Rewarding Learning

ADVANCED SUBSIDIARY (AS)
General Certificate of Education
2024

Life and Health Sciences

Assessment Unit AS 2
assessing
Human Body Systems

[SZ021]

WEDNESDAY 29 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)**	A bronchus/bronchi [1] B a bronchiole [1]	[2]	
	(b)	0.2 mm = 200 µm [1]; 20/200 = 0.1 sec [1] Correct answer only [2]	[2]	
	(c)	**(i)** Volume (of air in lungs) decreases	[1]	
		(ii) Reduced flow rates/less air breathed out/more air left in lungs (after exhaling)	[1]	
		(iii) Any **four** from: • Alveoli breakdown/collapse/rupture/alveolar (epithelial) walls thicken • Reduced (alveolar) surface area/increased diffusion pathway • Reduced diffusion • Less elastin/elastic tissue/less recoil/loss of elasticity • Reduced diffusion/concentration gradient	[4]	10
2	**(a)**	Circle around white blood cell (macrophage) [1] Explanation: White blood cell/macrophage/immune cells responsible for destruction of bacteria [1]	[2]	
	(b)	Thick muscle wall	[1]	
	(c)	**(i)** Appropriate scaling of each axis [2] Axes labelled appropriately including correct units [1] Points plotted correctly for Person A [1] Points plotted correctly for Person B [1] Lines drawn through points [1] Allow maximum of one incorrect point plotted per line drawn	[6]	
		(ii) Person A 124 × 200 = 24 800 ml min^{-1} [1] Person B 188 × 200 = 37 600 ml min^{-1} [1]	[2]	
		(iii) Person B [1] threshold Regular intense exercise strengthens the heart (muscle) [1] Greater stroke volume/cardiac output/or correct calculated value [1]	[3]	14

				AVAILABLE MARKS
3	**(a)**	Total fat higher in cow's milk/1.6 g vs 1.1 g [1] Cow's milk 4.6 g carbohydrate while almond milk has 0 g [1] Cow's milk 4.7 g lactose while almond milk has 0 g [1]	[3]	
	(b) **(i)**	Growth and repair (of body/body tissues)	[1]	
	(ii)	Fatigue/swelling/reduced immunity/prone to infections/loss of muscle mass/hair, skin, nail problems	[1]	
	(c) **(i)**	Any **three** from: • Lower saturated fat/or converse • Lower energy kcal/or converse • Higher saturated fat associated with heart disease/cardiovascular disease • Higher energy kcal associated with weight gain/obesity • Obesity is a risk factor for diabetes/cardiovascular disease/ cancer	[3]	
	(ii)	Calcitonin/parathyroid hormone	[1]	
	(iii)	Any **three** from: • Needed for healthy bones/prevention of rickets, osteomalacia, osteoporosis • Needed for healthy teeth • Regulates muscle (heart) contractions • Needed for normal blood clotting • Nerve impulses	[3]	12
4	**(a)**	Any **three** from: • Affect blood pressure • Affect the amount of water in the blood/water balance/controls water movement • Affect the pH of the blood/keep blood pH constant/buffer blood • Nerve impulse • Hydrochloric acid in stomach • Electrical balance/muscle contraction	[3]	
	(b) **(i)**	Aldosterone	[1]	
	(ii)	Negative feedback [1] Prevents over-correction/going **above** normal levels [1]	[2]	
	(c) **(i)**	Low sodium: Brain swelling/seizures/death	[1]	
	(ii)	High Sodium: High blood pressure/hypertension/(Increased) cardiovascular disease/CHD/heart disease/heart attack/(increased risk of) stroke/(increased risk of) kidney damage/increased risk of dehydration	[1]	8

5 Max **four** from:

- Exceeding recommended units
- By 7 units
- Need to reduce units
- Already spread over 3 or more days per week
- Already have (4) alcohol-free days

Max **four** from:

- Liver damage/disease
- Cardiovascular disease
- 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

AVAILABLE MARKS

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6	**(a)**	**(i)**	Five portions of fruit and vegetables each day [1]	
		(ii)	Lucy and Katie meeting recommendations/Emma is not meeting recommendations [1] Any **four** from: • Emma 2 portions • Lucy 5 (6, if vegetables in spaghetti bolognese) portions • Katie 5 portions • Emma carrots and broccoli • Katie fruit, salad, mushrooms, peas, carrots • Lucy orange juice, salad, apple, fruit, banana (vegetables in spaghetti bolognese) [5]	
	(b)	**(i)**	Guideline **daily energy intake** for an adult female in the UK is 2000/2500 (kcal) [1]	
		(ii)	Lucy and Katie meeting (or below) recommendations/both 2000 kcal or Emma is not meeting recommendations/2000 (or 2500) vs 2650/150 (650) extra calories [1] Weight gain/overweight/obesity/obesity is a risk factor for diabetes/ cardiovascular disease/cancer [1] [2]	
		(iii)	Any **three** from: • Emma overall least healthy/Lucy overall most healthy/Katie 'middle' healthy • Emma snacks high fat/high sugar/high calorie • Lucy (or Katie) plain nuts contain fibre/minerals/protein/or other acceptable answer • Lucy one piece of fruit as snack [3]	
	(c)	**(i)**	Wholegrain bread [1] Wholegrain pasta [1] [2]	
		(ii)	Any **two** from: • 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 [2]	16

				AVAILABLE MARKS
7	(a)	(i)	Ribose [1]	
		(ii)	Phosphate bond in ATP is broken/(one) phosphate is removed from ATP [1]	
	(b)	(i)	Needed to make ATP (from ADP)/needed for phosphorylation [1]	
		(ii)	(Oxygen) needed for formation of ATP/phosphorylation/(Oxygen) used (so its level falls) [1]	
		(iii)	Less oxygen available in medium at 3 min than at 2 min/because all available oxygen (in solution) has been used up [1]	
	(c)		Oxygen concentration in the solution will not change [1] Glucose cannot enter mitochondria (too large/no carrier system/needs to be converted to pyruvate (during glycolysis/in the cytoplasm) before entry)/ glucose cannot be metabolised (in mitochondria) [1] [2]	7
			Total	**75**