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LEVEL 3 CERTIFICATE AND EXTENDED  
CERTIFICATE  
**APPLIED SCIENCE**  
**ASC4**

The Human Body

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**Mark scheme**  
January 2018

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Version: 1.0 Final



1 8 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 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](http://aqa.org.uk)

## **Marking methods**

In fairness to candidates, all examiners must use the same marking methods. The following advice may seem obvious, but all examiners must follow it as closely as possible.

1. If you have any doubt about how to allocate marks to an answer, consult your Team Leader.
2. Refer constantly to the mark scheme and standardising scripts throughout the marking period.
3. Use the full range of marks. Don't hesitate to give full marks when the answer merits them.
4. The key to good and fair marking is consistency.

## **Introduction**

The information provided for each question is intended to be a guide to the kind of answers anticipated and is neither exhaustive nor prescriptive. All appropriate responses should be given credit.

Where literary or linguistic terms appear in the Mark Scheme, they do so generally for the sake of brevity. Knowledge of such terms, other than those given in the specification, is not required. However, when determining the level of response for a particular answer, examiners should take into account any instances where the candidate uses these terms effectively to aid the clarity and precision of the argument.

## **Descriptions of levels of response**

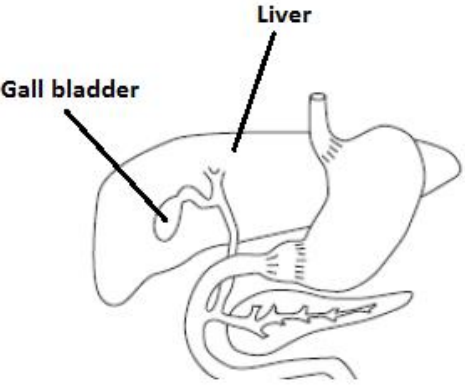
The following procedure must be adopted in marking by levels of response:

- read the answer as a whole
- work up through the descriptors to find the one which best fits
- where there is more than one mark available in a level, determine the mark from the mark range judging whether the answer is nearer to the level above or to the one below.

Since answers will rarely match a descriptor in all respects, examiners must allow good performance in some aspects to compensate for shortcomings in other respects. Consequently, the level is determined by the 'best fit' rather than requiring every element of the descriptor to be matched. Examiners should aim to use the full range of levels and marks, taking into account the standard that can reasonably be expected of candidates.

Question	Answers	Additional Comments/Guidelines	Mark
01.1	resorption ossification	in either order	1 1
01.2	hinge		1
01.3	can flex / bend / extend / straighten in one plane (only)	do <b>not</b> allow rotation	1 1
01.4	any <b>two</b> from, <ul style="list-style-type: none"> <li>• provide a smooth surface</li> <li>• reduce friction</li> <li>• protect the bones from wearing away</li> <li>• absorb impact</li> </ul>		2
01.5	(axial) is the vertebrae, skull, sternum and ribs.		1
<b>Total</b>			<b>8</b>

Question	Answers	Additional Comments/Guidelines	Mark
02.1	any <b>two</b> from, <ul style="list-style-type: none"> <li>• inadequate bone development</li> <li>• inadequate tooth development</li> <li>• decreased blood clotting</li> <li>• reduced nerve / muscle development</li> </ul>	ignore bone diseases	2
02.2	any <b>two</b> from, <ul style="list-style-type: none"> <li>• tired / fatigued</li> <li>• light-headed / dizzy</li> <li>• pale complexion / blue tinge to skin</li> <li>• increased infection</li> </ul>	ignore headaches / nausea allow reduced red blood cells / haemoglobin	2
02.3	iron supplements eat foods high in iron	allow examples e.g. red meat, spinach	1  1

Question	Answers	Additional Comments/Guidelines	Mark
02.4		Labelled anywhere on correct organs Both needed for one mark	1
02.5	bile emulsifies lipid molecules (which) gives a larger surface area (for enzymes / lipase to work) enzymes / lipase help breakdown (the bonds) in the lipids <b>or</b> break lipid molecules into smaller /soluble molecules	allow enzymes lower the activation energy (for hydrolysis)	1 1 1
02.6	(water is used to) break the ester bonds between glycerol and the fatty acid		1 1
<b>Total</b>			<b>12</b>

Question	Answers	Additional Comments/Guidelines	Mark
03.1	Iron (ion) / Fe <sup>2+</sup>		1
03.2	(pulse) oximeter		1
03.3	95 – 99 (%)		1
03.4	line follows shape to the left of the line		1
	line finishes at approximately the same level		1
03.5	(at high altitude there is a) lower partial pressure of oxygen	allow higher rate of respiration	1
	(therefore) more red blood cells made to carry (enough) oxygen <b>or</b>		1
	(therefore) more oxygen is carried		1
	when returning to sea level (there are more rbc's so) more oxygen is carried (than normal)		1
	for (aerobic) respiration (to continue for longer) (and) more energy is released (for use by muscles)		1
<b>Total</b>			<b>10</b>

Question	Answers	Additional Comments/Guidelines	Mark
04.1	(somatic is) the voluntary (nervous system) such as voluntary movement / walking (autonomic is) the involuntary (nervous system) allows internal organs to function properly	allow correct example  allow correct example	1 1 1 1
04.2	any <b>two</b> from, <ul style="list-style-type: none"> <li>• slows heart rate</li> <li>• increases digestive system activity</li> <li>• constricts pupils</li> <li>• salivation</li> <li>• constricts bronchi</li> <li>• slows breathing rate</li> <li>• stimulates urination</li> <li>• causes erection</li> <li>• increases salivation / perspiration</li> </ul>		2
04.3	cerebellum		1



Question	Answers	Additional Comments/Guidelines	Mark
04.4	any <b>two</b> from, <ul style="list-style-type: none"> <li>• breathing will stop</li> <li>• heart will stop</li> <li>• loss of consciousness</li> </ul>	allow poor balance / staggering	2
<b>Total</b>			<b>9</b>

Question	Answers	Additional Comments/Guidelines	Mark
05.1	(A) H-band <b>or</b> H zone (B) I-band <b>or</b> light band (C) A-band <b>or</b> dark zone		1 1 1
05.2	B gets shorter <b>or</b> decreases in length C stays the same (length)	ignore contracts	1 1
05.3	myosin (head) attaches to the actin (filament) myosin (head) changes shape <b>or</b> swivels moving the actin (filament) over the myosin (filament)		1 1 1
05.4	calcium unblocks the binding sites on the actin filaments if there is no calcium, tropomyosin remains unchanged (therefore) the myosin heads cannot bind to the actin (to cause contraction)	if no other marks awarded, allow one mark for Dantrolene acting as a muscle relaxant.	1 1 1
<b>Total</b>			<b>11</b>

Question	Answers	Additional Comments/Guidelines	Mark
06.1	-69	accept in range –67 to –69	1
06.2	C		1
06.3	B		1
06.4	any <b>two</b> from, <ul style="list-style-type: none"> <li>• myelinated neurones have faster conduction speeds (than non-myelinated)</li> <li>• in A and C increasing (axon) diameter increases the speed of conduction</li> <li>• the presence of myelin has no effect on axon diameter</li> </ul>	allow idea of data not sufficient to show real trends <b>or</b> not sufficient to make a valid conclusion.	1  1
06.5	calcium channels open (therefore) calcium ions move in (to the presynaptic knob) which causes vesicles to move to / fuse with the (presynaptic) membrane		1  1  1
06.6	(drug blocks serotonin uptake channels) therefore more serotonin in synapse / gap to bind to receptors (alleviating the symptoms of depression)		1  1

<b>Total</b>			<b>10</b>
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