iii) The cyclist noticed that he needed to pass less urine than usual after his cycle races.

Explain why.

.....  
.....  
.....  
.....

(2 marks)





4 The photograph was taken at the scene of a crime.



(a) Look at the photograph. The Scenes of Crime Officers have taken a number of precautions to prevent the contamination of evidence.

Give **two** precautions that you can see.

1 .....

2 .....

*(2 marks)*

(b) Some broken glass was found at the crime scene.

Describe how to collect the glass to examine it in the laboratory.

.....

.....

.....

.....

.....

.....

.....

*(3 marks)*

**Turn over ►**



(c) Some white powder was found at the scene of the crime.

A sample of the powder was collected and sent to the forensic laboratory for analysis.

(i) Complete the table using the correct words from the box.

<b>Alkali</b>	<b>Calcium ions</b>	<b>Carbonate ions</b>	<b>Sodium ions</b>
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<b>Test</b>	<b>Result</b>	<b>Substance</b>
Add acid	Carbon dioxide given off	
Flame test	Yellow flame	
Add universal indicator	Turns purple	

(3 marks)

(ii) Name the white powder.

.....  
(1 mark)

(iii) Give the formula for carbon dioxide.

.....  
(1 mark)



**Turn over for the next question**

**Turn over ►**



5 (a) The people in the diagram came to a hospital and were seen by a dietician.

The dietician gave each person advice about how much energy (kcal) they needed in their diet each day.



Young child  
Energy requirement .....



Office worker  
Energy requirement .....



Builder  
Energy requirement .....

(i) Write under each person the energy requirement recommended by the dietician.

Choose the correct amount for each person from the list below.

2000 kcal
4000 kcal
1300 kcal

(1 mark)



- (ii) Which food would the dietician tell the builder to eat to provide more energy?

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

Carbohydrate	
Calcium	
Protein	
Vitamin C	

(1 mark)

- (iii) The dietician advised the builder to cut down on the amount of salt in his diet.

Suggest why.

.....  
.....

(1 mark)

- (iv) The office worker had just broken her leg. The dietician advised her not to eat too much fat and sugar.

Explain why the dietician gave this advice.

.....  
.....  
.....  
.....

(2 marks)

**Question 5 continues on the next page**

**Turn over ►**



- (b) Young children need healthy meals and snacks to provide them with the energy and minerals they need.

Look at the examples of snacks eaten by different children in a day.

<b>Snack list A</b>	<b>Snack list B</b>	<b>Snack list C</b>
1 small glass of milk	1 packet of crisps	1 small portion of French Fries
1 small yoghurt with fruit	4 biscuits	1 small bag of toffee popcorn
Vegetable sticks	1 carton of squash	1 glass of Coke
Toast fingers with soft cheese		
<b>250 kcal</b>	<b>390 kcal</b>	<b>750 kcal</b>

- (i) Which snack list, **A**, **B** or **C**, would the dietician use to recommend daily snacks for a young child?

.....  
(1 mark)

- (ii) Give **two** reasons for your choice.

1 .....

2 .....

(2 marks)

- (iii) Name the important mineral in milk.

.....  
(1 mark)

- (iv) Why do young children need this mineral?

.....

.....  
(1 mark)

10
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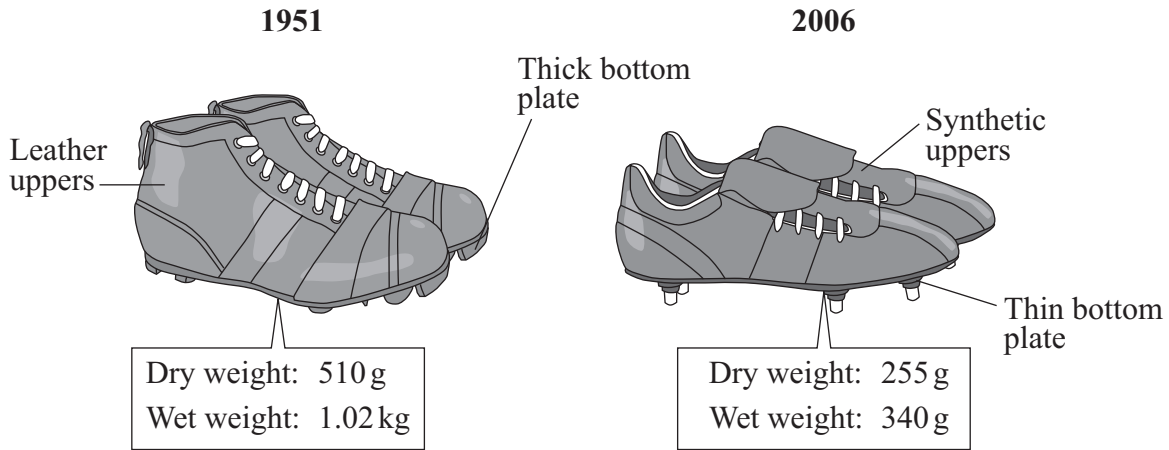
**Turn over for the next question**

**Turn over ►**



6 A materials scientist researches and develops new designs and materials to make sports shoes.

The diagrams show how football boots have changed over 55 years.



(a) Some differences between the boots are labelled.

Write down **two** other design differences that you can see.

- 1 .....
- 2 ..... (2 marks)

(b) Modern boots are now made using synthetic materials in the uppers instead of leather.

Give **three** advantages of using synthetic materials for the uppers.

- 1 .....
- .....
- 2 .....
- .....
- 3 .....
- ..... (3 marks)





(c) The number of footballers who break a bone (metatarsal) in their foot is increasing.  
Suggest a feature of the new boots that could be causing this increase.

Explain your choice.

Feature .....

Explanation .....

.....

(2 marks)

(d) The studs at the bottom of the boot can be made from a variety of materials.

Choose a material from the words in the box that could be used to make the studs.

<b>Ceramic</b>	<b>Composite</b>	<b>Metal</b>	<b>Polymer</b>	<b>Wood</b>
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Give **two** reasons for your choice.

Material .....

Reason 1 .....

.....

Reason 2 .....

.....

(2 marks)

<b>9</b>

**Turn over for the next question**

**Turn over ►**



7 A Scenes of Crime Officer found three fingerprints, **A**, **B** and **C**, at the scene of a crime.



Fingerprint **A**



Fingerprint **B**

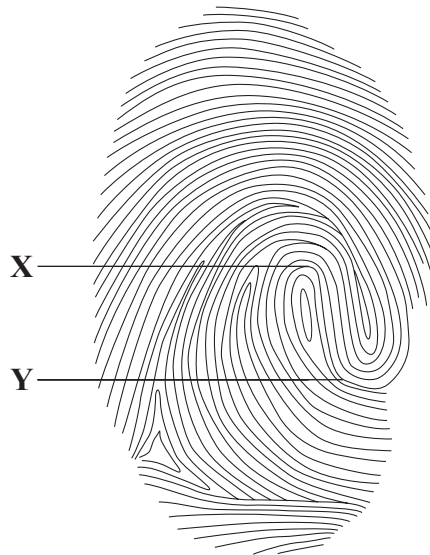


Fingerprint **C**

(a) What is this type of fingerprint pattern called?

.....  
(1 mark)

(b) A suspect was arrested and his fingerprints were taken. The diagram shows one of his fingerprints.



(i) Has the suspect been at the scene of the crime?

Explain your answer.

.....  
.....

(1 mark)



- (ii) Use a ruler to measure the length of the suspect's fingerprint from **X** to **Y** in millimetres.

Length = ..... mm  
(1 mark)

- (iii) The drawing is magnified  $\times 5$ .

Calculate the distance from **X** to **Y** in the real fingerprint.

.....

Distance from **X** to **Y** = .....  
(1 mark)

- (c) Describe a method used by a Scenes of Crime Officer to reveal, lift and store fingerprints left at the scene of the crime.

.....  
.....  
.....  
.....  
.....  
.....

(3 marks)

- (d) Explain why fingerprint evidence on its own cannot be used to prove that the suspect committed the crime.

.....  
.....  
.....  
.....

(2 marks)

9
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**END OF QUESTIONS**



**There are no questions printed on this page**

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