



Level 3 Certificate/Extended Certificate

APPLIED SCIENCE

ASC4

Unit 4 The Human Body

Mark scheme

January 2020

Version: V1 Final Mark Scheme

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 Examiner.

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.

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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	ID
01.1	any two from: <ul style="list-style-type: none"> • support • protection • movement • marrow / blood cell production • resorption / ossification / (bone) modelling 	allow mineral store	2	AO1 2b	E
01.2	cartilage		1	AO1 2a	A
01.3	ball and socket		1	AO2 2c	G
01.4	hinge		1	AO1 2c	G
01.5	any two from: <ul style="list-style-type: none"> • skull / cranium / hyoid / mandible • bones in the inner ear • ribs • sternum • vertebrae / coccyx / sacrum 	allow vertebral column	2	AO1 2a	E
Total			7		

Question	Answers	Additional comments	Mark	AO	ID
02.1	serotonin		1	AO1 5i	A
02.2	any two from: <ul style="list-style-type: none"> • low mood / sadness lack of enjoyment • feeling hopeless / helpless / tearful • tired / exhausted • no motivation / interest • low self-esteem • guilt-ridden • irritable / intolerant • difficulty making decisions • feeling anxious / worried • suicidal thoughts • self-harming • changes in weight / appetite • low sex drive • disturbed sleep / insomnia • social withdrawal 		2	AO1 5j	E
02.3	any two from: <ul style="list-style-type: none"> • insulation • respiratory substrate • produce hormones • produce (new) cell membranes • protect organs 	allow energy store	2	AO1 1i	E
02.4	any one from: <ul style="list-style-type: none"> • medical diagnosis of depression • interview / observation by a (medical) professional • answers to the question are subjective • <18 year olds were not included in the study 	allow participants may lie allow do more than one questionnaire	1	AO3 5j	E

02.5	depression is more likely / severe if you are underweight or obese		1	AO3 5j	E
	depression least likely / severe if you are overweight		1		
		allow severity of depression is second highest in the obese group			
		allow other correct conclusions derived from the graph			
02.6	muscle stiffness		1	AO1 5j	A
	tremors in the hands		1		
02.7	drug B has a similar shape / structure to dopamine	allow complementary shape to dopamine receptors	1	AO2 5k	E
	(so) it mimics dopamine		1		
		allow can be broken down to form dopamine (1) and bind to (dopamine) receptors (1)			
or					
(so) it binds to dopamine receptors					
Total			12		

Question	Answers	Additional comments	Mark	AO	ID
03.1	A sarcomere	accept Z disc	1	AO1 2d	E
	B Z line		1		
	C myosin (filament)		1		
03.2	shortens / narrows	allows get smaller	1	AO2 2e	E
	as the actin and myosin (filaments) slide over / between each other		1		
03.3	100 times per second		1	AO1 2e	A
03.4	ATP		1	AO1 2e	E
03.5	binds to troponin		1	AO1 2f	E
	causing tropomyosin to change shape		1		
	or causing tropomyosin to move revealing / unblocking the binding sites (on actin)		1		
03.6	(calcium ions) are actively transported	allow back into the sarcoplasmic reticulum	1	AO1 2f	E
	out of the sarcoplasm / myofibril		1		
03.7	functions over long periods of time		1	AO1 2j	A
	has a high density of mitochondria		1		
	has a very good blood supply		1		

<p>03.8</p>	<p>phosphate removed from ATP is added to the creatine</p>	<p>allow creatine kinase catalyses the conversion (of creatine to creatine phosphate)</p> <p>allow for 2 marks, creatine + ATP → creatine phosphate + ADP</p>	<p>1 1</p>	<p>AO1 2m</p>	<p>E</p>
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<p>Total</p>			<p>17</p>
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Question	Answers	Additional comments	Mark	AO	ID
04.1	(pupils) constrict	allow get smaller	1	AO2 4e	E
	(breathing rate) decreases		1		
04.2	brain stem		1	AO2 4g,h,i	A
04.3	any one from: <ul style="list-style-type: none"> • reasoning • planning • movement • emotions • problem-solving • language • impulse control • social interaction 		1	AO1 4g	A
04.4	X dendrites		1	AO1 5a	E
	Y axon		1		
04.5	sensory	allow bipolar neurone	1	AO1 5a	G
04.6	moves potassium ions into the cell and sodium ions out of the cell		1	AO1 5b	A
04.7	sodium (ion) channels open		1	AO1 5b	E
	(so) sodium ions diffuse / flood in		1		
	(and) sodium ions are positive (and therefore the inside of the neurone becomes positively charged)		1		
04.8	has a myelin sheath or it is myelinated	allow saltatory conduction from node to node	1	AO2 5c,d AO1	E
	so (electrical) impulse jumps from node to node		1		

Total			13
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Question	Answers	Additional comments	Mark	AO	ID
05.1	sodium (ions) and glucose absorbed by co-transport	allow sodium moved by the sodium – potassium pump (to the blood)	1	AO1 1g	E
	sodium actively transported (from cells of small intestine) to blood		1	AO2	
	(so) sodium ions diffuse (from small intestine) to the cells		1	AO2	
05.2	any two from: <ul style="list-style-type: none"> • drink A has the highest sodium chloride • drink A causes the highest blood glucose concentration • drink B contains sodium chloride and the blood glucose concentration increases slightly • water / drink C has no sodium chloride and blood glucose concentration falls 	allow drink B contains sodium chloride and the blood glucose concentration stays fairly constant	2	AO3 1g	E
05.3	any two from: <ul style="list-style-type: none"> • sample size is too small • only one set of data or not been repeated or only measured blood glucose concentration three times • drink B gives a lower / same / similar blood glucose concentration as drink C (for the first 60 minutes) • drink A gives the highest blood glucose concentration, but it could be due to the higher concentration of glucose • more than one variable changed at a time or other factors / Vitamin B / protein might affect the uptake of glucose 		2	AO3 1g	E

05.4	(5.5 – 4.8 =) 0.7	an answer of 12.7 or 13 (%) scores 3 marks	1	AO2 1g	E
	$\frac{0.7}{5.5} \times 100$		1		
	12.7 (%)	allow 13 (%)	1		
05.5	repair / build muscles / tissues	allow co-transport	1	AO2 1i	E
Total			11		