Candidate Name	Centre Number	Candidate Number
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WJEC CBAC

GCSE

682/02

ADDITIONAL APPLIED SCIENCE

Unit 2: Science at Work in Applied Contexts

HIGHER TIER

P.M. THURSDAY, 19 May 2011

45 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**6**	
2.	**9**	
3.	**9**	
4.	**6**	
5.	**5**	
6.	**6**	
7.	**7**	
Total	**48**	

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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.

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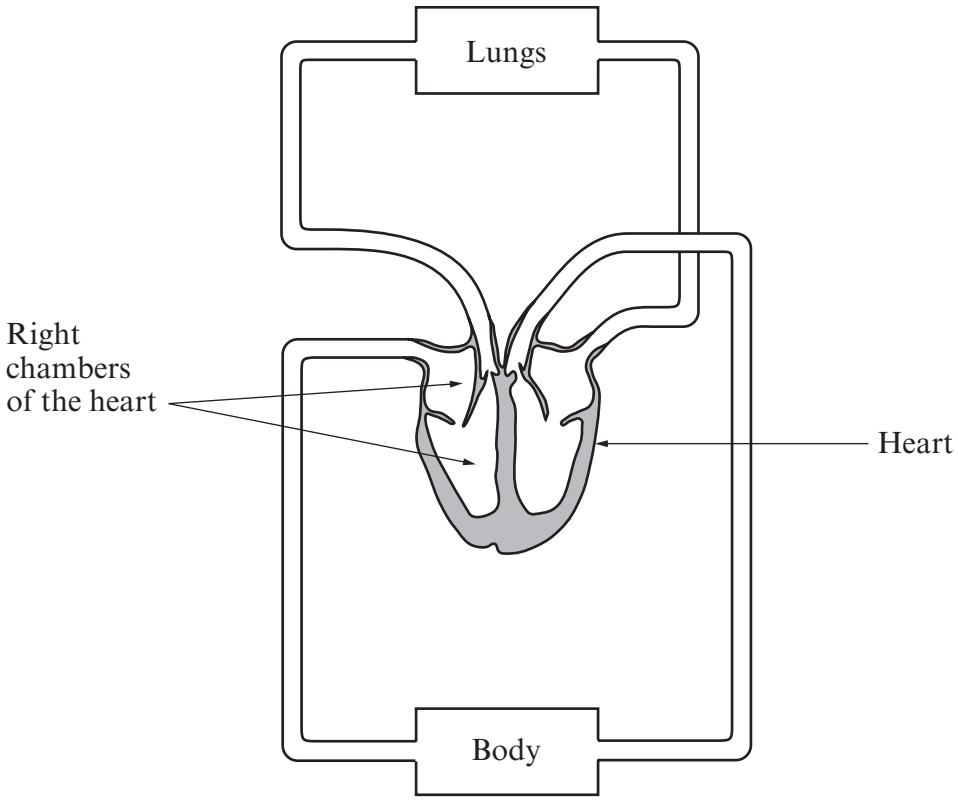
SECTION A (24 marks)

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

1. Elite athletes need an efficient cardiovascular system to perform at the highest level. The diagram shows the human cardiovascular system.



(a) (i) Name the right chambers of the heart. [2]

..... and .....

(ii) Name the chamber that pumps blood to the lungs. ..... [1]

(iii) Name the chamber that receives blood from the lungs. ..... [1]

(b) Explain why physiologists call the cardiovascular system a double circulatory system. [2]

.....

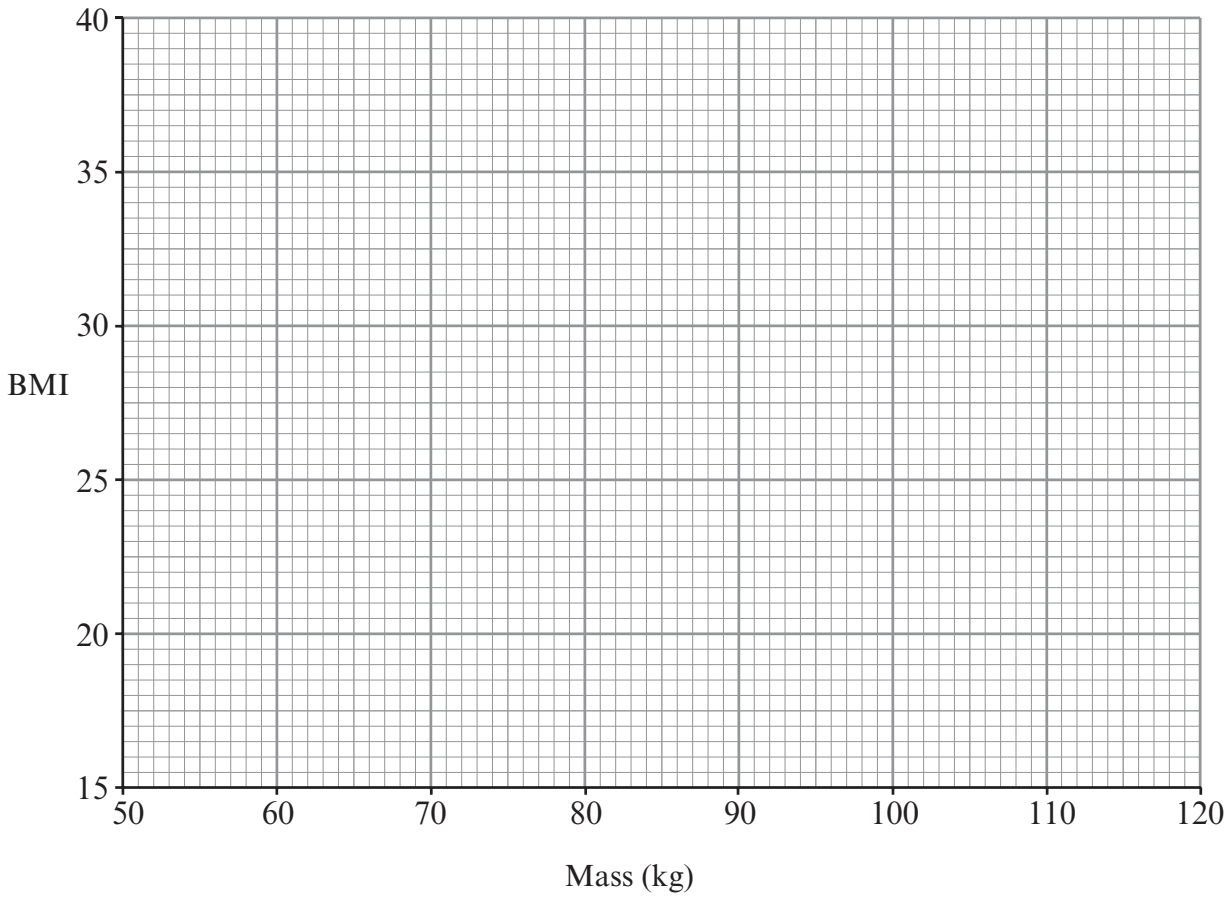
.....

Examiner only

2. The table shows how the Body Mass Index (BMI) of a 170 cm tall adult varies with mass.

Mass (kg)	*BMI*
53.5	18.5
63.5	22
72.5	25
86.0	30
115.0	40

(a) (i) Use the data to plot a graph on the grid below. [3]



(ii) Use the graph to estimate the BMI for a mass of 80 kg. ..... [1]

(iii) Use the graph to estimate the mass for a BMI of 35. ..... [1]

(b) Values of BMI give the following body types.

Obese (>30)	Overweight (25-30)	Normal (18.5-25)	Underweight (<18.5)

(i) Use the information above to find the maximum mass of a 170 cm adult before they are classed as obese. [1]

.....

(ii) Use the information above to estimate the **lowest** mass a 170 cm adult can have and still be classed as having 'normal BMI'. [1]

.....

(c) The equation used to calculate BMI is

$$\text{BMI} = \frac{\text{Mass}}{\text{Height}^2}$$

Use this equation to calculate the BMI for a 170 cm adult who has a mass of 90 kg. [2]

BMI = ...

Examiner only

3. Trainee dieticians are learning about parts of the diet.

(a) Complete the table to show the function of each part of a diet. [7]

Part	*Function*
Carbohydrates	.....
Fats	.....
Proteins	.....
Fibre	.....
Vitamin C	.....
Iron	.....
Calcium	.....

(b) (i) Name **one** type of food that is a good source of protein. ..... [1]

(ii) Name **one** type of food that is good source of vitamin C. ..... [1]

Examiner only

SECTION B (24 marks)

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

4. Manufacturers of sporting equipment use different types of materials.

(i) The soles of high performance athletic trainers are made from polymers. Describe the advantages of using polymers. [3]

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.....

(ii) Modern poles used in pole vaulting are made from fibreglass. Explain why fibreglass is a suitable material to use but glass is not. [3]

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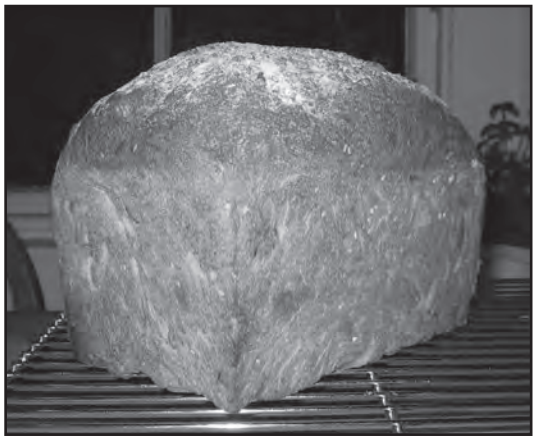
6

Examiner only

5. Bakers use yeast. Yeast used for bread making responds to warm water. When exposed to sugars in bread mixture and in flour, it begins to break down these sugars. The reaction releases gas bubbles. The mixture is left for a while for it to rise before being put in the oven. The bread continues to rise during its early cooking stages, and then may deflate slightly as cooking continues.



(a) (i) Name the process that involves yeast breaking down sugars.

..... [1]

(ii) Name the gas produced during the reaction. ..... [1]

(b) Explain why the bread mixture rises at first but will stop rising or even deflate during the later stages of cooking. [3]

.....

.....

.....

5

Examiner only

6. A physiologist monitors the cardiovascular system of an athlete.

(i) Explain why the physiologist expects the heart rate **and** breathing rate of the athlete to increase during exercise. [3]

.....

.....

.....

.....

(ii) As the athlete becomes fitter, their recovery time will improve. Describe how the physiologist determines the athlete's recovery time. [3]

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6

Examiner only

7. During a police investigation, a forensic scientist tests a powder she suspects contains potassium chloride, which is an ionic compound.

(i) Describe the bonding in potassium chloride. [3]

.....

.....

.....

(ii) State the test that the forensic scientist could use to confirm that the powder is a potassium compound. [1]

.....

(iii) **Name** and **describe** the test that the forensic scientist could use to confirm that the powder is a chloride. [3]

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7