



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education**

Life and Health Sciences

Assessment Unit AS 2
assessing
Human Body Systems

[SZ021]

Assessment

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

		AVAILABLE MARKS
1	<p>(a) Any five from:</p> <ul style="list-style-type: none"> • Intercostal muscles relax; • Diaphragm moves up/relaxes/domes; • Ribs move down (and in); • Volume (not size/not gets smaller) of the thorax decreases; • Pressure inside the thorax increases; • Air moves up a pressure gradient. <p style="text-align: right;">[5]</p> <p>(b) (i) A Tidal volume [1] B Expiratory/Inspiratory reserve volume [1] C Expiratory/Inspiratory reserve volume [1]</p> <p style="text-align: right;">[3]</p> <p>Note: there is potential for ambiguity in the diagram when naming the lung volume measurements so accept Expiratory or Inspiratory reserve volume for both B and C. If the same name is used for both award [1] in total for B and C.</p> <p>(ii) Any two from:</p> <ul style="list-style-type: none"> • Deep(est) inhalation/deep(est) breath in; • (Fully) exhale through the spirometer/blow hard (fully) out; • Best of three (readings) taken. <p style="text-align: right;">[2]</p> <p>(iii) Any three from:</p> <ul style="list-style-type: none"> • Lung tissue elastic/can expand and recoil; • In emphysema lung tissue is damaged/loses elasticity; • Bronchioles collapse/trap air in alveoli; • Alveoli unable to recoil efficiently/expel air; • Alveoli over-expand and rupture. <p style="text-align: right;">[3]</p>	13
2	<p>(a) (i) • Vegetarian burger lower in total fat/4.8 vs 24.7/beefburger higher in total fat [1] • Vegetarian burger lower in saturated fat/0.5 vs 10.7/beefburger higher in saturated fat [1] • Vegetarian burger has no cholesterol/beefburger has 76 mg/100 g of cholesterol [1]</p> <p style="text-align: right;">[3]</p> <p>(ii) Vegetarian burger better for health [1] Any three from:</p> <ul style="list-style-type: none"> • Beefburger is higher in kilocalories/or converse • Many more kcal are derived from the fat content in beefburger/ 76 vs 30/or converse • Extra calories/calories from fat can contribute to weight gain/obesity • Obesity is a risk factor for diabetes/cardiovascular disease (heart attack/stroke)/cancer [3] <p style="text-align: right;">[4]</p> <p>(b) (i) Any one from:</p> <ul style="list-style-type: none"> • Fibre may help reduce blood cholesterol levels; • Fibre may improve digestive transit. <p style="text-align: right;">[1]</p> <p>(ii) Any one from:</p> <ul style="list-style-type: none"> • Cardiovascular disease/heart attack/stroke; • Cancer. <p style="text-align: right;">[1]</p> <p>(c) (i) Vegetarian burger is lower in iron than beefburger/0.5 vs 1.6/ or converse.</p> <p style="text-align: right;">[1]</p>	

(ii) Any **three** from:

- Iron important component of haemoglobin; [1]
- Haemoglobin (found in the red blood cell) transports oxygen throughout body; [1]
- Low iron may lead to anaemia; [1]
- Symptoms of anaemia include tiredness and pale skin. [1]

[3]

AVAILABLE
MARKS

13

3 Max **four** from:

- Consuming 18 units;
- Exceeding recommended units;
- By 4 units;
- Need to reduce units;
- Need to spread over 3 or more days per week;
- Already have (5) alcohol-free days;

Max **four** from:

- Liver damage/disease
- Cardiovascular disease/diabetes/stroke/heart attack
- Cancer
- Neurological damage/nerve/brain
- Sexual problems
- Problems with conception/pregnancy
- Mental health effects

Level of Response	Marking Criteria	Marks
Excellent	Candidates give 7–8 points from the indicative content. Presentation, spelling, punctuation and grammar are excellent.	[7]–[8]
Very good	Candidates give 5–6 points from the indicative content. Presentation, spelling, punctuation and grammar are very good.	[5]–[6]
Good	Candidates give 3–4 points from the indicative content. Presentation, spelling, punctuation and grammar are sufficiently competent to make the meaning clear.	[3]–[4]
Basic	Candidates give 1–2 points from the indicative content. There may be some errors in spelling, punctuation and grammar.	[1]–[2]
	Response is not worthy of credit.	[0]

[8]

8

4 (a) (i) **Two** correct points from graph (110 – 80) [1]
Correct subtraction after – before [1] = 30 [1]
If only correct answer given then [2] marks.

[2]

(ii) Anywhere on the x (time) axis between 70 and 120 min.

[1]

(iii) To raise blood glucose levels/because blood glucose is too low.

[1]

		AVAILABLE MARKS
<p>(b) Any three from:</p> <ul style="list-style-type: none"> • Complex carbohydrates release glucose over a long(er) period of time, or converse for simple carbohydrates; • Complex carbohydrates reduce fluctuations in blood glucose/glucose highs/peaks, or converse for simple carbohydrates; • Reduces the need for insulin; • (Body) uses glucose as it is released. 	[3]	7
<p>5 (a) (i) Appropriate scaling of each axis [2] Axes labelled appropriately including correct units [1] Points plotted correctly for running [1] Points plotted correctly for public speaking [1] Lines drawn through points [1] Allow maximum of one incorrect point plotted per line drawn [6]</p> <p>(ii) To establish his resting/baseline pulse rate/to determine if the activities changed his resting pulse rate. [1]</p> <p>(b) • Both activities increased pulse rate [1] • Running produced a higher maximum pulse rate/public speaking produced a lower maximum pulse rate/121 vs 105 [1] • Maximum pulse rate achieved at 1 minute for both activities/ 121 and 105 [1] • Pulse rate remained higher for longer with running/or converse (above 80 for more than 7 minutes vs 7 minutes)/Pulse rate with did not return to baseline/or converse [1] • Pulse rate for public speaking returned to resting levels 7 minutes after activity had ended (80). [1]</p>	[6]	12
<p>6 (a) Short term: Weight maintenance/tone health/muscle development/improved mental health/improved respiratory function/improved cardiovascular function Any other appropriate response [1]</p> <p>Long term: Increased life expectancy/reduced risk of cardiovascular disease (or heart attack/stroke/respiratory disease (or named)/obesity/type 2 diabetes/cancer (or named) [1]</p>	[2]	
<p>(b) (i) Any six from:</p> <ul style="list-style-type: none"> • In all years girls lower than boys/19 vs 28, 16 vs 21, 20 vs 23/or converse in each (named) year girls lower than boys/19 vs 28, 16 vs 21, 20 vs 23/or converse; • Boys % overall highest in 2008; • Girls % overall highest in 2015; • Both % overall lowest in 2012; from all years in study • Boys decreased 2008 to 2012/7%; • Increased slightly 2012 to 2015/2%; • Girls decreased 2008 to 2012/3%, increased in 2012 to 2015/4%; • Boys lower than baseline (2008) in 2015/fewer meeting guidelines; • Girls higher than baseline (2008) in 2015/more meeting guidelines. <p>(ii) • % boys not meeting guidelines = 79% [1] • % girls not meeting guidelines = 84% [1] • $163 \div 2$ [1] • 81.5% [1]</p>	[6]	12

- 7 (a) (i) Adenine [1]
- (ii) Energy is released; [1] terminal (end/last) phosphate is removed; [1] [2]
- (iii) Any **two** from:
- Energy released in small steps/small amount of energy released;
 - Single reaction;
 - ATP can be easily transported around the cell. [2]
- (b) (i) Any **three** from:
- NAD/FAD reduced/hydrogen attached to NAD/FAD;
 - H⁺ ions/electrons transferred from coenzyme to coenzyme/carrier to carrier/series of redox reactions;
 - energy made available as electrons passed on; energy used to synthesise ATP from ADP and phosphate/using ATPase;
 - H⁺/protons passed into intermembrane space;
 - H⁺/protons flow back through enzyme. [3]
- (ii) Aerobic respiration requires oxygen/anaerobic energy does not require oxygen. [1]
 Maximum energy (95%) obtained in first 10 s of running obtained from anaerobic respiration/only 5% of energy generated in first 10 s of running obtained from aerobic energy. [1] [2]

Total

**AVAILABLE
MARKS**

10

75