

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  
Foundation Tier  
January 2011

# Additional Applied Science **AASC/2F**

## Unit 2 Science at Work

### Written Paper

# F

Thursday 13 January 2011 9.00 am to 10.00 am

**For this paper you must have:**

- a ruler.

You may use 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.



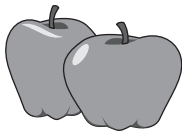
J A N 1 1 A A S C 2 F 0 1

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

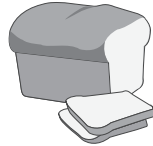
**1** A hospital dietician advised a patient to eat food containing lots of protein.

Protein is an important nutrient in our diet.

**1 (a) (i)** Tick (✓) **two** boxes which show foods that contain a lot of protein.



**Apples**



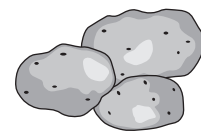
**Bread**



**Cheese**



**Milk**



**Potatoes**

(2 marks)

**1 (a) (ii)** What is the function of protein in the diet?

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

To provide insulation

To repair body tissues

To allow the blood to clot

(1 mark)



**1 (b)** Other nutrients are also important in the diet.

Match the nutrient to the test that will show if it is found in a food.

Draw **one** line from each nutrient to the correct food test.

**Nutrient**

**Food test**

Protein

When mixed with iodine, turns a blue/black colour

When heated with Benedict's solution, turns orange

Glucose

When mixed with sodium hydroxide and copper sulfate (Biuret test), turns purple

Starch

When rubbed on filter paper, turns the filter paper translucent

(3 marks)

**Question 1 continues on the next page**

**Turn over ►**



1 (c) Eggs are a good source of protein.

The picture shows one method that a farm can use to produce eggs on a large scale.

The chickens on the farm are kept in cages so they cannot move around very much.



1 (c) (i) What is the name given to this type of farming?

.....  
(1 mark)

1 (c) (ii) The farmer can produce more eggs by controlling the environment in which the chickens live.

Apart from preventing the chickens from moving around, give **two** other environmental factors that the farmer is able to control.

Factor 1 .....

Factor 2 .....  
(2 marks)



1 (c) (iii) Put a tick (✓) in the box that shows why the farmer does **not** want the chickens to move about.

More of their energy is put into producing eggs

They do not get tired so easily

They do not peck each other so much

(1 mark)

1 (c) (iv) Apart from being able to control the environment, give **two** other advantages of producing eggs by this method.

Advantage 1 .....

Advantage 2 .....

(2 marks)

12

Turn over for the next question

Turn over ►



**2** A materials scientist researches materials to use for sports equipment.

**2 (a)** The table shows some properties of materials that may be used in sports equipment.

For each material, complete the table by putting a tick (✓) in the column that shows which property matches the material for that use.

Put only **one** tick in each row.

Material (use)	Property		
	Flexible	Low density	High melting point
Aluminium (bicycle frame)			
Ceramic (brake discs in racing cars)			
Polymer (nylon tennis racquet strings)			

(3 marks)

**2 (b) (i)** What is the name given to a material that is made up of more than one type of material?

Draw a ring around the correct answer.

**composite**

**marble**

**polyester**

**silica**

(1 mark)

**2 (b) (ii)** Fibreglass is made from two materials bonded together.

Fibreglass is made from a ceramic and a polymer. It can be used to make small boats.

Suggest **two** properties of fibreglass.

Property 1 .....

Property 2 .....

(2 marks)



**2 (c)** A sports shirt can be made from natural or synthetic materials.

From the words in the box, choose **one** natural and **one** synthetic material that would be suitable for making a sports shirt.

ceramic

cotton

leather

nylon

silk

**2 (c) (i)** Natural material for making a sports shirt:

.....  
(1 mark)

**2 (c) (ii)** Synthetic material for making a sports shirt:

.....  
(1 mark)

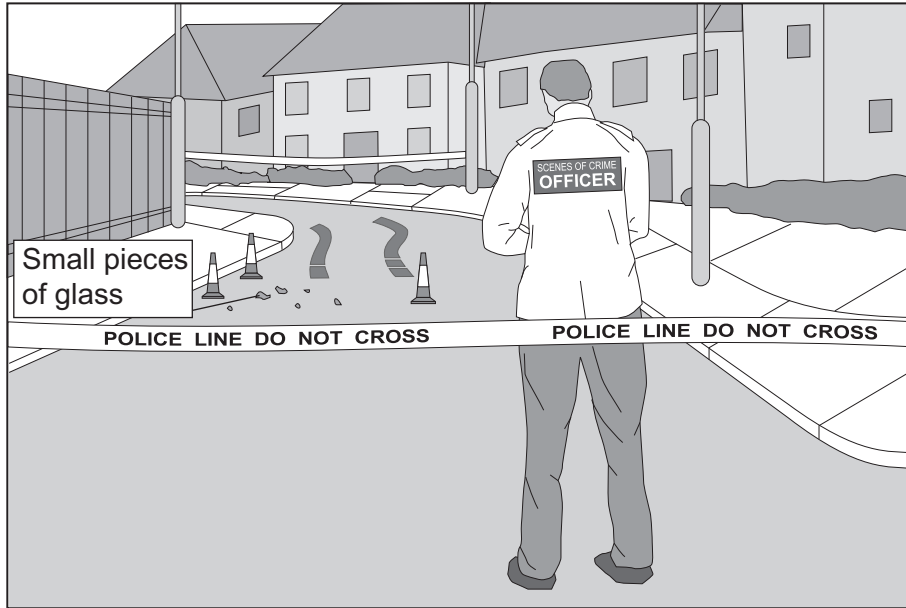
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**Turn over for the next question**

**Turn over ►**



3 A Scenes of Crime Officer (SOCO) arrives at the scene of a hit-and-run incident.



3 (a) Give **two** reasons why it is important to cordon off the crime scene.

Reason 1 .....

Reason 2 .....

(2 marks)

3 (b) The SOCO found small pieces of glass at the scene of the hit-and-run incident.

3 (b) (i) What equipment would the SOCO use to collect the pieces of glass?

.....

(1 mark)

3 (b) (ii) How would the SOCO store the glass once he had collected it?

.....

.....

.....

(2 marks)





3 (b) (iii) A forensic scientist uses the oil immersion method to measure the refractive index of the glass.

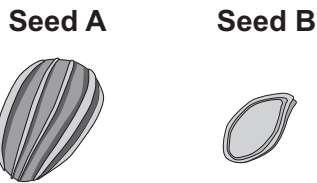
The four stages in the table describe what should be done in the oil immersion method, but they are not in the correct order.

Label the stages 1–4 to show the correct order, 1 being the first stage.

Stage	Order
Record the temperature of the oil	
Heat the oil	
Place the fragments of glass in the oil	
Compare the measurements with those in a data book to find the refractive index	

(3 marks)

3 (c) Two different seeds, **A** and **B**, were collected at the scene of a crime. The seeds from the crime scene were compared with some seeds found on the boots of a suspect.



3 (c) (i) What **two** features of the seeds could be used to compare the seeds from the crime scene with the seeds from the suspect's boot?

Feature 1 .....

Feature 2 .....

(2 marks)

3 (c) (ii) A seed found on the suspect's boot matched a seed that was found at the crime scene.

Does this mean that the suspect committed the crime?

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

Give **one** reason for your answer.

.....

.....

(1 mark)



4 A doner kebab is an example of a fast food that may be eaten as a snack.



4 (a) The table shows some nutritional information about a doner kebab.

Nutritional information per kebab		Average percentage of Recommended Daily Allowance (RDA)
Energy (kJ)	4985	50
Salt (g)	5.6	98
Fat (g)	62.3	89
Saturated fat (g)	29.5	148

4 (a) (i) Use the figures from the table to give **two** reasons why eating a doner kebab as a snack is **not** a healthy option. Explain your answers.

Reason 1 .....

Explanation .....

.....

Reason 2 .....

Explanation .....

.....

(4 marks)

4 (a) (ii) What is the average recommended daily energy allowance?

..... kJ

(1 mark)

4 (b) Explain why it is important to control the amount of sugar in the diet.

.....

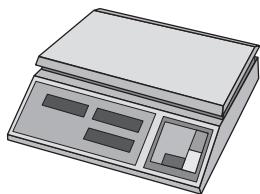
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(1 mark)

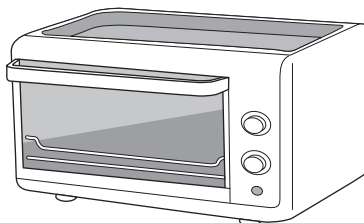


**4 (c)** A scientist at the Food Standards Agency (FSA) analysed the percentage of water in the kebab meat.

**4 (c) (i)** Describe how the scientist would do this, using the equipment shown in the diagrams.



**Electronic balance**



**Oven**

.....

.....

.....

.....

.....

.....

(3 marks)

**4 (c) (ii)** What should the temperature of the oven be in this experiment?

Draw a ring around the correct answer.

**10 °C**

**60 °C**

**160 °C**

(1 mark)

**4 (c) (iii)** Which equation should the scientist use to calculate the percentage of water in the meat?

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

$$\frac{\text{mass after} - \text{mass before}}{\text{mass after}} \times 100$$

$$\frac{\text{mass before} - \text{mass after}}{\text{mass before}} \times 2$$

$$\frac{\text{mass before} - \text{mass after}}{\text{mass before}} \times 100$$

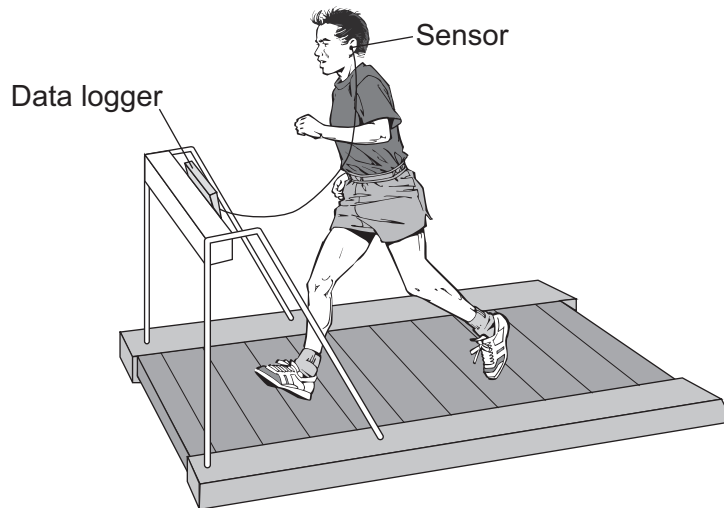
(1 mark)

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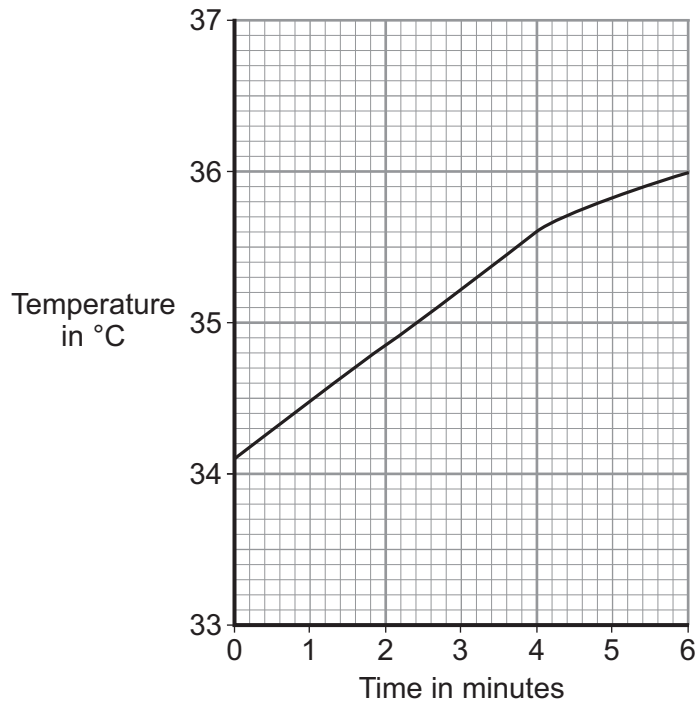
Turn over ►



- 5** A sports physiologist measured the effect of exercise on an athlete's body temperature. The physiologist attached a temperature sensor to the athlete's earlobe. The sensor was connected to a data logger, which recorded the athlete's temperature as he exercised for 6 minutes.



The results are shown on the graph.



- 5 (a) (i)** What was the athlete's temperature at the start of the exercise?

..... °C  
(1 mark)



5 (a) (ii) By how much did the athlete's temperature rise during the 6 minutes exercise?

..... °C  
(1 mark)

5 (a) (iii) Give **two** reasons why using a data logger is a good method of recording body temperature in this experiment?

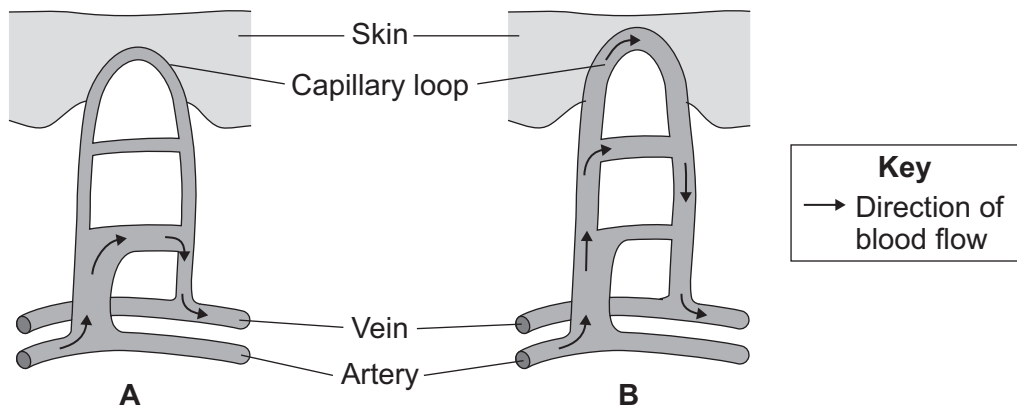
Reason 1 .....

Reason 2 .....

(2 marks)

5 (b) The flow of blood through the body is used to control temperature.

The diagrams show a blood vessel at two different stages during exercise.



Which diagram, **A** or **B**, shows the blood vessel of the athlete after exercise?

Write your answer in the box.

Explain how the change in the blood vessel helps the body to lose heat.

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

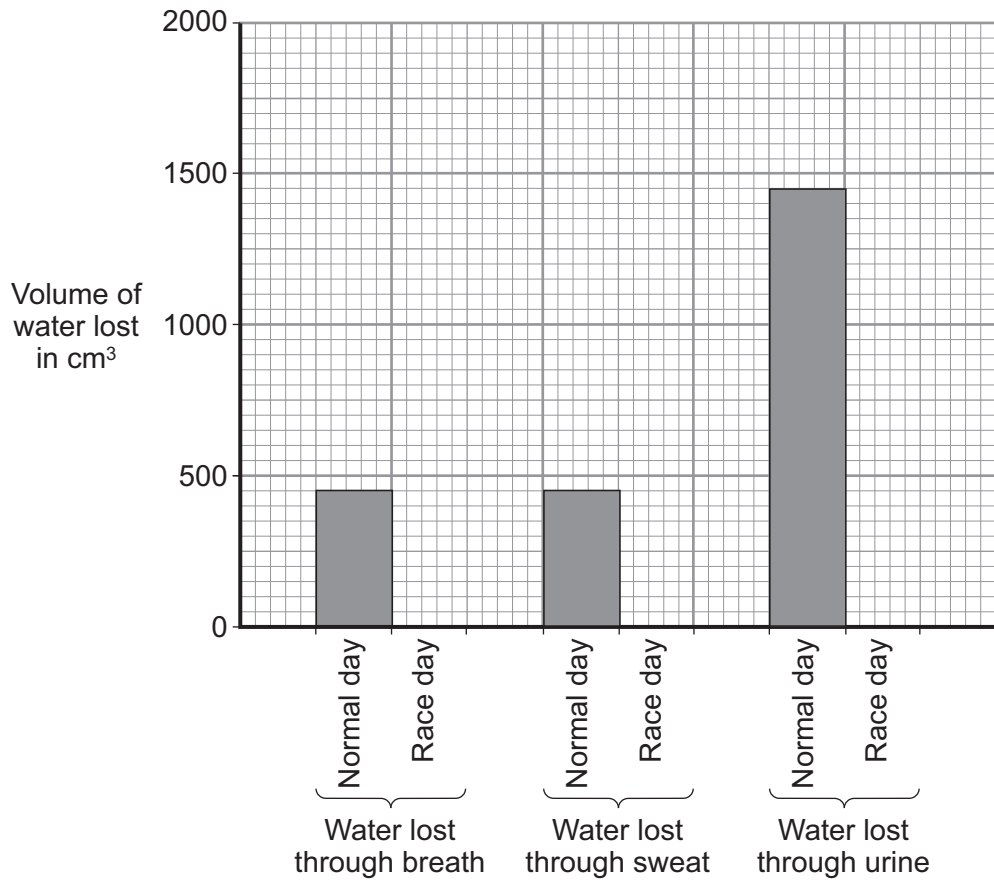
(2 marks)

Question 5 continues on the next page

Turn over ►



5 (c) The bar chart shows how much water is lost from the athlete's body on a normal day.



The athlete ran a race.

Draw **three** bars on the bar chart to show how the volume of water lost through breath, sweat and urine might be different on race day.

(3 marks)

9
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**6** Technicians in forensic laboratories do many chemical tests to identify substances.

**6 (a)** The table shows the positive results from some tests for a range of substances.

Positive result	Substance
Reacts with acidified potassium dichromate and turns it from orange to green	
Gives a lilac colour in a flame test	
When bubbled through limewater, the limewater turns milky	
When added to sodium hydroxide solution, a blue precipitate forms	

Use words from the box to complete the table.

carbon dioxide	copper ions	ethanol
glucose	hydrogen	potassium ions

(4 marks)

**6 (b)** Sodium chloride is an ionic compound.

**6 (b) (i)** What is the formula for sodium chloride?

.....  
(1 mark)

**6 (b) (ii)** How are the particles held together in ionic compounds?

.....  
.....  
.....  
(2 marks)

**6 (b) (iii)** Why do ionic compounds have high melting points?

.....  
.....  
.....  
(2 marks)

9
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**END OF QUESTIONS**



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ANSWER IN THE SPACES PROVIDED**

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Question 4 Photograph: Getty Images/Foodcollection

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