Level 3 Certificate/Extended Certificate
APPLIED SCIENCE
ASC4

Unit 4 The Human Body

Mark scheme

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2 2 1 A A S C 4 / M S

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.

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 2 with a small amount of level 3 material it would be placed in level 2 but be awarded a mark near the top of the level because of the level 3 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 1

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.1	any **one** from: • (to) form haemoglobin • (to) transports oxygen (around the body)	allow form myoglobin	1	AO1 1i

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.2	any **two** from: • tired / fatigued • light-headed / dizzy • headaches • palpitations • pale complexion / gums / nails **or** blue tinge to skin • increased infections • shortness of breath		2	AO1 1j

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
01.3	any **two** from: • red meat • spinach • kale • lentils • liver • nuts • fortified breakfast cereals • dried fruits • iron supplements	if no foods stated, allow **1** mark for eat foods rich / high in iron	2	AO1 1k

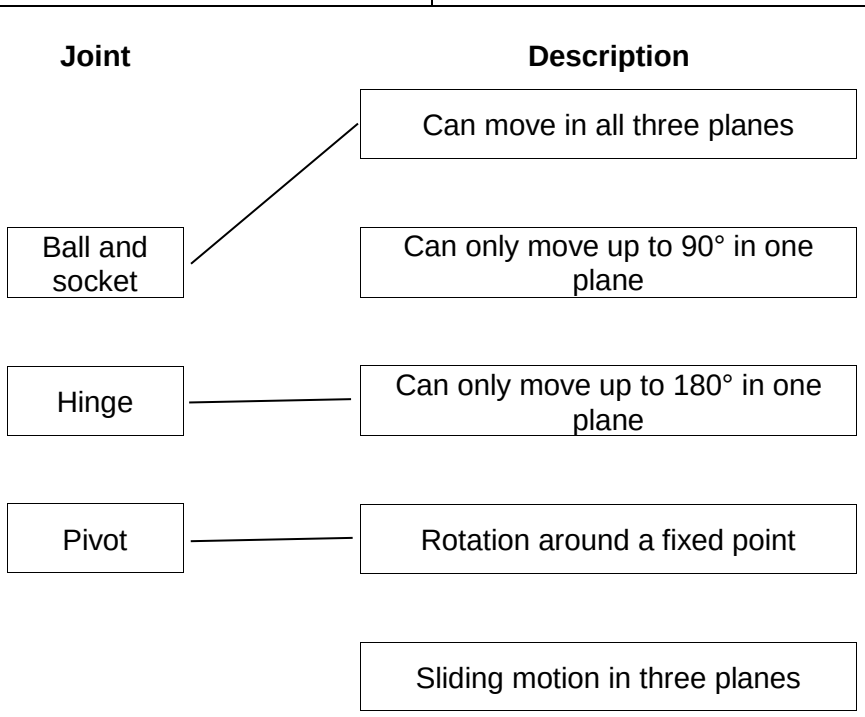
Total Question 1		**5**

Question 2

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.1	any **two** from: • support • protection • movement • blood cell production • bone remodelling **or** ossification **or** resorption	allow production of a named blood cell	2	AO1 2b

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.2	(axial) skull / spine / rib(s) / ribcage / ear bones / sternum (appendicular) correct named bone such as shoulder / clavicle / pelvis / femur	allow the axial skeleton is the bones of the trunk allow the appendicular is the bones of the appendages / limbs ignore arm / leg / foot / hand unqualified	1 1	AO1 2a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.3	ligament		1	AO1 2c

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.4	 additional line from a box negates **1** mark for that box		3	AO1 2c

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.5	to lubricate the joint		1	AO1 2c

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.6	any **two** from: • both have spaces **or** both have a spongy appearance • bone **B** has fewer gaps / spaces • bone **B** has larger gaps / spaces • bone **B** is more porous		2	AO3 2a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.7	more likely to break bones / joints	ignore weaker bones	1	AO2 2a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
02.8	any **two** from: • increase calcium intake • increase vitamin D intake • (weight bearing) exercise	allow examples of how to increase calcium intake allow examples of how to increase vitamin D intake	2	AO2 1i

Total Question 2		**14**

Question 3

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.1	**Term** / **Description** Chemical digestion Mechanical digestion Breaking large food particles into smaller particles Condensation reactions take place during this type of digestion Hydrolysis of the bonds within a food molecule Joining small molecules together to form insoluble molecules additional lines from a box negates the mark for the box		2	AO1 1b

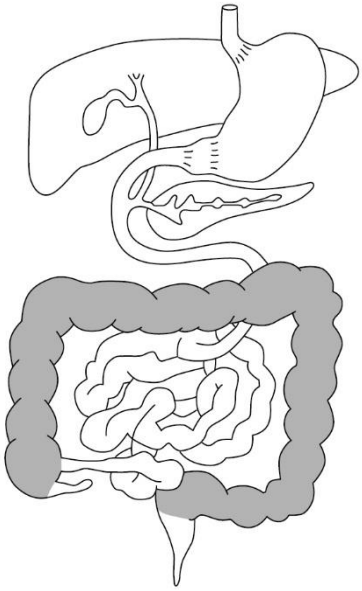
Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.2	carbohydrase(s)		1	AO1 1b, c, e & f
	any **two** from: • small intestine • pancreas • salivary gland	allow mouth	1	
	glucose	allow sugars	1	
	small intestine	allow villi / microvilli	1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.3	(hydrochloric acid) reduces the pH of the stomach		1	AO1 1d
	(so it is at) the optimum pH / conditions for the enzymes to work	allow activates / converts (inactive) pepsinogen **or** converts pepsinogen to pepsin	1	

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.4	gall bladder		1	AO1 1b

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.5	fats / lipids		1	AO1 1d

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.6	large intestine	allow colon	1	AO1 1b

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.7	large intestine shaded in grey 	ecf from Question **03.6**	1	AO1 1a

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
03.8	sodium ions are absorbed by co-transport with glucose (so) more sodium ions are absorbed (absorption of sodium ions) causes water to be absorbed (from food)		1 1 1	AO2 1g

Total Question 3		**15**

Question 4

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.1	brain stem		1	AO1 4i

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.2	(cerebellum) controls / coordinates movement (as the person runs away) (occipital lobe) processes the impulses from the eye (parietal lobe) recognises the snake (as dangerous)	allow controls balance (as the person runs away) allow processes the information from the eye allow visual processing ignore vision unqualified allow helps control movement / orientation	1 1 1	AO2 4g, h

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.3	somatic nervous system controls voluntary movements (and the) autonomic nervous system controls involuntary / automatic movement / actions	 allow the autonomic nervous system controls subconscious responses	1 1	AO1 4b

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.4	(sympathetic) controls (physiological) functions in response to threatening situations (parasympathetic) maintains normal (physiological) functioning		1 1	AO1 4c

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.5	stimulates the digestive system		1	AO1 4e

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.6	dilates the pupils		1	AO1 4d

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
04.7	any **two** from: • temporal lobe is responsible for memory • (**B**) there is less grey / living brain tissue (than **A**) • (and) there is more dead / diseased / injured parts	allow temporal lobe is damaged allow there are bigger gaps / cavities	2	AO3 4g

Total Question 4		**12**

Question 5

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.1	any **three** from: • can generate / make ATP very quickly • can respire anaerobically • has a store of creatine phosphate (for anaerobic respiration) • can contract quickly • (more) powerful contractions		3	AO2 2i, k

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.2	sarcomere		1	AO1 2d

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.3	actin		1	AO1 2d

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.4	2.1 – 1.7 **or** 0.4 $\frac{0.4}{1.7}$ (× 100) 23.5(29…) or 24 (%)		1 1 1	AO2 2d

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.5	calcium ions bind with troponin causing tropomyosin to change shape and unblock the binding sites myosin heads attach to actin head changes shape / position sliding the actin along the myosin	 allow myosin forms a cross bridge with actin	1 1 1 1	AO1 2e, f

Question	Answers	Extra information	Mark	AO/ Spec. Ref.
05.6	active transport (moves the calcium ions) out of the sarcoplasm / myofibril	 allow (moves the calcium ions) into the sarcoplasmic reticulum	1 1	AO1 2f

Total Question 5		**14**