



Rewarding Learning
ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2019

Centre Number

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Candidate Number

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Life and Health Sciences

Assessment Unit AS 2
assessing
 Human Body Systems



SZ021

[SZ021]

WEDNESDAY 15 MAY, AFTERNOON

TIME

1 hour 30 minutes.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Answer **all seven** questions.

Write your answers in the spaces provided in this question paper.

INFORMATION FOR CANDIDATES

The total mark for this paper is 75.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You may use an electronic calculator.

Quality of written communication will be assessed in Question **5(d)**.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	

Total Marks	
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- 1 A student went to the supermarket to buy a pre-prepared bacon and tomato pasta dish for lunch. She found two options – the ‘standard’ and the ‘healthy’ dish.

The table below shows some of the nutritional information on the packaging.

	Standard pasta dish	Healthy pasta dish
Energy /kcal	542	357
Sugar /g	3	5
Fat /g	30	8
Saturated Fat /g	6	3
Salt /g	3	2

The guideline **daily energy intake** for an adult in the UK is 2000 kcal.

- (a) (i) Calculate the percentage (%) of the guideline daily energy intake that the **standard** pasta dish contains.

You are advised to show your working.

_____ % daily energy intake [2]

- (ii) State **two** reasons why the standard pasta dish might **not** be considered good for health when compared to the healthy pasta dish. Use data from the table to support your answer.

_____ [2]

- (iii) Suggest why the healthy pasta dish might **not** be considered good for health.

_____ [1]

Examiner Only	
Marks	Remark

(iv) Using your answer to (iii), give **one** possible long-term effect on the body as a consequence of eating foods like this.

_____ [1]

The table below provides nutritional information for a milk chocolate bar and a banana.

Food	Nutritional information per 100 g of the food				
	Energy /kcal	Sugar /g	Fibre /g	Vitamin B /mg	Vitamin C /mg
Banana	81	18	2.6	0.5	9
Chocolate bar	468	25	4.2	0	0

(b) (i) Using the data provided in the table, explain why the banana would be a more healthy source of nutrition.

_____ [3]

(ii) Give **one** function of vitamin B in the body.

_____ [1]

(iii) Give **one** function of vitamin C in the body.

_____ [1]

Examiner Only	
Marks	Remark

2 (a) (i) Define the term homeostasis.

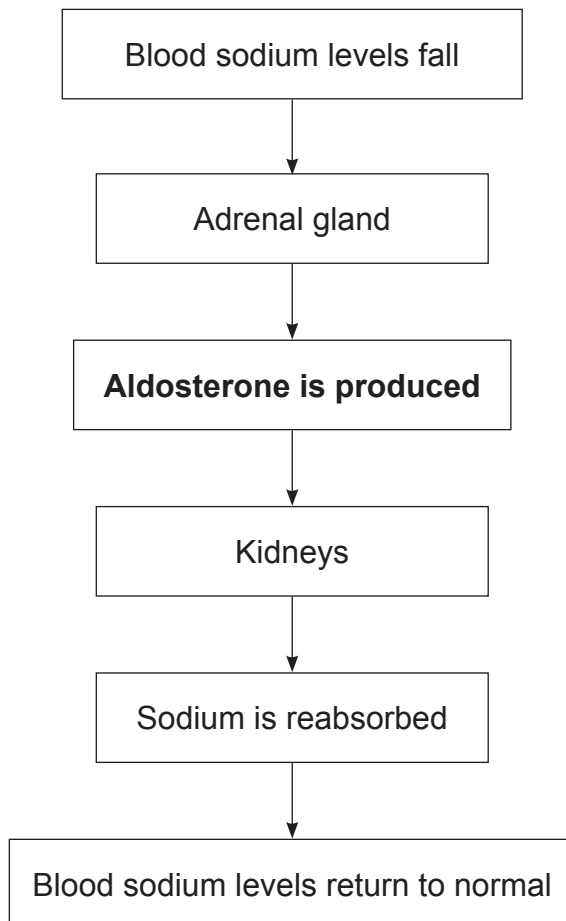
[1]

Sodium chloride contains sodium ions and chloride ions which are essential in the human body.

(ii) State **three** functions of these ions.

[3]

The flow diagram below shows how blood sodium levels are regulated.



Examiner Only	
Marks	Remark

- 3 The UK government recommends that children and adults get 10 μg of vitamin D each day.

Vitamin D is found in a number of foods, either naturally or added to the food by the manufacturer (fortified). The table below shows the vitamin D content of some foods.

Vitamin D food source	Vitamin D $\mu\text{g}/\text{serving}$
Egg	0.5
Salmon	5.0
Liver	1.0
Mushrooms	5.0
Milk (fortified)	2.5
Breakfast cereal (fortified)	1.5

- (a) (i) A person ate a breakfast on Day 1 containing 4 μg of vitamin D. Complete the table for Day 1 to show how the person could obtain an additional 6 μg of vitamin D using only food sources from the table above. [1]
- (ii) Complete the table for Day 2 using food sources from the above table **other** than those used on Day 1. You must ensure breakfast contains 4 μg of vitamin D and dinner contains 6 μg of vitamin D. [2]

	Breakfast	Dinner
Day 1	containing 4 μg vitamin D	
Day 2		

Examiner Only

Marks Remark

4 (a) (i) State the typical range of the human pulse rate.

From _____ beats per minute to _____ beats per minute [1]

(ii) What feature of the left ventricle of the human heart causes high blood pressure to be produced here?

_____ [1]

The left ventricle contains a maximum volume of blood before it contracts and pumps blood into the blood vessels. The time between contractions is one beat of the heart.

The table below shows the volume of blood in a woman's left ventricle at different times during **one second**.

Time / seconds	Volume of blood in left ventricle /cm ³
0.0	110
0.1	118
0.2	93
0.3	63
0.4	50
0.5	55
0.6	80
0.7	88
0.8	100
0.9	110
1.0	118

(b) (i) Use the information in the table to calculate the woman's pulse rate in **beats per minute**.

You are advised to show your working.

_____ beats per minute [2]

Examiner Only	
Marks	Remark

- 5 (a) State what the UK guidelines advise on how adults should **spread** their alcohol consumption throughout a week.

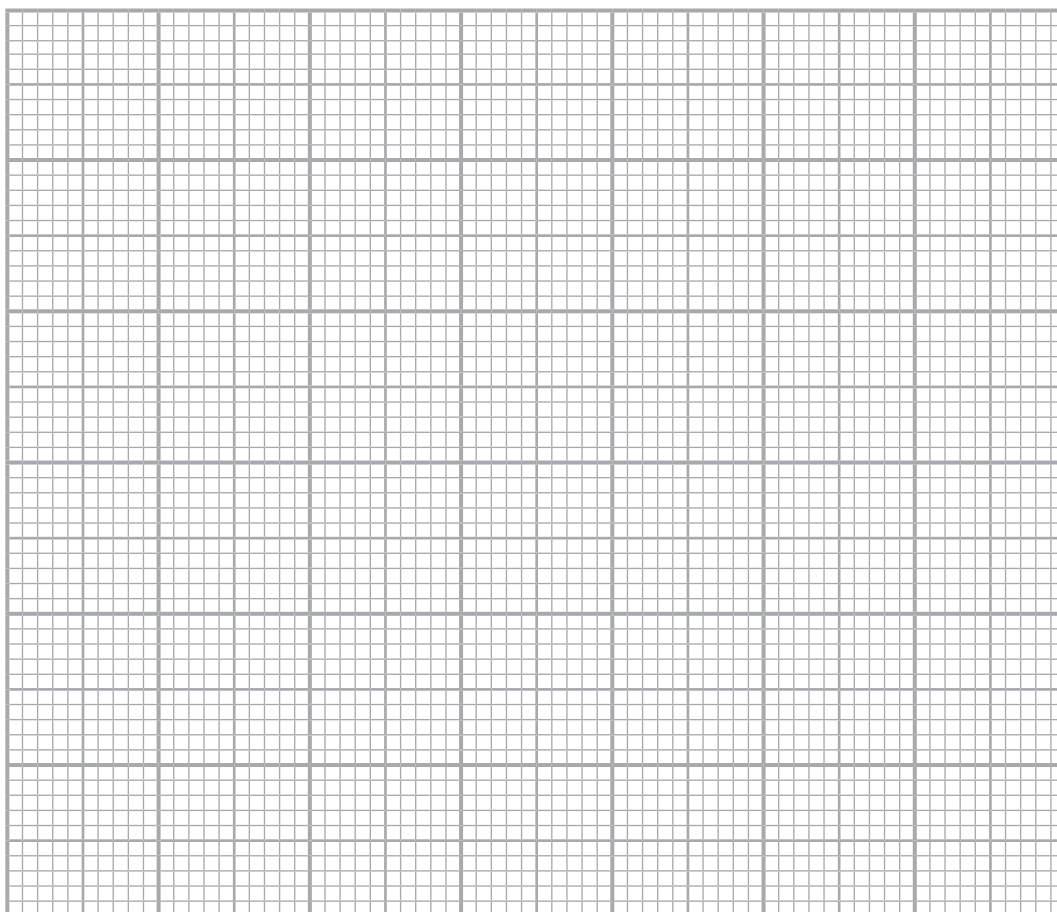
[1]

The table below shows information on the percentage of adults who drank up to 14 units, or more than 14 units of alcohol per week according to age group.

Age group	Percentage of age group /%	
	Up to 14 units /week	More than 14 units /week
Young adults	26	17
Adults	28	11
Middle-aged	24	8
Elderly	9	2

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- (b) Construct a bar graph for both sets of results on the grid below, with percentage (%) of age group on the y axis. Label both axes.



[6]

Examiner Only	
Marks	Remark

6 A peak flow meter measures respiratory system function. Peak expiratory flow rate is a measurement of how quickly a person can blow air out of their lungs.

(a) Describe how peak expiratory flow rate is measured using a peak flow meter.

[4]

Peak expiratory flow rate is often used to help diagnose and monitor asthma.

A doctor wanted to compare the effects of two asthma drugs (drug **A** and drug **B**) on peak expiratory flow rate in women.

Twenty women aged 35 **with asthma** were divided by the doctor into two groups.

Group 1: Ten women took drug **A** each day.

Group 2: Ten women took drug **B** each day.

The investigation was carried out for twelve weeks.

Peak expiratory flow rates were measured in all twenty women before the beginning of the investigation (week 0) and in weeks 4, 8 and 12.

The results are shown in the table below.

Mean Peak expiratory flow rates /L min ⁻¹				
	Week 0	Week 4	Week 8	Week 12
Group 1	340	425	450	465
Group 2	342	400	425	450

Examiner Only	
Marks	Remark

7 Human skeletal muscles can respire both aerobically and anaerobically.

(a) (i) Name **two** stages that are present in aerobic respiration but not present in anaerobic respiration.

1. _____
2. _____ [2]

(ii) State **one** reason why anaerobic respiration is advantageous to human skeletal muscles.

_____ [1]

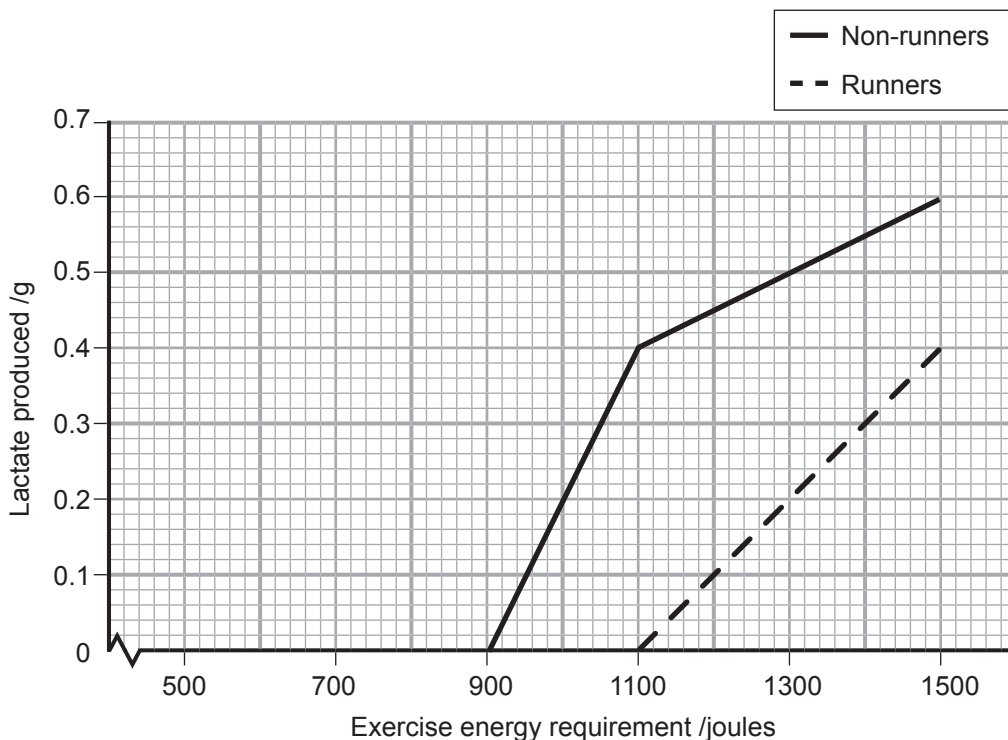
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(Questions continue overleaf)

A sports scientist carried out an investigation to find the effect of exercise on lactate production in men who ran regularly and men who did not.

The graph shows the results of the investigation.



Source: Principal Examiner

(b) (i) Under which conditions is lactate produced in the body?

_____ [1]

(ii) Use the graph to find the **difference** in lactate production between the runners and non-runners when exercising at a level requiring 1200 joules of energy.

You are advised to show your working.

Lactate produced = _____ g [2]

Examiner Only	
Marks	Remark

(iii) Explain why men who ran regularly could exercise at a level requiring higher energy than non-runners.

[2]

(iv) Describe how regular vigorous exercise benefits the respiratory system.

[2]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER

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