



Rewarding Learning
ADVANCED SUBSIDIARY (AS)
General Certificate of Education

Centre Number

--	--	--	--	--

Candidate Number

--	--	--	--

Life and Health Sciences

Assessment Unit AS 2
assessing
 Human Body Systems



SZ021

[SZ021] Assessment

TIME

1 hour 30 minutes.

Assessment Level of Control:

Tick the relevant box (✓)

Controlled Conditions	
Other	

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 3.

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

Total Marks	
--------------------	--

(ii) Describe how a spirometer is used to measure a person's **vital capacity**.

[2]

In patients with severe emphysema, vital capacity is below normal values.

(iii) Explain, using your knowledge of emphysema, why vital capacity is reduced in this condition.

[3]

Examiner Only	
Marks	Remark

2 The table below gives information on the nutritional content of a vegetarian burger and a beefburger.

Food	Energy kcal/100 g	Total fat/g/100 g	Saturated fat/g/100 g	Cholesterol/mg/100 g	Percentage (%) energy from total fat	Fibre/g/100 g	Iron/mg/100 g
Vegetarian Burger	146	4.8	0.5	0	30	6.0	0.5
Beefburger	291	24.7	10.7	76	76	0	1.6

Adapted from Micronutrient Profile Factsheet. © Quorn

(a) (i) Compare the amounts of **total fat**, **saturated fat** and **cholesterol** in the vegetarian burger with the amount in the beefburger.

[3]

(ii) State and explain which burger would be better for long-term health with respect to **energy kcal** and **percentage (%) energy from total fat**.

[4]

Examiner Only	
Marks	Remark

3 The table below provides information on the units of alcohol contained in a range of alcoholic drinks.

Alcoholic drink	Units of alcohol
Small bottle of alcopop	1
Large bottle of alcopop	3
Single measure of spirit	1
Pint of beer	2
Glass of wine	2

You have been asked to give a presentation to a group of healthcare professionals on the **UK guidelines on alcohol consumption**. The average alcohol intake among these healthcare professionals is 4 glasses of wine, 4 pints of beer and 2 measures of spirit spread over 2 days per week.

During your talk you should:

- State the average number of units of alcohol taken by these healthcare professionals per week;
- Provide advice on whether the average current alcohol intake and frequency by the healthcare professionals is meeting the UK guidelines on alcohol consumption;
- Discuss the **long-term negative effects on health** of regularly exceeding the recommended intake of alcohol.

Quality of written communication will be assessed in this question.

Alcohol intake and advice

Examiner Only	
Marks	Remark

Long-term negative effects on health

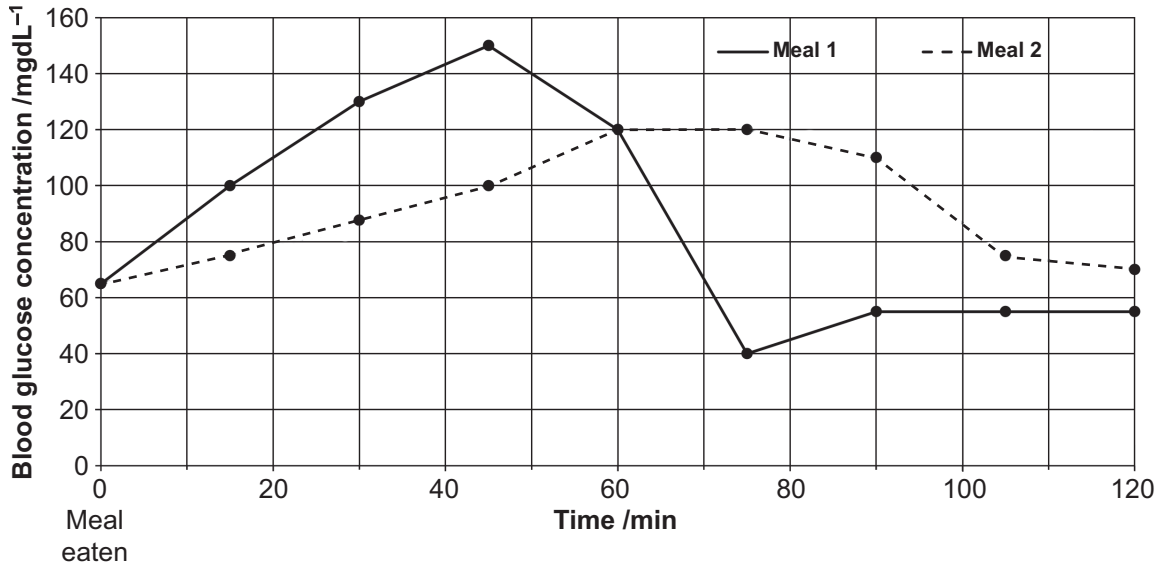
[8]

Examiner Only	
Marks	Remark

4 A woman took part in a clinical trial to test the effect of two different meals on her blood glucose concentration.

After eating each meal her blood glucose concentration was measured every fifteen minutes for two hours.

The results are shown in the graph below.



Source: Principal Examiner

(a) (i) Use the graph to calculate the difference in the blood glucose at 20 minutes after eating meal 1 and meal 2.

You are advised to show your working.

Difference: _____ [2]

(ii) Use an arrow to indicate on the graph a time where the level of **glucagon** would be raised after consuming **meal 1**. [1]

(iii) Why is glucagon produced at this time?
 _____ [1]

Examiner Only	
Marks	Remark

(b) Meal 2 contains complex carbohydrates.
Using the graph, explain how complex carbohydrates are beneficial in the regulation of blood glucose.

[3]

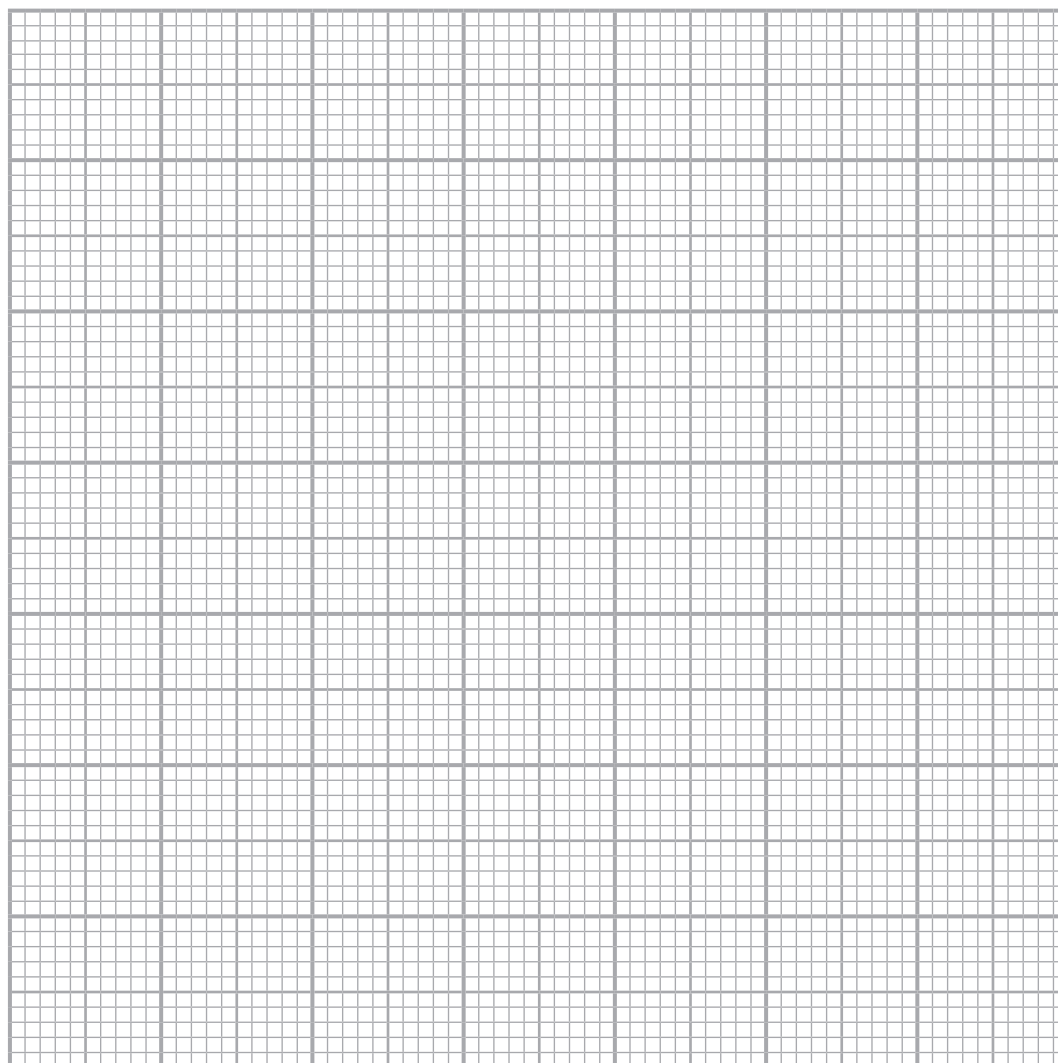
Examiner Only	
Marks	Remark

- 5 A student carried out an investigation to compare the effect of running and of public speaking on his pulse rate.

His pulse rate was **80 beats per minute before beginning** each of the two activities. He carried out each activity and then measured his pulse rate for seven minutes **after each activity had finished**.

Time after activity /min	Pulse rate /beats per minute	
	Running	Public speaking
1	121	105
3	110	97
5	97	85
7	85	80

- (a) (i) Plot these results on the graph paper, with time on the x axis. Label both axes.



[6]

Examiner Only

Marks Remark

(ii) Explain why the student measured his pulse rate before beginning each activity.

_____ [1]

(b) Using the information given and appropriate data from the table, **analyse** how each activity affected pulse rate.

_____ [5]

Examiner Only	
Marks	Remark

6 The UK government guidelines state that children aged 5–15 years should carry out moderate to vigorous physical activity for a minimum of 60 minutes each day.

(a) State one short-term and one long-term positive effect of regular physical exercise on general health.

Short-term _____
 _____ [1]

Long-term _____
 _____ [1]

The table below provides information from a survey on the percentage of children aged 5–15 years, separated by gender, who met the daily physical activity guidelines from 2008–2015.

	Percentage of children who met UK government daily physical activity guidelines	
Year	Boys	Girls
2008	28	19
2012	21	16
2015	23	20

"Copyright © 2016, Re-used with the permission of NHS Digital. All rights reserved"
<http://webarchive.nationalarchives.gov.uk/20180307193646/http://digital.nhs.uk/catalogue/PUB22610>

Examiner Only	
Marks	Remark

The Krebs cycle takes place in the mitochondrial matrix. It releases hydrogen ions. These hydrogen ions are used in the synthesis of ATP molecules in the electron transport chain in the inner membrane of the mitochondria.

(b) (i) Describe how ATP is synthesised in the electron transport chain.

[3]

During sprinting, the percentage of energy derived from aerobic and anaerobic respiration by runners was measured. The table below shows the results.

Time /s	Energy obtained /%	
	Aerobic respiration	Anaerobic respiration
10	5	95
30	30	70
90	50	50

The current men's world record in the 100 m sprint is 9.58 seconds, set by Jamaica's Usain Bolt in 2009.

Usain Bolt did not need to breathe in during his 100 m sprint.

(ii) Use this information and the data in the table to explain why.

[2]

THIS IS THE END OF THE QUESTION PAPER

Examiner Only	
Marks	Remark

Permission to reproduce all copyright material has been applied for.
In some cases, efforts to contact copyright holders may have been unsuccessful and CCEA
will be happy to rectify any omissions of acknowledgement in future if notified.