Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
June 2008

ADDITIONAL APPLIED SCIENCE **AASC/2F**
Unit 2 Science at Work
Foundation Tier

F

Thursday 5 June 2008 9.00 am to 10.00 am

For this paper you must have:
- 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. Answers written in margins or on blank pages will not be marked.
- 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		5	
2		6	
3			
4			
Total (Column 1) →			
Total (Column 2) →			
TOTAL			
Examiner's Initials			

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

1 The Food Standards Agency (FSA) encourages us to eat a diet containing a balance of nutrients.

Different nutrients help the body with different functions.

1 (a) A list of the functions of some of the nutrients is given in the box.

Provide energy	**Repair body tissues**	**Strengthen bones**
Insulate the body	**Protect against disease**	

In the table, write the correct function next to the nutrient.

Nutrient	Function
Proteins	
Carbohydrates	
Vitamins	
Fats	

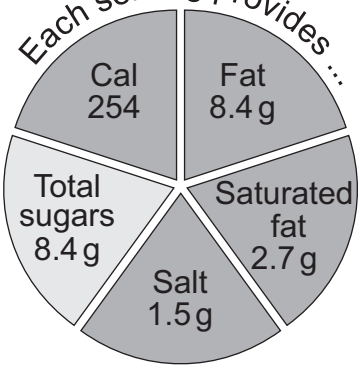
(4 marks)

1 (b) The FSA tries to help us to understand the amount of certain nutrients in the foods we eat.

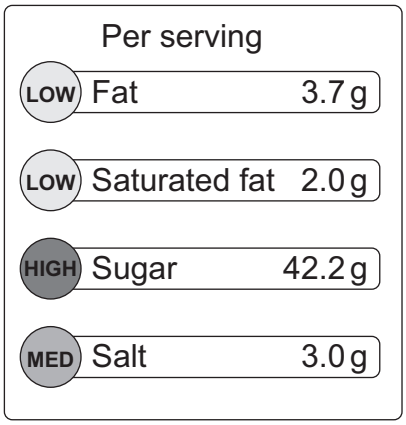
The FSA is encouraging the use of traffic light colours on food labels. The table below is a key to what the colours mean.

Traffic light colour	What the colour means
Red	High levels of the nutrient
Amber	Medium levels of the nutrient
Green	Low levels of the nutrient

Study the information on food labels **A**, **B** and **C**.



A



B

Suitable for home freezing				
Calories 160	**Low** fat 3.7 g	**Low** saturated fat 1.5 g	**Low** sugars 0.9 g	**Med** salt 0.7 g
per serving				

C

1 (b) (i) Using the key on page 2, state which label, **A**, **B** or **C**, has a red traffic light colour on it. Write your answer in the box.

(1 mark)

1 (b) (ii) Label **A** and label **C** are from ready-made chicken dinners.

Which dinner would a 'healthy eater' choose?

Explain your choice.

Label .....

Reason .....

.....

(2 marks)

Question 1 continues on the next page

1 (c) The FSA checks a sample of each of the chicken dinners to find out if they contain any glucose (a reducing sugar).

The following sentences are about the test for glucose. Complete each sentence by drawing a ring around the correct word or phrase.

1 (c) (i) The food sample is tested for glucose using

Benedict's solution

iodine solution

copper sulphate solution

.

(1 mark)

1 (c) (ii) After adding the test solution, the mixture should be

stirred

heated

mixed with potassium hydroxide

.

(1 mark)

1 (c) (iii) If glucose is present, the mixture turns

blue/black

red/orange

purple

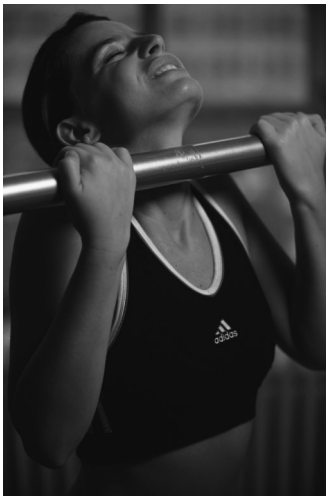
.

(1 mark)

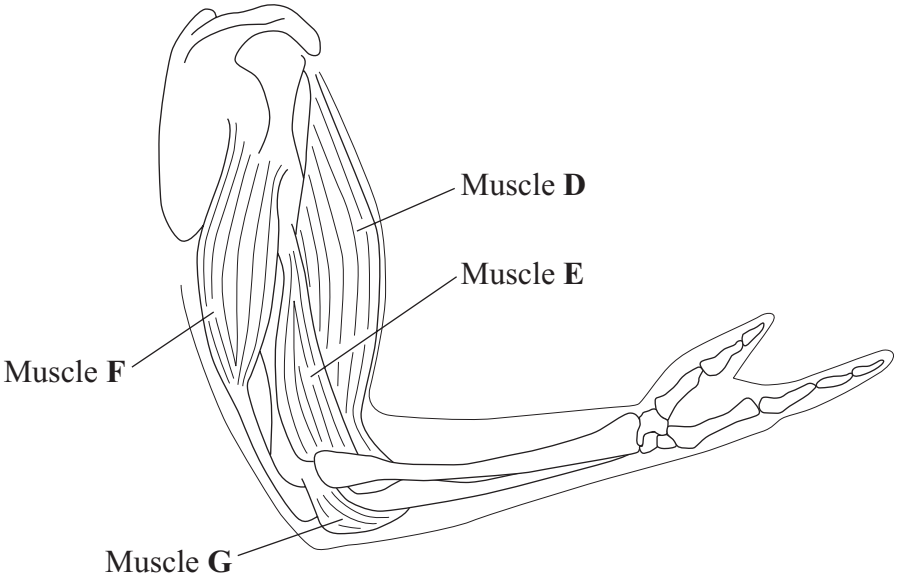
10

2 An athlete is training for a weight lifting competition. She needs to develop her arm muscles.

The athlete's sports physiologist gives her some exercises to do on a chinning bar.



2 (a) Look at the diagram of the muscles in the arm.



2 (a) (i) Which muscle, **D**, **E**, **F** or **G**, would contract to lift the athlete's body?
Write your answer in the box.

(1 mark)

2 (a) (ii) Which muscle, **D**, **E**, **F** or **G**, would contract to lower the athlete's body?
Write your answer in the box.

(1 mark)

2 (a) (iii) Name muscle **D**.

.....

(1 mark)

Turn over ▶

2 (a) (iv) What are *antagonistic* muscles?

.....

.....

(1 mark)

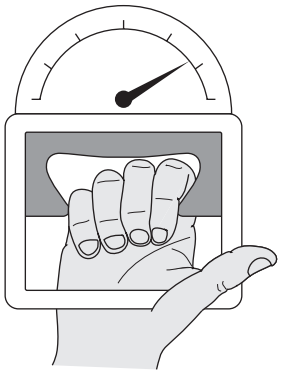
2 (b) After a short time on the chinning bar, the athlete noticed some changes in her body.

Put a tick (✓) in the boxes next to the **three** changes that would occur. Tick **three** boxes.

Heart rate increases	☐
Urination increases	☐
Skin becomes redder	☐
Skin temperature rises	☐
Breathing rate decreases	☐

(3 marks)

2 (c) (i) The equipment shown in the diagram is used to measure the strength of the athlete's muscles.



Describe how to use this equipment to measure the athlete's muscle strength.

.....

.....

.....

.....

.....

(3 marks)

2 (c) (ii) The table shows the ratings for this test.

Gender	**Rating**				
	Excellent	**Good**	**Average**	**Fair**	**Poor**
Male	>56	51–56	45–50	39–44	<39
Female	>36	31–36	25–30	19–24	<19

The athlete's measurement on this test is 27.

What is her rating?

.....

(1 mark)

11

Turn over for the next question

3 A forensic scientist compared samples of pollen and carpet fibres found at a crime scene with those found on a suspect.

3 (a)

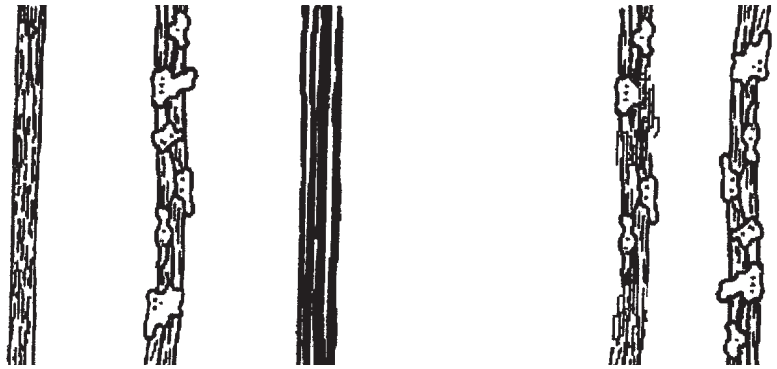
Question 3(a) is not reproduced here due to third-party copyright constraints.

The full copy of this paper can be obtained by ordering from AQA Publications.

3 (b) The forensic scientist found some fibres on the suspect's shoes.

He compared them with the carpet fibres found at the crime scene.

Fibres from shoe **Fibres from carpet**



X **Y** **Z**

3 (b) (i) Which of the fibres on the suspect's shoes, **X**, **Y** or **Z**, matches the fibres from the carpet? Write your answer in the box.

(1 mark)

3 (b) (ii) Does this prove that the suspect was at the crime scene?

Draw a ring around your answer. **Yes / No**

Explain your answer.

.....

.....

(1 mark)

3 (b) (iii) Which method would the forensic scientist use to examine the carpet fibres?

Draw a ring around the correct method.

Comparison microscope **Dusting** **Flame test** **Plaster cast**

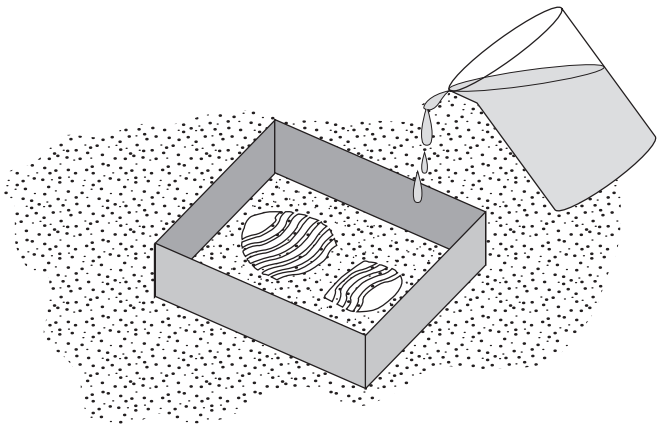
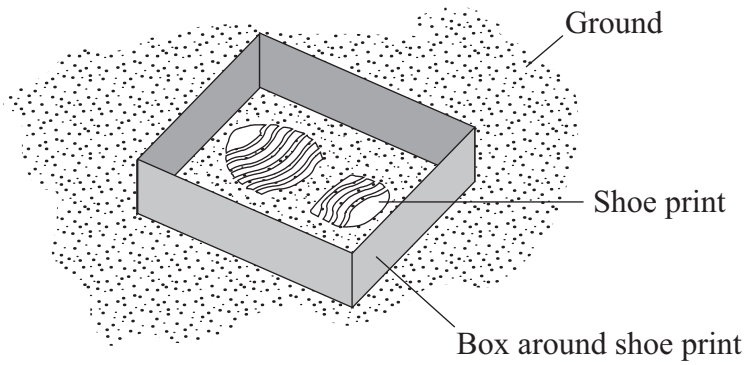
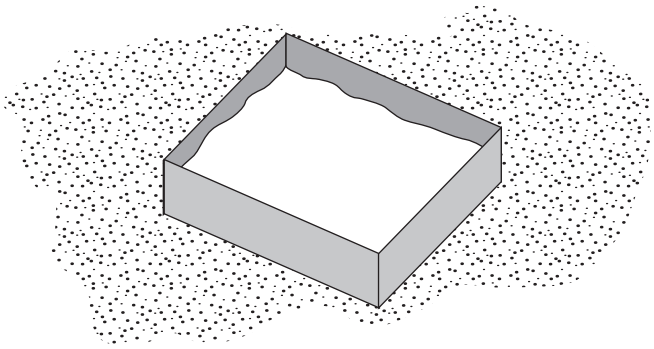
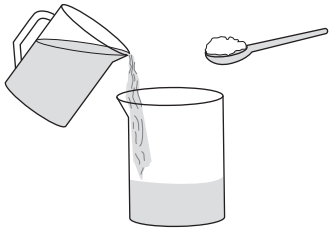
(1 mark)

Question 3 continues on the next page

3 (c) A shoe print was found in some mud at the crime scene.

The Scenes of Crime Officer made a cast of the shoe print.

The diagrams show the stages in making a cast of the shoe print. They are not in the correct order.

	Diagram number	**Description of stage**
		
		
		
		

In the table, label the diagrams **1**, **2**, **3** and **4** to put them in the correct order. Write a sentence next to each diagram to describe the stage.

(4 marks)

3 (d) Databases can be used to store information about the tread marks of a shoe.

What other information may be stored in a database used in forensic investigations?

.....

.....

(1 mark)

11

Turn over for the next question

4 Farmers may produce food either organically or intensively.

Farmer **P** and Farmer **Q** grow vegetables and keep pigs. The table shows the methods each farmer uses.

Farmer P	Farmer Q
Uses artificial fertilisers	Uses natural fertilisers
Kills weeds using a herbicide	Removes weeds by digging them up
Uses biological pest control	Sprays crop with pesticide
Keeps pigs outdoors eating natural food	Keeps pigs indoors and feeds them with concentrated food

4 (a) (i) What **two** organic methods does Farmer **P** use?

1 .....

2 .....

(2 marks)

4 (a) (ii) What **two** organic methods does Farmer **Q** use?

1 .....

2 .....

(2 marks)

4 (b) Farmer **Q** grows carrots.

Carrots need nutrients from the soil to grow.

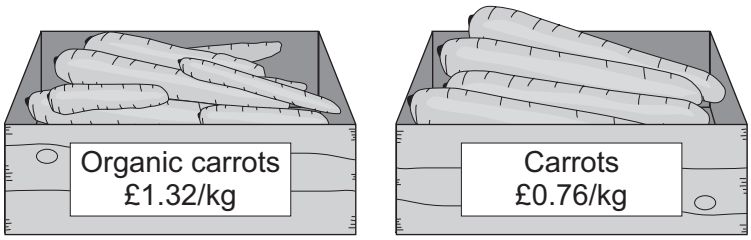
Put a tick (✓) in the boxes next to **four** nutrients that the carrots need. Tick **four** boxes.

- Nitrates ☐
- Vitamin A ☐
- Phosphates ☐
- Starch ☐
- Potassium ☐
- Glucose ☐
- Magnesium ☐

(4 marks)

4 (c) The diagram shows two types of carrot for sale.

Farmed organically **Farmed intensively**



4 (c) (i) How much more do organic carrots cost per kg?

.....

(1 mark)

4 (c) (ii) Why do some people buy organic carrots, even though they cost more?

.....

.....

(1 mark)

10

Turn over for the next question

5 Two athletes visited a sports nutritionist for advice about their fitness.

The nutritionist measured the height and weight of each athlete.

Table 1

Athlete	Height (in m)	Mass (in kg)	BMI
1	1.50	63.5	28.2
2	1.60	65.0	

To find out if the athletes were the correct weight for their height the sports nutritionist calculated their BMI.

5 (a) (i) What does BMI stand for?

.....

(1 mark)

5 (a) (ii) Use the formula:

$$\text{BMI} = \frac{\text{mass (kg)}}{\text{height}^2\ (\text{m}^2)}$$

to calculate the BMI for **Athlete 2**.

BMI .....

(2 marks)

5 (b) **Table 2** shows what the BMI values mean.

Table 2

BMI	What it means
< 18.5	Underweight
18.5 – 24.9	Ideal weight
25.0 – 29.9	Overweight
> 30.0	Obese

5 (b) (i) The sports nutritionist advised **Athlete 1** about his training programme and diet.

Use the information in **Table 1** and **Table 2**, and your own knowledge, to say what advice she should give to **Athlete 1**.

.....

.....

.....

.....

(2 marks)

5 (b) (ii) Suggest why the BMI is only an **indicator** of ideal weight.

.....

.....

(1 mark)

5 (c) The sports nutritionist told **Athlete 2** to record his dietary habits.

Describe how the athlete could do this and what he would need to record.

.....

.....

.....

.....

.....

.....

(3 marks)

9

6 Some blood is found at the scene of a crime.

6 (a) Describe how a Scenes of Crime Officer would collect and store a sample of the blood.

.....

.....

.....

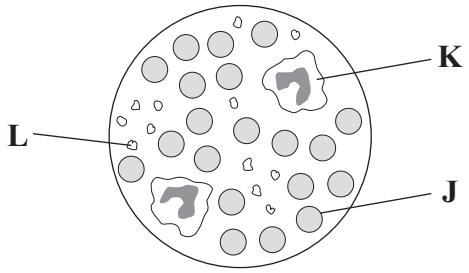
.....

.....

.....

(3 marks)

6 (b) A forensic scientist examined a sample of the blood under a microscope. The diagram shows what he saw.



6 (b) (i) Name **J**, **K** and **L**.

J .....

K .....

L .....

(3 marks)

6 (b) (ii) Which part of a blood cell is needed for DNA profiling?

.....

(1 mark)

6 (b) (iii) The forensic scientist also tested the blood to identify its blood group.

Name the **four** main blood groups.

.....

(2 marks)

9

END OF QUESTIONS

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