

Candidate Name	Centre Number	Candidate Number
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**GCSE**

682/02

**ADDITIONAL APPLIED SCIENCE**

**Unit 2: Science at Work in Applied  
Contexts**

**HIGHER TIER**

A.M. THURSDAY, 13 January 2011

45 minutes

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	4	
2.	9	
3.	11	
4.	9	
5.	8	
6.	7	
<b>Total</b>	<b>48</b>	

**ADDITIONAL MATERIALS**

In addition to this examination paper, you may require a calculator and a ruler.

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet.

**INFORMATION FOR CANDIDATES**

The number of marks is given in brackets at the end of each question or part-question.

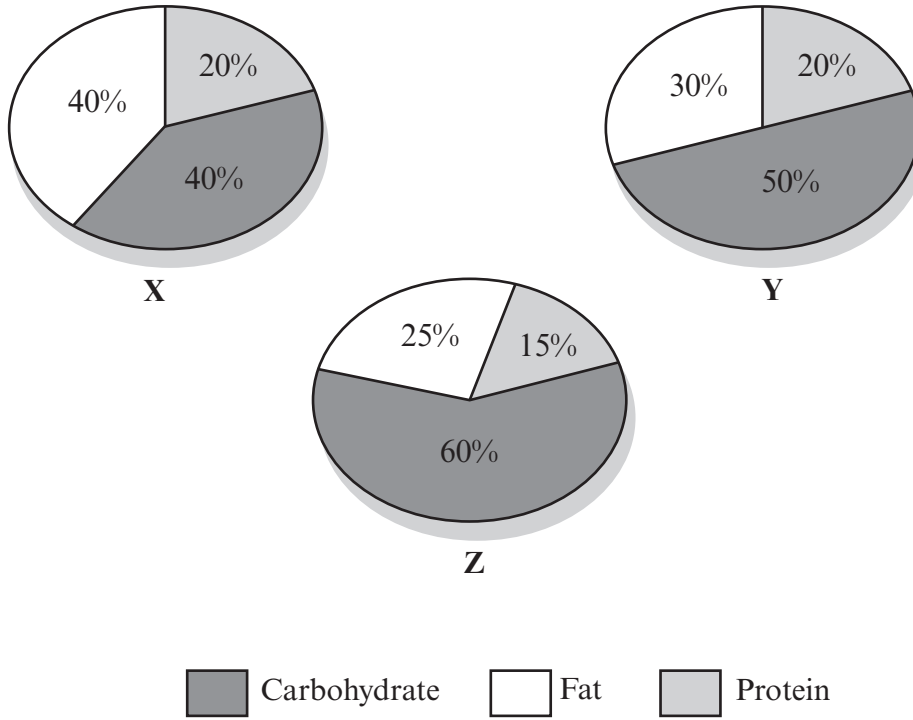
You are reminded of the necessity for good English and orderly presentation in your answers.

You are reminded to show all your working. Credit is given for correct working even when the final answer given is incorrect.

**SECTION A (24 marks)**

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

1. A dietician analyses three types of diet. Her results are shown below.



(a) (i) Which diet is recommended for rugby players? ..... [1]

(ii) Give **one** reason why this diet is recommended. [1]

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(b) (i) Which diet is the most unhealthy? ..... [1]

(ii) Give **one** reason for your answer. [1]

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.....

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2. (a) Health workers are concerned about anorexia.

(i) What is anorexia?

[2]

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(ii) Anorexia is more common in teenage girls than boys. Give **one** reason why.

[1]

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(iii) Describe **two** long-term health problems associated with anorexia.

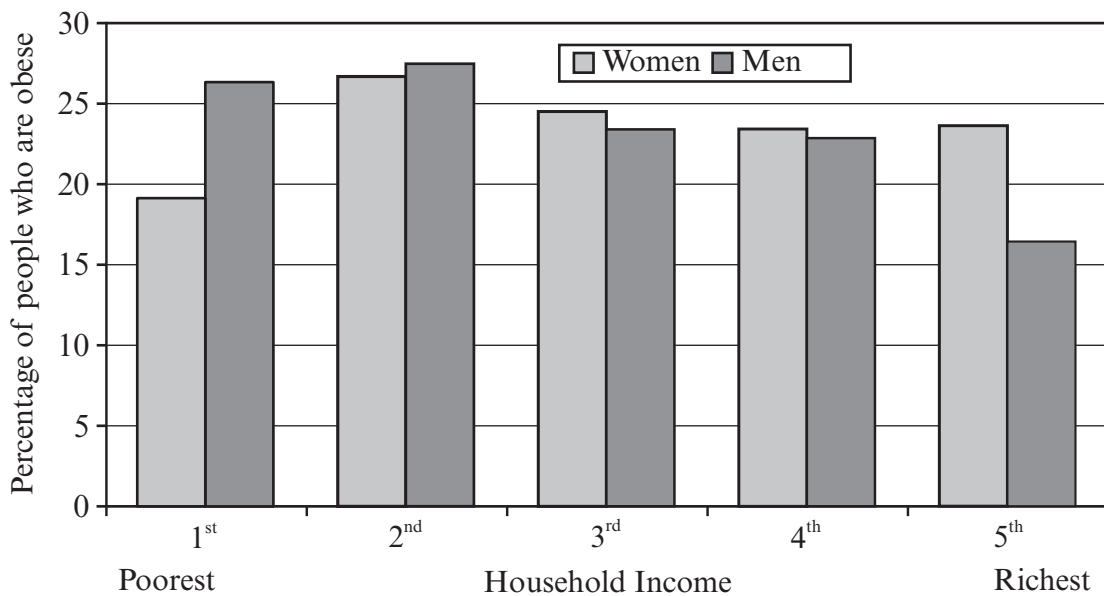
[2]

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(b) The government is concerned about the impact of obesity on society and the economy.

(i) The chart shows the percentage of obese people in families with different incomes.



It is often claimed that there is more obesity among the poorest families. Explain whether this claim is supported by the information in the chart.

[2]

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(ii) Give **two** ways in which obesity affects the economy.

[2]

- 1. ....  
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- 2. ....  
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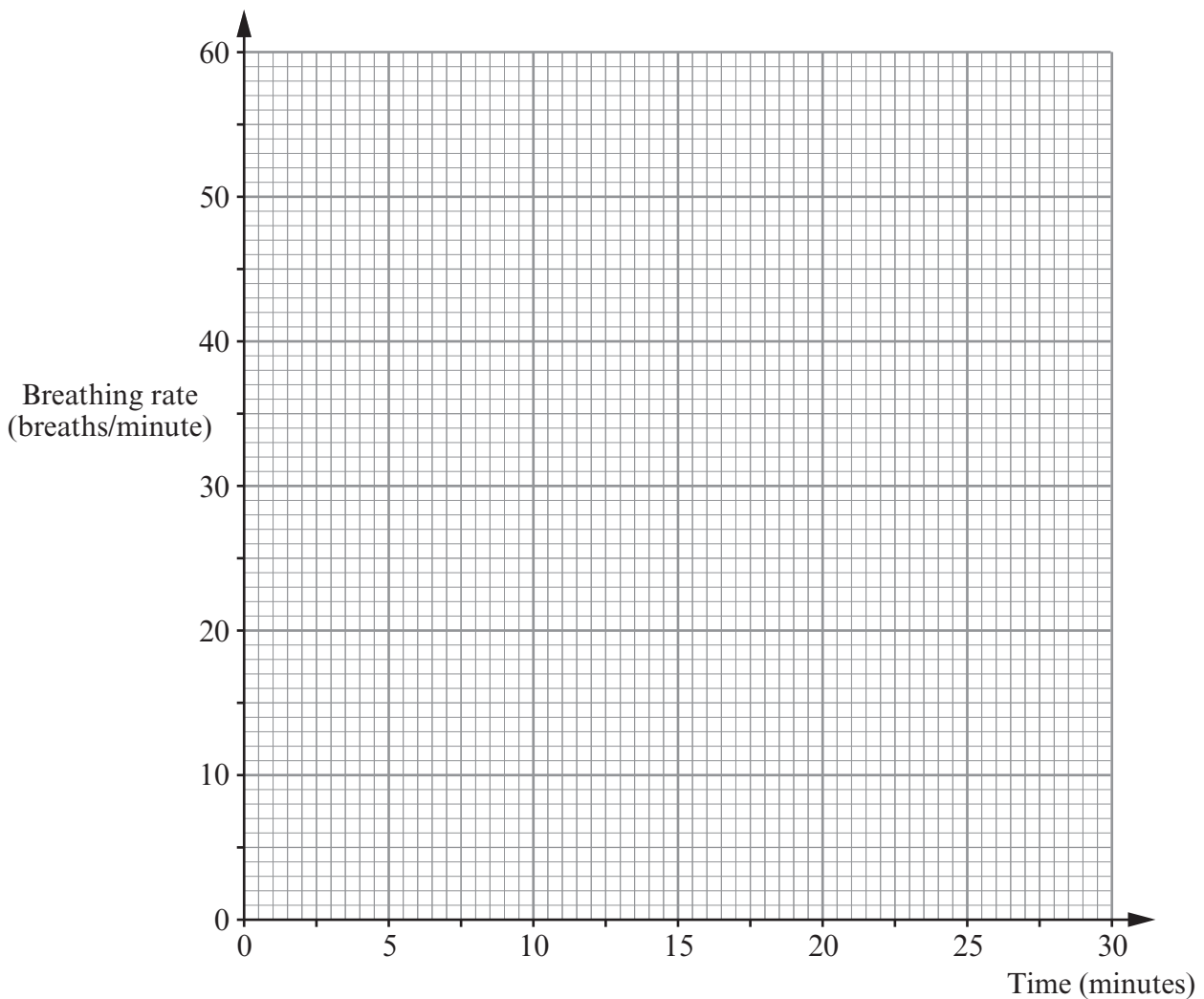
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3. A physiologist measures the breathing rate of an athlete before, during and after exercise. The results are shown below.

<i>Time (minutes)</i>	0	5	10	15	20	25	30
<i>Breathing rate (breaths/minute)</i>	12	26	45	58	34	21	12

- (a) (i) Plot the results on the grid below and join them point to point.

[3]



- (ii) At what time did the physiologist tell the athlete to stop exercising?

..... minutes [1]

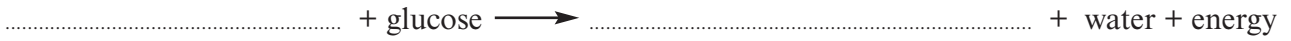
- (iii) How long did the athlete's breathing rate take to return to normal after she stopped exercising?

..... minutes [1]

(b) Explain why the athlete's breathing rate increases during exercise. [2]

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(c) (i) The athlete gets energy from respiration. Complete the respiration equation below. [2]



(ii) During prolonged exercise, an athlete may get cramp. Explain why. [2]

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**SECTION B (24 marks)**

4. (a) The shot used by women shot putters has a mass of 4 kg.  
Modern shots are made from brass instead of lead.  
The table shows some properties of shot made from lead and brass.

<i>Material</i>	<i>Density (g/cm<sup>3</sup>)</i>	<i>Volume (cm<sup>3</sup>)</i>	<i>Hardness (Moh)</i>
Lead	11.3	354	2
Brass	8.7		4

- (i) Use the information in the table to explain the advantage of making shot from brass instead of lead. [2]

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- (ii) Use the equation below to find the volume of a brass shot. [3]

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

Volume = ..... cm<sup>3</sup>

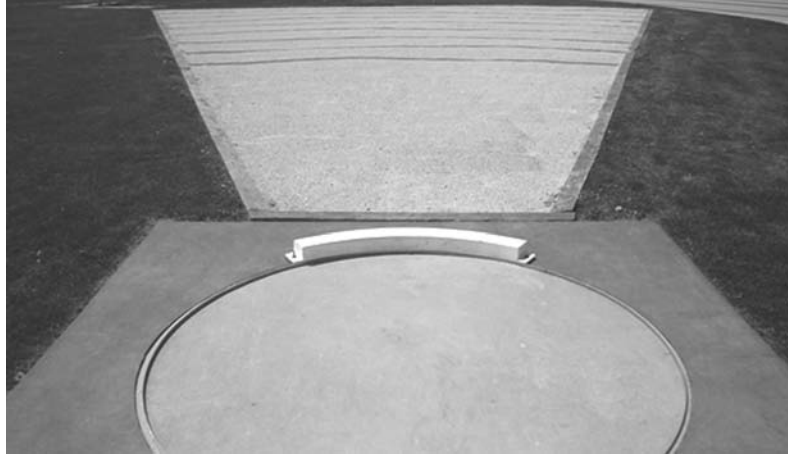
- (b) Female shot putters wear clothing made from Lycra.  
Describe the advantages of Lycra compared with natural materials. [2]

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- (c) The modern shot putt throwing circle and stop board are made from aluminium instead of wood.



In terms of its properties, explain the advantages of using aluminium.

[2]

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5. A Scenes of Crime Officer (SoCO) may collect blood samples at a crime scene.

(a) Explain how the SoCO can use tests to link blood found at the scene to a suspect. [3]

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(b) The SoCO can also do a chromatography test on the blood to see if the suspect has been taking drugs. Describe the process of paper chromatography. You may use a diagram to help answer your question. [3]

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(c) Describe **two** precautions that are taken so that evidence is not contaminated during the investigation of the crime scene. [2]

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6. The safety of food and its supply to the public is monitored by Environmental Health Officers and the Food Standards Agency (FSA).

(a) The FSA monitors the manufacture of food. It issued a warning that resulted in more than 350 food products being taken off shop shelves after they were contaminated with an illegal food additive.

Food manufacturers regularly use food additives as an ingredient in food. They have to be approved by the FSA. E numbers are categorised in series as shown below.

<b>E Numbers for Types of Additives</b>	
<i>Series</i>	<i>Function</i>
E100	Colours
E200	Preservatives
E300	Antioxidants
E400 +	Miscellaneous

Describe the advantages and disadvantages of using food additives.

[4]

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(b) A mystery surrounded a health scare that caused an Environmental Health Officer to close the Fat Duck restaurant. Over a period of three weeks 30 diners called in to report vomiting, diarrhoea and flu-like symptoms. Explain how an Environmental Health Officer would determine the cause of this outbreak of illness.

[3]

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