AQA General Certificate of Secondary Education
Foundation Tier
June 2012

Additional Applied Science   AASC/2F

F

Unit 2   Science at Work

Written Paper

Wednesday 30 May 2012   1.30 pm to 2.30 pm

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.

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

1 Different materials are used to make modern sports equipment. The material used depends on its properties.

1 (a) (i) Draw a line from the material to the use for that material.

Material	**Use for material**
Metal	Bicycle frame
Ceramic	Running shoe
Wood	Disc brakes in a racing car
	Golf club

(3 marks)

1 (a) (ii) The table shows three materials used in sports equipment.

Material	**Property of material**
Aluminium	
Ceramic	
Polyester	

Choose a property for each material from the box below. Write each property in the correct place in the table.

strong and light	**flexible**	**low thermal conductivity**	**high thermal conductivity**

(3 marks)

1 (b) Materials used to make sports clothing can be either natural or synthetic.

Give **one** example of each type of material.

Natural ....

Synthetic ....

(2 marks)

1 (c) The picture shows some shoes used for ballet dancing.
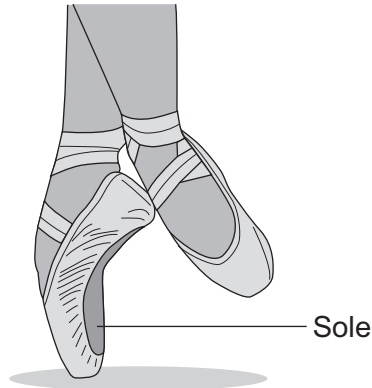
Sole

The sole of the shoe can be made from leather or satin (a type of fabric).

Suggest **two** advantages to the ballet dancer of making the sole of the shoe from leather.

1 ....

2 ....

(2 marks)

10

Turn over for the next question

Turn over ▶

2 This question is about different methods of farming.

Some foods are grown with the help of chemicals.

2 (a) Use words from the box to complete the table.

| artificial fertiliser | fungicide | herbicide | pesticide |

Name of chemical	What the chemical does
	Kills insect pests
	Kills unwanted plants
	Provides nutrients for the plants

(3 marks)

2 (b) The picture shows some pigs living on a farm.
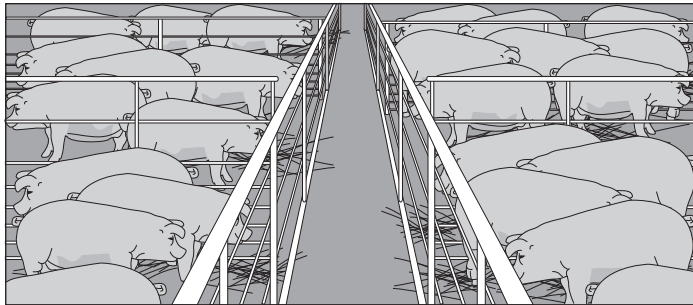
2 (b) (i) What is this method of farming called?

....

(1 mark)

2 (b) (ii) Give **two** advantages to the farmer of keeping pigs in this way to produce meat.

1 ....

....

2 ....

....

(2 marks)

2 (b) (iii) Give **one** disadvantage to the farmer of keeping pigs in this way to produce meat.

....

....
(1 mark)

2 (b) (iv) Another farmer wanted to get the most meat from his pigs.

He decided to test how the number of pigs per pen affected their growth.
He decided to have two identical pig pens and kept four pigs in one pen and eight pigs in the other pen.

Pen
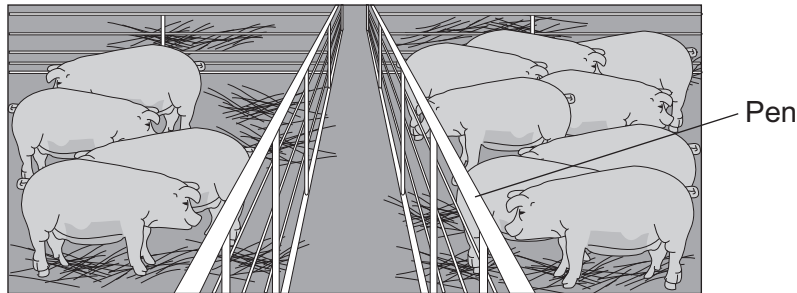
Describe how the farmer could find out what was the best number of pigs per pen (4 or 8) to produce the most meat from the pigs.

....

....

....

....

....

....
(3 marks)

2 (b) (v) Some variables should be controlled. Name **two** variables that should be controlled in the experiment you have described.

1 ....

....

2 ....

....
(2 marks)

Question 2 continues on the next page

Turn over ▶

2 (c) The diagram shows the percentage of each cut of meat that comes from a pig.
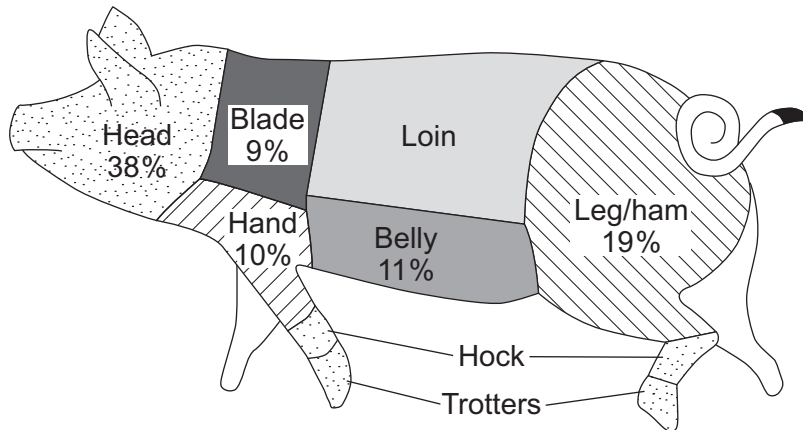
2 (c) (i) What percentage of the pig is used to make loin chops?

....

(1 mark)

2 (c) (ii) What is the main nutrient found in meat?

....

(1 mark)

14

Turn over for the next question

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED

Turn over ▶

3   A Scenes of Crime Officer (SOCO) was called to a jewellery shop because the shop had been broken into.

The first thing he did was to put tape around the crime scene.

CRIME SCENE DO NOT CROSS

3 (a)   Why is tape put around the crime scene?

....

....

(1 mark)

3 (b)   Some fibres were collected at the crime scene.

3 (b) (i)   Describe how the SOCO would collect these fibres so that they can be sent to the forensic laboratory.

....

....

....

....

....

....

(3 marks)

3 (b) (ii)   What scientific instrument would a forensic scientist use to examine the fibres?

....

(1 mark)

3 (b) (iii) The fibres collected from the crime scene were compared with some fibres on the clothing that a suspect was wearing when he was arrested.

Give **two** features of fibres that could be used to match the samples.

1 ....

2 ....

(2 marks)

3 (b) (iv) The fibres on the suspect's clothing did not match the fibres from the crime scene.

Does this prove that he was not at the crime scene?

Yes ☐

No ☐

Explain your answer.

....

....

(1 mark)

8

Turn over for the next question

**4** Sports physiologists need to understand the structure and function of the cardiovascular system.

4 (a) Different parts of the blood have different functions.

Draw a line from the part of the blood to the function of that part.

Part of the blood　　　　　　　　　　　**Function**

| Platelets |

| Red blood cell |

| White blood cell |

| Transports substances |

| Helps to protect the body from disease |

| Carries oxygen |

| Helps to heal cuts |

(3 marks)

4 (b) The diagram shows the structure of the heart.

A ....

D ....

B ....

C ....
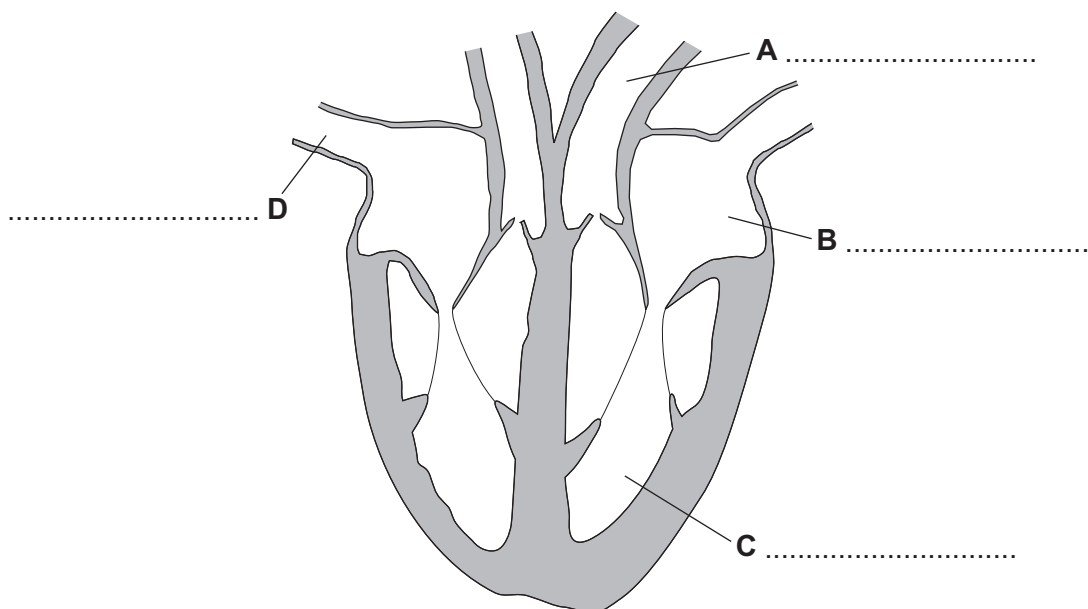
4 (b) (i) Choose words from the list in the box to label parts **A**, **B**, **C** and **D** on the diagram.

| aorta　　left atrium　　left ventricle　　right atrium　　right ventricle　　vena cava |

(4 marks)

4 (b) (ii) Where does the blood go after leaving the heart at **A**?

....
(1 mark)

4 (c) (i) The heart pumps blood containing oxygen to the cells of the body.

Why do the cells need oxygen?

....
(1 mark)

4 (c) (ii) One type of blood vessel has very thin walls. The thin walls allow oxygen to pass from the blood to body cells.

What is the name of this type of blood vessel?

....
(1 mark)

10

Turn over for the next question

Turn over ▶

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

These foods usually have a high fat content.

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

1 ....

2 ....

(2 marks)

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

1 ....

2 ....

(2 marks)

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

....

....

(1 mark)

5 (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 ....

....

2 ....

....

3 ....

....

(3 marks)

5 (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.

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

What evidence is there to support this claim?

....

....
(1 mark)

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

....

....
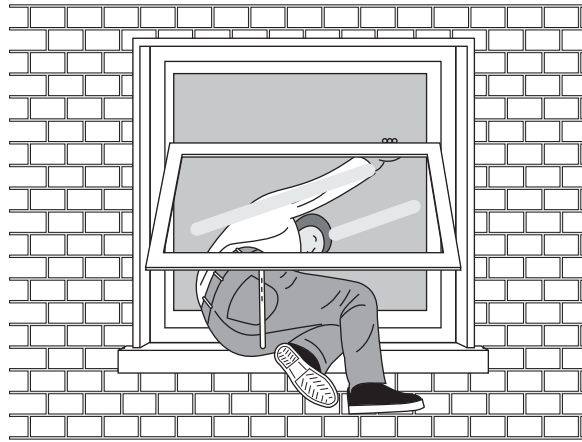
.... mg
(1 mark)

10

Turn over for the next question

Turn over ▶

6 A burglar entered a house through an open window.

A shoeprint was found in the soil below the window.

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

....

....

....

....

....

....

(3 marks)

6 (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.

....

....

(1 mark)

6 (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	

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

(1 mark)

6 (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.

....

....

....

.... %

(3 marks)

8

END OF QUESTIONS

There are no questions printed on this page

DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED