



Rewarding Learning

**ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2017**

Life and Health Sciences

Assessment Unit AS 2

assessing

Human Body Systems

[SZ021]

MONDAY 15 MAY, AFTERNOON

**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	(a) (i)	A: Atrio-ventricular valve/AV valve/tricuspid valve [1]	[2]	9		
		B: Right atrium [1]				
		(ii) Left ventricle [1]				
	(iii) Vena cava [1]					
	(b)	Any two from:	[2]			
		<ul style="list-style-type: none"> • Thick middle layer (tunica media is thicker) • Narrow lumen • Overall rounded shape 				
	(c)	Any three from:	[3]			
		<ul style="list-style-type: none"> • Measure blood pressure before beginning exercise • Same level of exercise • Same length of time of exercise • Repeat measurements • Calculate class average for males and for females 				
	2	(a) (i)	A Bronchus [1]		[2]	18
			B Bronchiole [1]			
(ii)		Blood capillaries [1]				
(iii)		Maximum any three adaptations from:	[6]			
		Folded shape of alveoli [1]; and therefore a large surface area [1]				
		Alveoli 1 cell thick/thin walls [1]; short diffusion path [1]				
(b) (i)		Alveoli are covered by a moist layer [1]; aids gas diffusion. [1]	[6]			
		Close proximity to capillaries [1]; for ease of diffusion/concentration gradient [1]				
		Correct explanation with adaptation				
		Appropriate scaling of each axis starting at (0, 0) [2]				
	Axes labelled appropriately including correct units [1]					
(ii)	Points plotted correctly before treatment [1]	[6]				
	Points plotted correctly after treatment [1]					
(iii)	Lines drawn through points [1]	[2]				
	Allow maximum of one incorrect point plotted per line drawn					
(ii)	Two correct points from graph (41 – 34%) [1]	[2]				
	Correct subtraction After – before [1] = 7					
(iii)	If only correct answer given then [2] marks	[1]				
	Drug may be reducing excess mucus amount (and/or stickiness)					

- 3 (a) • Fat intake too high [1]; reduce named fat intake [1]
 • Vitamin C too low [1]; increase intake of citrus fruits/fruit juice/
 tomatoes/potatoes [1]
 • Iron level too low [1]; increase red meat/green leafy vegetables/
 fortified cereals [1] [6]
- (b) Correct recommendation linked to correct evaluation of data
 Reduce to no more than 14 units/week. [1]
 Needs to spread units evenly over 3 days or more [1] [2]
- (c) Reduced oxyhaemoglobin/reduced oxygen (in skin/blood capillaries close
 to skin) [1]
 Reduced **oxygen** availability for (cellular) **respiration** [1] [2]
- 4 Indicative content
 Any **six** from:
- overweight/obesity
 - increased blood pressure
 - increase heart rate/pulse
 - shortness of breath/reduced lung capacity
 - cardiovascular disease/stroke
 - lack of coordination/movement control
 - reduced musculoskeletal strength
 - negative psychological effects described or adoption of unhealthy
 behaviours [6]

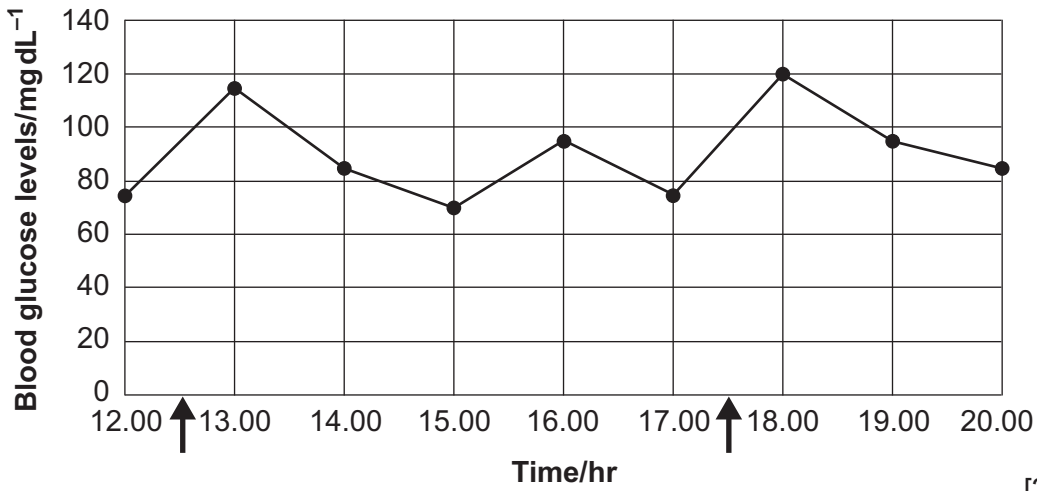
AVAILABLE
MARKS

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Level of response	Marking Criteria	Marks
Excellent	Candidates give 5–6 points from the indicative content. Presentation, spelling, punctuation and grammar are excellent.	[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]

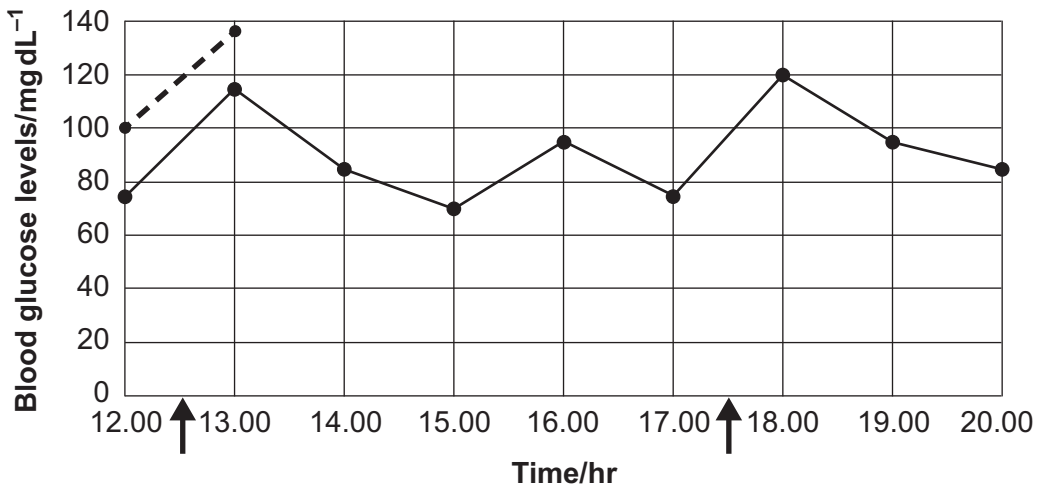
- 5 (a) (i) Increase in blood glucose levels between 12.00 and 13.00
 Decrease between 13.00 and 15.00. [1]
- (ii) Arrows anywhere between 12.00 and 13.00 (during lunch) [1] and
 anywhere between 17.00 and 18.00 (during evening meal) [1]



(iii) To lower blood glucose levels/because blood glucose is too high [1]

- (iv) Any **two** from:
- Glucose uptake increased
 - Glucose converted to glycogen
 - Increased respiration/more respiration

- (b) (i) Dashed line starts above 80 mg dL⁻¹ [1]
 Stays above original graph [1] [2]



(ii) Lack of insulin/no insulin/little insulin [1]

- (iii) Any **two** from:
- Complex carbohydrates release glucose/sugar over a long(er) period of time
 - Reduce fluctuations in blood sugar/sugar highs/peaks
 - Reduces the need for insulin
 - (Body) uses glucose as it is released

AVAILABLE
MARKS

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			AVAILABLE MARKS	
6	(a)	(i) Required to build and maintain cell membranes/make steroid hormones (testosterone, oestrogen, progesterone) [1]		
		(ii) Cardiovascular disease/atherosclerosis/heart disease [1]		
	(b)	(i) Any two from: <ul style="list-style-type: none"> • All male • All 55 • All same diet • All comparable and slightly elevated cholesterol levels at start of investigation (week 0) [2]		
		(ii) Any two from: <ul style="list-style-type: none"> • Smoking • Low physical activity level • Kidney or liver disease • Family history of raised cholesterol [2]		
		(iii) Allows scientist to determine cholesterol lowering effects of drug or drink [1], do not accept 'control/comparator group' with no further explanation. [1]		
	(c)	Any four from: <ul style="list-style-type: none"> • Both reduced to healthy levels (5.0 mmolL⁻¹ or less) • At week 12 drug reduced to lower level than drink • 4.0 mmol L⁻¹ for drug vs 5.0 mmolL⁻¹ for drink • Drug reduced to healthy level sooner – reduced by week 4 (vs week 12 for drink) • Group 1 has reduced to better than healthy levels (< 5.0 mmolL⁻¹) [4]	11	
	7	(a)	(i) Ribose [1]	
			(ii) Any six from: <ul style="list-style-type: none"> • Hydrogens produced during glycolysis and/or Krebs cycle • Hydrogen carried by NAD/FAD (or flavoprotein) and coenzyme Q • Hydrogen dissociates into electrons (and protons) • Electrons pass along cytochromes • One carrier is oxidised as hydrogen/electron is removed so that the next carrier is reduced/series of redox reactions • Carriers are at progressively lower energy levels • Sufficient energy available at certain stages to produce ATP • ATP produced by oxidative phosphorylation • NAD = 3 ATP and FAD = 2 ATP (both values must be correct) [6]	
		(b)	More ATP produced in aerobic/less produced in anaerobic [1] Aerobic requires oxygen/anaerobic does not [1] Aerobic does not produce lactic acid/anaerobic produces lactic acid [1]	10
			Total	75