Surname		Other Names	
Centre Number			Candidate Number				
Candidate Signature									

For Examiner's Use

General Certificate of Secondary Education
January 2009

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

F

Thursday 15 January 2009 1.30 pm to 2.30 pm

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 is responsible for controlling the labelling of our food.

1 (a) Study the information on the food label.

Added ingredients:
strawberries (6%), bananas (4%), raw cane sugar, thickener (modified maize starch)

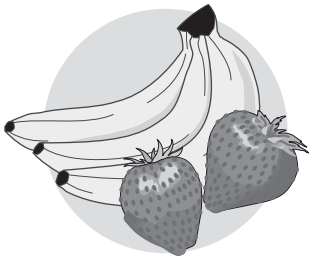
Nutritional information Typical values per 100 g	
Energy	245 kJ/58 kcal
Protein	4.6 g
Carbohydrate	7.2 g
of which sugars	6.5 g
Fat	1.2 g
of which saturates	0.2 g
Fibre	0.2 g
Sodium	0.1 g

KEEP REFRIGERATED
Once opened consume within 3 days

County Fare

Low-fat live yoghurt

Strawberry and Banana



Low-fat yoghurt made with a bioculture of *Lactobacillus acidophilus*

200 g

Suitable for vegetarians

Gluten free

Made in the UK

Sell by: 21st January 2009

1 (a) (i) The yoghurt contains bacteria.

What information on the label tells you that bacteria are present?

.....

.....

(1 mark)

1 (a) (ii) What percentage of the yoghurt is fruit? ..... %

(1 mark)

1 (a) (iii) Name an additive in this pot of yoghurt.

.....

(1 mark)

1 (a) (iv) Calculate how much energy is provided by this pot of yoghurt. Include the units in your answer.

.....

.....

Energy in pot of yoghurt = ...

(2 marks)

1 (a) (v) What nutrient in this yoghurt has been reduced to encourage a healthy diet?

.....

(1 mark)

1 (b) Read the following passage about making yoghurt.

> Yoghurt is made from boiled milk. Bacteria are added to the milk and the mixture is kept warm for several hours. The bacteria multiply and turn milk sugar (lactose) into lactic acid. The lactic acid curdles the milk into yoghurt.

1 (b) (i) Why is the milk boiled before starting to make yoghurt?

.....

.....

(1 mark)

1 (b) (ii) Why is the mixture kept warm?

.....

.....

(1 mark)

1 (b) (iii) What do bacteria use lactose for? Draw a ring around the correct answer.

energy **growth** **insulation**

(1 mark)

1 (b) (iv) What pH would you expect the yoghurt to be? Draw a ring around the correct answer.

pH 5 **pH 7** **pH 9**

(1 mark)

1 (b) (v) Describe how to find the pH of the yoghurt.

.....

.....

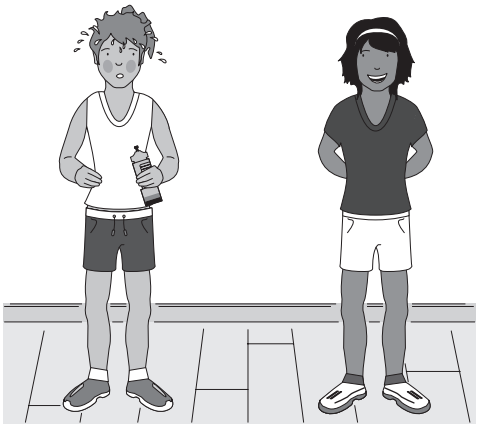
.....

.....

(2 marks)

12

2 A student wanted to improve her fitness. A sports physiologist recommended that the student joined an aerobics class.



Student A **Student B**

2 (a) Which student, **A** or **B**, has just finished an aerobics class?

Give **two** reasons for your answer.

Student .....

Reason 1 .....

Reason 2 .....

(2 marks)

2 (b) (i) What gas from the air does the student use to do aerobic exercises?

.....

(1 mark)

2 (b) (ii) Which organ in the student's body removes this gas from the air?

Draw a ring around the correct answer.

heart **kidney** **liver** **lungs**

(1 mark)

2 (b) (iii) Which organ in the student's body pumps this gas to the muscles?

Draw a ring around the correct answer.

heart **kidney** **liver** **lungs**

(1 mark)

2 (c) When the student respires she releases energy.

Where does the energy released by respiration come from?

Draw a ring around the correct answer.

cellulose **glucose** **fat** **protein**

(1 mark)

2 (d) The table shows the student's breathing rate when she is doing different activities.

Use the data in the table to answer the questions.

Activity	**Breathing rate (average number of breaths per minute)**
Walking	15
Sprinting	24
Watching TV	14
Aerobics	22

2 (d) (i) Which activity produces the highest breathing rate?

.....

(1 mark)

2 (d) (ii) The student watches TV and then does an aerobics class.

Calculate the increase in her breathing rate.

.....

.....

(1 mark)

2 (e) Describe how you would measure the student's breathing rate.

.....

.....

.....

.....

(2 marks)

10

3 (a) A Scene of Crime Officer (SOCO) uses different methods when collecting the evidence left at a crime scene. Some of these methods are listed below.

Draw a straight line from each method to its correct use.

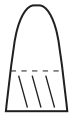
Method	**Use**
Make a plaster cast	To avoid contamination of evidence
Place in a sealed evidence bag	To record impressions
Use tweezers	To collect blood samples
Dust with a fine powder	To collect fibre samples
Swab with a sterile cotton bud	To reveal fingerprints

(4 marks)

3 (b) A forensic scientist examined a bullet that was found at the scene of a crime.

He compared the bullet with bullets fired from the guns of four suspects.

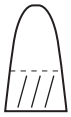
Bullet found at crime scene



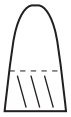
Bullets from suspects' guns

C

D



E



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3 (b) (i) Which bullet, **C**, **D**, **E** or **F**, matches the bullet found at the scene of the crime?

Write your answer in the box.

.....

(1 mark)

3 (b) (ii) Does matching the bullet prove that one of the suspects was at the scene of the crime?

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

Explain your answer.

.....

.....

(1 mark)

3 (c) A SOCO collected a blood sample at the crime scene. The blood was sent for DNA profiling.

3 (c) (i) Use words from the box to complete the sentences below.

nuclei	**plasma**	**red**	**water**	**white**

DNA can be found in the ..... of

..... blood cells.

These cells are found in the liquid part of the blood, which is

called .....

(3 marks)

3 (c) (ii) The DNA was matched to the DNA of one of the suspects.

Could the DNA also match the DNA of the victim?

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

Explain your answer.

.....

.....

(1 mark)

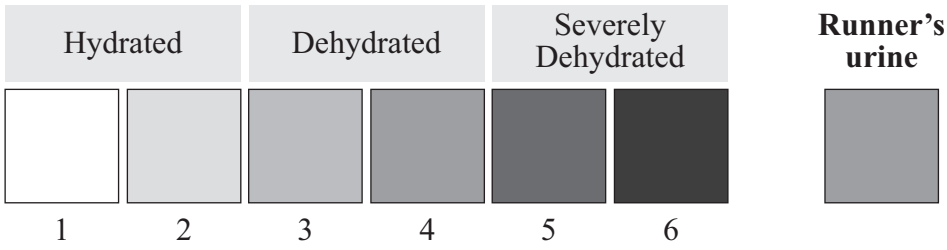
10

4 A marathon runner needs to maintain the correct amount of water in her body.

A sports physiologist tested the marathon runner's urine after the runner finished a race.

The result of the runner's urine test was compared with the urine chart.

Urine chart



4 (a) (i) Use the chart to comment on the hydration level of the runner.

.....

.....

(1 mark)

4 (a) (ii) **Apart from** through urine, what **other** way does the body lose water?

.....

.....

(1 mark)

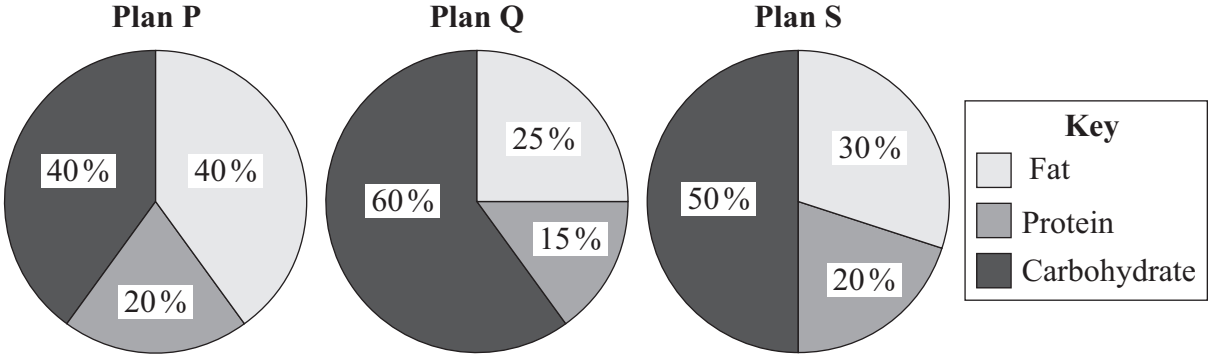
4 (a) (iii) The sports physiologist advised the runner to drink an isotonic sports drink.

Draw a ring around the **three** main ingredients of an isotonic sports drink.

caffeine **electrolytes** **flavouring** **glucose** **water**

(2 marks)

4 (b) The runner asked a sports nutritionist for advice about her diet. The pie charts show three nutrition plans.



4 (b) (i) Which plan, **P**, **Q** or **S**, would the sports nutritionist advise for the runner?

Write your answer in the box. .....

(1 mark)

4 (b) (ii) Give a reason for your answer.

.....

.....

(1 mark)

4 (c) The runner needed a new running shirt. The shirt could be made from natural or synthetic materials.

4 (c) (i) Give **one** example of each material.

Natural material .....

Synthetic material .....

(2 marks)

4 (c) (ii) Give **two** advantages of using synthetic materials.

1 .....

.....

2 .....

.....

(2 marks)

10

5 The Food Standards Agency recommends that adults should eat no more than 6 g of salt a day.

Three people recorded what they ate one evening.

Person 1:	3 packets of crisps, 2 portions of chips, $\frac{1}{2}$ pizza.
Person 2:	2 packets of crisps, lasagne, 1 portion of chips.
Person 3:	1 packet of crisps, 1 pizza, 2 portions of chips.

The table shows the amount of salt per portion in the food that each person ate.

Food (one portion)	**Amount of salt (g)**
One packet of crisps	0.6
Chips	1.4
$\frac{1}{2}$ Pizza	2.5
Lasagne	1.8

5 (a) (i) Calculate the amount of salt eaten by each person and put your answers in the table below.

One has been done for you.

.....

.....

.....

.....

Person	**Amount of salt eaten (g)**
1	.....
2	4.4
3	.....

(2 marks)

5 (a) (ii) Which person is eating too much salt?

.....

(1 mark)

5 (a) (iii) Many adults eat 12 g or more of salt per day.

Suggest **two** ways in which people could reduce the amount of salt in their diet.

1 .....

.....

2 .....

.....

(2 marks)

5 (a) (iv) Name **one** of the health risks caused by eating too much salt.

.....

(1 mark)

5 (b) (i) Salt is an ionic compound. Describe the structure of an ionic compound.

.....

.....

.....

.....

(2 marks)

5 (b) (ii) What is the melting point of salt (sodium chloride)?

Draw a ring around the correct answer.

–40 °C **0 °C** **40 °C** **801 °C**

(1 mark)

9

6 A forensic scientist tested some substances that were collected from the scene of a crime.

6 (a) (i) The forensic scientist used a precipitation reaction.

What is a precipitation reaction?

.....

.....

(1 mark)

6 (a) (ii) The forensic scientist mixed a solution of one of the substances with sodium hydroxide. A pale blue precipitate formed.

What metal was present in the solution?

.....

(1 mark)

6 (b) (i) The forensic scientist carried out tests on another of the substances.

Complete the table.

Test	**Result**	**Substance**
Add dilute nitric acid	....	Carbonate
Flame test	Brick red flame	.....

(2 marks)

6 (b) (ii) Name the substance that was being tested in (b)(i).

.....

(1 mark)

6 (b) (iii) The forensic scientist did a flame test.

Describe how the scientist would do a flame test.

.....

.....

.....

.....

.....

.....

(3 marks)

6 (b) (iv) Give **one** precaution the forensic scientist should take to make sure that the results of the chemical tests are reliable.

.....

.....

(1 mark)

9

END OF QUESTIONS

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