



ASSESSMENT and  
QUALIFICATIONS  
ALLIANCE

# Mark scheme

# June 2003

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## GCSE

## Human Physiology and Health

3417

## Foundation

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## Information to Examiners

### 1. General

The mark scheme for each question shows:

- the marks available for each part of the question;
- the total marks available for the question;
- the typical answer or answers which are expected;
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The typical expected **answer** is given in the left hand side of the appropriate section of the mark scheme. The **extra information** is given in the right hand side of the same section and should only be applied to that item in the mark scheme.

e.g. **Question:** Where, in a human, would the cell body of a motor neurone be found?

*(1 mark)*

<b>Mark Scheme</b>	<b>answers</b>	<b>extra information</b>
	brain or spinal cord or CNS	'grey matter' must be qualified re. one of these
<b>Candidates' Answers</b>	1. <i>in the brain</i> 2. <i>in the grey matter</i> 3. <i>in the grey matter of the spinal cord</i>	scores 1 mark scores 0 marks scores 1 mark

At the beginning of the mark scheme to a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be located in an unusual situation, such as on the diagram or a graph.

In general, the extra information on the right hand side of the mark scheme is there to amplify the mark scheme, showing possible acceptable alternatives which may be given by candidates, providing limits of accuracy (e.g. in reading data from a graph), as well as any common errors which might result in cancellation of the mark. The purpose is to improve the consistency of marking.

All marks are awarded independently unless linking is specified.

### 2. Emboldening

- 2.1** In a list of acceptable answers where more than one mark is available 'any **two** from:' is used, with the number of marks emboldened. Each of the points following is a potential mark.
- 2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.
- 2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a /; e.g. allow smooth / free movement.)

### 3. Marking points

#### 3.1 Marking of Quality of Written Communication

Examiners are reminded of the need to assess QoWC by the following statement appearing in the appropriate parts of the mark scheme:

The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme.

The maximum marks available to a candidate whose answer is not well expressed will be (the number of marks available) – 1.

### 3.2 Marking of lists

This applies to questions requiring a set number of responses, but for which candidates have provided extra responses. The general principle to be followed in such a situation is that 'right + wrong = wrong'.

Each error/contradiction negates each correct response. So, if the number of errors/contradictions equals or exceeds the number of marks available for that part of the question, no marks can be awarded

However, responses considered to be neutral (indicated as \* in this example) are ignored and are not penalised.

e.g. **Question:** Give **three** functions of the placenta. (3 marks)

Mark Scheme	answers	extra information
	any <b>three</b> from: supply oxygen to fetus supply food to fetus supply antibodies to fetus remove CO <sub>2</sub> from fetus  remove urea from fetus	<b>allow</b> correct named food <b>do not</b> accept 'protein' unqualified <b>allow</b> 'remove waste' only if no named examples  <b>do not</b> accept 'supply blood to fetus'

#### Candidates' Answers:

1. To supply oxygen and food to the baby	✓ ✓	scores 2 marks
2. To supply oxygen, food and blood to the fetus	✓ ✓ ×	scores 1 mark
3. To supply oxygen, food and blood to the fetus and remove CO <sub>2</sub>	✓ ✓ × ✓	scores 2 marks
4. To supply oxygen (and goodness) to the baby and remove waste	✓ * ✓	scores 2 marks

### 3.3 Use of chemical symbols/formulae

If a candidate writes a chemical symbol/formula instead of the required chemical name, full credit can be given if the symbol/formula is correct and if, in the context of the question, such action is appropriate.

### 3.4 Marking procedure for calculations

**3.4.1** Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working being shown. However, if the answer is incorrect, mark(s) can still be gained by correct substitution/working. This is shown in the 'extra information' column.

**3.4.2** In a calculation based on figures obtained by the candidate from information supplied elsewhere in the question (e.g. from a table or a graph), credit will still be given for workings based upon the candidate's incorrect figures and the answer resulting therefrom.

**3.4.3** Where calculations are based on incorrectly recalled relationships, neither the incorrectly recalled relationship, nor the resulting calculation based on the incorrect relationship, will be credited.

**3.5 Interpretation of 'it'**

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

**3.6 Errors carried forward**

There should be no error carried forward from a previous answer which has been based on wrong science or an incorrect calculation. Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f in the marking scheme.

**3.7 Phonetic spelling**

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term. Particular terms to watch out for are:

urea	urine		
ureter	'ureta'	'urether'	urethra
mitosis	'meitosis'	'miosis'	meiosis

**3.8 Brackets**

(.....) is used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

**3.9 Interpretation of marginal points**

There will be times when the answer is almost, but not quite, correct. Some examiners would award a mark while others would not. In any one script, an attempt should be made to balance these nearly correct answers by giving the mark 50% of the time and withholding it the other 50%. If this is not done, the marking would end up being too lenient or too harsh.

**3.10 Unexpected Correct Answers not in the Mark Scheme**

The Examiner should use professional judgement to award credit where a candidate has given an unexpected correct answer which is not covered by the mark scheme. The Examiner should consult with the Team Leader to confirm the judgement. The Team Leader should pass this answer on to the Principal Examiner with a view to informing all examiners.



**Foundation Tier Question 1**

question	answers	extra information	mark
(a)	<b>A</b>		1
	<b>B</b>		1
(b)	tissues organs	in this order	2
(c)	(stomach) digestive system (brain) nervous system (lungs) breathing system		3
total			7

**Foundation Tier Question 2**

question	answers	extra information	mark
(a)	lung cancer		1
	rickets		1
	poliomyelitis		1
(b)(i)	<b>4</b> correct plots	<b>2/3</b> correct plots – <b>1 mark</b> ± half a square	2
(ii)	(brand) <b>B</b>		1
(iii)	nicotine	accept carbon monoxide accept carcinogens or named examples	1
(iv)	any <b>two</b> from: are addicted / dependant / have craving for develop withdrawal symptoms chemical changes in the body	do <b>not</b> accept references to peer pressure or stress	2
total			9

**Foundation Tier Question 3**

question	answers	extra information	mark
(a)	fat / lipids fibre	in either order	2
(b)(i)	starch <b>and</b> fat	both required	1
(ii)	(test 1) starch (test 2) protein		2
(iii)	<i>The answer to this question requires ideas in good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme</i>  crush biscuit in water  add Benedict's  heat <b>or</b> water bath  green <b>or</b> yellow <b>or</b> orange / red / brown colour	maximum of <b>3</b> marks if ideas not well expressed ✗ Q if communication mark penalised maximum of <b>3</b> marks for diagram    do <b>not</b> accept boil	1 1 1 1
total			9

**Foundation Tier Question 4**

question	answers	extra information	mark
(a)(i)	£2.10		1
(ii)	<u>most</u> expensive		1
(iii)	(£)15 000 000	accept $2 \times 7\,500\,000$ for <b>1</b> mark accept $7.5 \times 2\,000\,000$ for <b>1</b> mark	2
(b)	any <b>two</b> from: paper <b>or</b> card glass <b>or</b> bottles <b>or</b> jars metals <b>or</b> named metal <b>or</b> tins / cans (some) plastics	do <b>not</b> accept fabrics / cloth	2
total			6

**Foundation Tier Question 5**

question	answers	extra information	mark
(a)	sun <b>or</b> sunlight <b>or</b> light		1
(b)	make their own food		1
(c)	eat both plants <b>and</b> animals		1
(d)	cattle		1
(e)	any <b>two</b> from: ducks cattle chicken wheat		2
(f)	box with name <b>and</b> arrow to man	allow box anywhere do <b>not</b> accept if box connected to another producer	1
total			7

**Foundation Tier Question 6**

question	answers	extra information	mark
(a)	red blood cells white blood cells plasma		3
(b)(i)	vein		1
(ii)	(oxygen concentration) falls		1
(iii)	(oxygen used up by organs) in respiration		1
(iv)	(blood passes from lungs) along <b>B</b> / pulmonary vein to heart along <b>C</b> (to body organs) / aorta		3
total			9

**Foundation Tier Question 7**

question	answers	extra information	mark
(a)(i)	10		1
(ii)	30 (%)	$\pm 1$	1
(iii)	<p>growth of brain increases</p> <p>growth of reproductive organs increases</p> <p>brain <u>more</u> slowly or reproductive organs <u>faster</u></p> <p>reproductive organs increase by <b>greatest</b> amount</p>	<p>accept both increase for <b>2</b> marks</p> <p>accept specific references to data from graph e.g. brain increases by 4% reproductive organs by 43%</p> <p>accept reproductive organs increase faster than brain for 3 marks</p> <p><b>must</b> be a comparative statement for third mark point</p> <p>must be clear what time period is referred to</p>	3
(b)	<p>production of gametes</p> <p>growth of pubic hair</p> <p>increase in rate of growth</p>	more than three ticks minus one mark each tick	3
total			8

**Foundation Tier Question 8**

question	answers	extra information	mark
(a)(i)	recessive		1
(ii)	homozygous		1
(b)(i)	<p>(gametes) X X Y</p> <p>(children) XX XY</p>		2
(ii)	male		1
total			5



## Foundation Tier Question 9

question	answers	extra information	mark
(a)	C A		1 1
(b)	(Function) to crush <b>or</b> grind food  (Adaptation) any <b>one</b> from:  ridged large <b>or</b> big large surface area <b>or</b> broad / wide	ignore chew unless qualified – e.g. chew by grinding   accept cusps do <b>not</b> credit      rough bumpy	1  1
(c)	<u>bacteria</u> feed on <b>or</b> break down <u>sugar</u>  acid (produced) present in food / drink  (acid) erodes / dissolves / breaks down / attacks / damages enamel	do <b>not</b> accept food must have both bacteria <b>and</b> sugar  accept suitable source of acid  do <b>not</b> accept ‘eats’ – must be qualified ‘eats away’ do <b>not</b> accept decays the tooth	3
total			7

**Foundation Tier Question 10**

question	answers	extra information	mark
(a)	bacteria	accept correctly named alternatives	1
(b)(i)	chicken		1
(ii)	8	allow 1 mark for $\frac{16}{100} \times 50$	2
(c)(i)	(raw) milk is heated (rapidly) to 72 °C kept (at 72 °C) for 15 seconds cooled (rapidly)	do <b>not</b> accept boiled	4
(ii)	any <b>one</b> from: sterilisation <b>or</b> UHT dehydration	accept freezing do <b>not</b> accept refrigeration	1
total			9

## Foundation Tier Question 11

question	answers	extra information	mark
(i)	both use glucose both release energy	accept sugar do <b>not</b> accept <u>produce</u>	2
(ii)	any <b>one</b> from: <u>aerobic</u> uses oxygen <u>aerobic</u> releases more energy <u>aerobic</u> produces carbon dioxide <u>aerobic</u> produces water <u>anaerobic</u> produces lactic acid	accept reverse arguments	1
(b)	any <b>two</b> from: movement growth / repair maintenance of body temperature active transport	do <b>not</b> accept reproduction qualify action of body organs accept keeping warm	2
(c)(i)	18	accept 18.5	1
(ii)	1100		1
(iii)	30 000	allow <b>1</b> mark for $24 \times (1250)$ within small limit	2
(iv)	supplies <u>more</u> oxygen removes <u>more</u> carbon dioxide	accept for <b>1</b> mark when no gases are named gaseous exchange is faster / increases / more / better	2
total			11



## Foundation Tier Question 13

question	answers	extra information	mark
(a)(i)	C F A	do <b>not</b> accept names	3
(b)(i)	testes		1
(ii)	swim into oviduct / fallopian tube upper part (of oviduct) join <b>or</b> fuse / combine with egg	do not credit meet <b>or</b> fertilise / enter / penetrate egg without qualification	4
(c)	two eggs (released) each fertilised by separate <b>or</b> different sperm		2
(d)(i)	condom	accept vasectomy do <b>not</b> accept male pill	1
(ii)	ovary		1
(iii)	no egg (available) (for fertilisation) (sperm has nothing to fertilise) sperm unable to pass /( egg cannot meet sperm) (fertilised) egg unable to sink into <b>or</b> implant in uterus / no implantation	must have reason for no fertilisation  accept barrier for <u>sperm</u> do <b>not</b> accept difficult to pass	1  1 1
(iv)	any <b>one</b> from: not 100% effective eggs may still be released may forget to take 'pill' regularly	accept other drugs may affect accept qualified illness may affect e.g. upset stomach / sickness	1
total			16

**Foundation Tier Question 14**

question	answers	extra information	mark
(a)(i)	cowpox sufferers / dairymaids did not catch smallpox		1
(ii)	infection with cowpox gives protection <b>or</b> immunity from smallpox		2
(iii)	boy did not develop smallpox (after injection with cowpox) <b>or</b> the boy was immune to smallpox		1
(iv)	any <b>one</b> from:  boy already immune / has natural resistance  (smallpox) dose too small <b>or</b> weak		1
(v)	any <b>one</b> from:  could not be confirmed independently  too small a sample		1
(b)	any <b>one</b> from:  to establish if vaccine is effective  to see if vaccine harmful  to see if there are side effects  animals have similar immune systems  not ethical to test on humans	accept correct moral argument if related to humans	1
total			7