AQA

Level 3 Certificate / Extended Certificate

Applied Science

ASC4-Unit 4 The Human Body

Mark scheme

June 2018

Version/Stage: 1.0 Final

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Assessment Writer.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

Question	Answers	Additional comments	Mark	AO
01.1	small intestine	allow correctly named section of the small intestine	1	AO2
	correctly labelled		1	AO1
01.2	gall bladder	this order only	1	AO1
	pancreas		1	AO1
01.3	(releases) bile		1	AO1
	(which) emulsifies the fats	do **not** allow breaks down fats	1	AO1
	(which) gives a larger surface area (for enzymes to act upon)		1	AO2
01.4	(carbohydrase) carbohydrate **and** (protease) protein	1 mark for each row	1	AO1
	mouth / pancreas / small intestine **and** stomach / pancreas / small intestine		1	AO1
	mouth / small intestine **and** stomach / small intestine		1	AO1
01.5	scurvy		1	AO1
01.6	any **two** from, • swollen / bleeding gums • fatigue • painful limbs / joints • shortness of breath • bruising easily • bulging eyes • slower healing of cuts / wounds **or** skin cracking / peeling		2	AO1

01.7	any **two** from, • vitamin C supplements • eat foods high in vitamin C • correct named food e.g. citrus fruits / peppers / strawberries / broccoli		2	AO2

01.8	$\dfrac{211}{26}$ (×100) 811(.5)(%) **or** 812	an answer of 811(.5) or 812 scores 2 marks	1 1	AO2 AO2

01.9	reasons for, • there has been a (significant) rise in children with vitamin C deficiency reasons against, • only shows one type of malnutrition not all • only shows hospital admissions **or** may be other cases where they don't go to hospital • numbers are very small		1 1	AO3

Total			**19**	

Question	Answers	Additional comments	Mark	AO
02.1	(frontal lobe) emotions and reasoning		1	AO1
	(occipital lobe) visual processing		1	
	(parietal lobe) movement and recognition		1	
	(temporal lobe) memory and speech		1	

Question	Answers	Additional comments	Mark	AO
02.2	cerebral cortex		1	AO1

Question	Answers	Additional comments	Mark	AO
02.3	sympathetic		1	AO1

Question	Answers	Additional comments	Mark	AO
02.4	any **three** from, • forgetfulness / confusion • repeat things they've previously said • hard to make decisions • hesitant to try new things • getting lost • sleep problems • obsessive behaviour • sleep problems • mood swings **or** depression • hallucinations • difficulty eating / swallowing • incontinence • loss of speech		3	AO1

Question	Answers	Additional comments	Mark	AO
02.5	any **three** from, • calcium ions enter the (pre-synaptic) neurone • acetylcholine / neurone transmitter is released (from pre-synaptic membrane) • diffuses across the synapse • binds to receptors on the (post-synaptic) neurone (causing a new action potential)		3	AO1 AO1 AO1 AO1

Total			12	

Question	Answers	Additional comments	Mark	AO
03.1	ball and socket		1	AO2
03.2	movement in any plane	do **not** allow flexion / extension	1	AO2
03.3	**P** (synovial) fluid / cavity		1	AO1
	Q cartilage		1	AO1
03.4	hold the bones / joint together	do **not** allow shock absorber	1	AO1
03.5	any **one** from, • stop the metal rubbing against the bone • shock absorber • enable smoother movement		1	AO2
03.6	any **one** from, • completely covers the ends of the bone • two pieces fit together better • (movement) will be more stable		1	AO3

Total			7	

Question	Answers	Additional comments	Mark	AO
04.1	any **two** from, • function over long periods of time • respire aerobically • store glycogen • can respire fat (stores) • good blood supply • have myoglobin • high density of mitochondria	allow idea of slow to fatigue do **not** allow energy being produced / created	2	AO1
04.2	all points plotted correctly	allow **1** mark for 4 or 5 correct points plotted ignore line drawn	2	AO2

04.3	any **two** from,
	
	• first 6 / 7 / 8 minutes fast-twitch have more force (than slow twitch)
	• fast-twitch fatigue faster (than slow-twitch)
	• fast-twitch show a greater decrease in percentage force
	• fast-twitch decline at a steadier rate
	  or
	  slow-twitch rate of decline fluctuates more than fast-twitch
			2	AO3

04.4	ATP is used up (releasing energy for muscle contraction)		1	AO2
	(and therefore) myosin heads cannot change shape **or** myosin (heads) cannot detach (from the actin filaments)		1	AO1

04.5		idea of more needed to gain maximum marks		
	(more) creatine phosphate can be made		1	AO2
	phosphate can be used to make ATP **or** recycle ADP	do **not** allow energy being produced / created	1	AO1
	so more energy for muscle contraction **or** energy is more readily available		1	AO1

Total			**11**	

Question	Answers	Additional comments	Mark	AO
05.1	**S** dendrite(s)		1	AO1
	T node (of Ranvier)		1	
	U myelin (sheath)	allow Schwann cells	1	
05.2	U / myelin is an insulator		1	AO1
	(so) action potentials jump from node to node **or** (wave of action potentials moves by) saltatory conduction		1	
	(therefore) fewer action potentials needed (to reach the end of the neurone)		1	
05.3	sodium channels open		1	AO1
	sodium ions enter the axon / neurone		1	
05.4	sodium-potassium pump		1	AO1
	(actively) transports sodium ions out of the cell **and** potassium ions in to the cell		1	
	more sodium ions (are pumped) out compared with potassium ions (pumped) in **or** three Na^+ ions (are pumped) out and only two K^+ ions (are pumped) in	allow the membrane is more permeable to potassium ions so they diffuse back out of the cell (amplifying the effect)	1	
Total			**11**	