



# Mark Scheme (Results)

June 2014

Pearson Edexcel International  
GCSE Human Biology (4HB0/01)

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## General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Question number	Answer	Marks
1 (a)	A cytoplasm;	(1)
(b)	C organelle, cell, tissue, organ;	(1)
(c)	B oxygen and carbon dioxide;	(1)
(d)	B bacteria;	(1)
(e)	D producers;	(1)
(f)	A P;	(1)
(g)	D; pulmonary vein	(1)
(h)	D 54 g;	(1)
(i)	A 0 %;	(1)
(j)	B diffusion;	(1)

(Total for Question 1 = 10 marks)

Question number	Answer	Comments	Marks
2 (a)	biuret		(1)
(b) (i)	measuring cylinder;		(1)
(ii)	wear goggles/eye protection;	Ignore wearing (safety) gloves	(1)
(iii)	bottom of meniscus on 3;		(1)
(c)	protein not present in food P; protein present in food Q;		(2)

(Total for Question 2 = 6 marks)

Question number	Answer	Comments	Marks
3 (a)	<ul style="list-style-type: none"> <li>controls cell activities/chemical reactions/contains genes/genetic information/DNA;</li> <li>site of chemical reactions;</li> <li>controls what enters/leaves the cell</li> </ul>		<b>(3)</b>
(b)	<ul style="list-style-type: none"> <li>destroyed/digested/broken down;</li> <li>by (digestive) enzymes;</li> </ul>	allow kills	<b>(2)</b>
(c)	<ul style="list-style-type: none"> <li>binds/combines with antigens/clumps pathogens/bacteria;</li> <li>(antigen/antibody complex) acts as a signal to phagocytes</li> <li>enables phagocytes to break down pathogens more quickly/easily owtte;</li> </ul>		<b>(2)</b>

**(Total for Question 3 = 7 marks)**

Question number	Answer	Comments	Marks
4 (a)	<ul style="list-style-type: none"> <li>A pulp cavity;</li> <li>B enamel;</li> <li>C dentine;</li> </ul>		<b>(3)</b>
(b)	<ul style="list-style-type: none"> <li>4/5/6/7/8;</li> </ul>		<b>(1)</b>
(c)	<ul style="list-style-type: none"> <li>(vitamin) D;</li> <li>calcium/calcium phosphate;</li> </ul>		<b>(2)</b>
(d)	<ul style="list-style-type: none"> <li>removes plaque/bacteria/food particles;</li> <li>prevents/reduces acid formation;</li> <li>less enamel worn away;</li> <li>fluoride (in toothpaste) strengthens <u>enamel</u>;</li> </ul>		<b>(3)</b>

**(Total for Question 4 = 9 marks)**

Question number	Answer	Comments	Marks
5 (a)	<ul style="list-style-type: none"> <li>organisms in correct order as follows:</li> </ul> <p>barley → cows → humans OR</p> <pre>       humans      /    \   barley → cows </pre> <ul style="list-style-type: none"> <li>arrows in correct direction;</li> </ul>		(2)
(b) (i)	<p>two from:</p> <ul style="list-style-type: none"> <li>heat/movement/respiration/excretion / egestion/ not all of animal/organism is eaten/digested;;</li> </ul>	allow faeces as an alternative to egestion	(2)
(ii)	<ul style="list-style-type: none"> <li>barley contains more energy/produced faster ;</li> <li>(eating barley means) shorter food chain;</li> <li>less energy/biomass lost;</li> </ul>	accept converse argument	(2)
(c) (i)	<ul style="list-style-type: none"> <li>plants release oxygen during photosynthesis;</li> <li>oxygen needed for respiration;</li> <li>for energy;</li> </ul>		(2)
(ii)	<ul style="list-style-type: none"> <li>carbon dioxide;</li> <li>water;</li> </ul>		(2)

(Total for Question 5 = 10 marks)

Question number	Answer	Comments	Marks
6 (a) (i)	B AV/atrioventricular valve/tricuspid valve; C aorta;		(2)
(a) (ii)	D; A; A; E;	Also accept C	(4)
(b)	Four from: <ul style="list-style-type: none"> <li>• atheroma/fatty plaques/deposits;</li> <li>• <u>coronary</u> arteries narrowed/blocked;</li> <li>• reduced/no blood flow (to heart);</li> <li>• reduced/no oxygen/glucose;</li> <li>• to heart/cardiac muscle/cells;</li> <li>• aerobic respiration reduced/stopped;</li> <li>• heart muscle dies;</li> </ul>		(4)

(Total for Question 6 = 10 marks)

Question number	Answer	Comments	Marks
7 (a) (i)	fertilisation;		(1)
(ii)	oviduct/fallopian tube;		(1)
(b) (i)	row containing mitosis and 2;		(1)
(ii)	mutation		(1)
(c) (i)	<ul style="list-style-type: none"> <li>• X placenta/chorionic villi;</li> <li>• Y amniotic fluid;</li> </ul>		(2)
(ii)	shock absorber/protection of the embryo/fetus;		(1)
(iii)	three from: <ul style="list-style-type: none"> <li>• oxygen(to embryo);</li> <li>• food/glucose/nutrients (to embryo);</li> <li>• from(blood of) mother to embryo;</li> <li>• reference to growth of embryo</li> </ul>		(3)

(Total for Question 7 = 10 marks)

Question number	Answer	Comments	Marks
8 (a) (i)	<ul style="list-style-type: none"> <li>• maltose;</li> </ul>		<b>(1)</b>
(ii)	<ul style="list-style-type: none"> <li>• salivary gland;</li> <li>• pancreas;</li> <li>• small intestine/ ileum</li> </ul>	Ignore mouth	<b>(2)</b>
(b) (i)	<ul style="list-style-type: none"> <li>• 30 degrees 5/5.0;</li> <li>• 50 degrees 6.7;;</li> </ul>	Award 1 mark for 6.6 or 6.66	<b>(3)</b>
(ii)	<p>Three from:</p> <ul style="list-style-type: none"> <li>• higher at 40 °C /40 °C is the optimum/slower at 60 °C;</li> <li>• denatured at 60 °C;</li> <li>• bonds (in enzyme broken);</li> <li>• (shape of) active site altered;</li> <li>• substrate no longer fits;</li> </ul>	Allow comparison of data	<b>(3)</b>
(iii)	<p>Three from:</p> <ul style="list-style-type: none"> <li>• readings 10 degrees apart;</li> <li>• not enough readings around 40 °C degrees/take more readings around 40 °C;</li> <li>• optimum might be higher or lower than 40 degrees;</li> <li>• don't appear to be any repeats;</li> </ul>		<b>(3)</b>

**(Total for Question 8 = 12 marks)**



Question number	Answer	Comments	Marks
9 (a) (i)	traffic/car (exhausts)		<b>(1)</b>
(ii)	factories/power stations/burning fossil fuels/volcanoes;		<b>(1)</b>
(b) (i)	6; 20;;	Award one mark if 6/30 or 0.2 seen	<b>(3)</b>
(ii)	<ul style="list-style-type: none"> <li>• results show that there is less lichen present when sulfur dioxide/pollution is present/nearby;</li> <li>• it is an effective/good indicator of pollution/lichen appears to be affected by/sensitive to sulfur dioxide/pollution;</li> </ul>	Allow reverse argument	<b>(2)</b>
(c)	<p>Two from:</p> <ul style="list-style-type: none"> <li>• stops oxygen from combining with haemoglobin/reduces oxygen-carrying capacity of red blood cells/blood;</li> <li>• less oxygen reaches (brain) cells;</li> <li>• less respiration;</li> <li>• death of (brain) cells;</li> </ul>		<b>(2)</b>

**(Total for Question 9 = 9 marks)**

Question number	Answer	Comments	Marks
10 (a) (i)	Two from <ul style="list-style-type: none"><li>• flies may land on uncovered food;</li><li>• bacteria/pathogens transferred to food from the air;</li><li>• pathogens/bacteria transferred to food from server;</li></ul>		<b>(2)</b>
(ii)	Two from <ul style="list-style-type: none"><li>• takes time for bacteria to travel through the gut;</li><li>• bacteria have an incubation period/need time to multiply;</li><li>• certain level of bacteria/bacterial toxin needed (before symptoms show);</li></ul>		<b>(2)</b>



Question number	Answer	Comments	Marks
11 (a) (i)	homeostasis;		<b>(1)</b>
(ii)	<ul style="list-style-type: none"> <li>• hypothalamus;</li> <li>• constrict/vasoconstrict;</li> <li>• sweat;</li> <li>• evaporate;</li> <li>• shivering;</li> <li>• air;</li> <li>• insulation;</li> </ul>		<b>(7)</b>
(b) (i)	<ul style="list-style-type: none"> <li>• peaks in winter/more ice in winter;</li> <li>• troughs in summer/less ice in summer;</li> </ul>	Note: reference to seasons but wrong way round gains 1 mark	<b>(2)</b>
(ii)	<ul style="list-style-type: none"> <li>• sea ice volume is falling;</li> <li>• means it is getting warmer;</li> </ul>		<b>(2)</b>

**(Total for Question 11 = 12 marks)**

Question number	Answer	Comments	Marks
12 (a) (i)	Three from: <ul style="list-style-type: none"> <li>• platelets release enzyme;</li> <li>• thrombokinase;</li> <li>• prothromin to thrombin;</li> <li>• fibrinogen to fibrin;</li> <li>• a 'mesh' is formed over the cut owtte</li> </ul>		<b>(3)</b>
(ii)	<ul style="list-style-type: none"> <li>• stops blood flow/person losing too much blood;</li> <li>• stops pathogens/bacteria/disease-causing organisms entering;</li> </ul>	Allow reduces risk of infection Reject: stops disease (entering)	<b>(2)</b>
(b) (i)	<ul style="list-style-type: none"> <li>• male;</li> <li>• normal blood clotting;</li> <li>• <math>X^hY</math>;</li> <li>• <math>X^hX^h</math>;</li> </ul>	Do not accept normal Allow reversal of chromosomes i.e. $YX^h$	<b>(4)</b>
(ii)	<ul style="list-style-type: none"> <li>• females produced can only be <math>X^HX^h</math> or <math>X^HX^H</math>;</li> <li>• if child who has haemophilia is female they must have <math>X^hX^h</math>;</li> <li>• but man whose blood clots normally must have <math>X^H</math> allele/does not carry recessive allele;</li> <li>• father cannot pass on <math>X^h</math> to child/mother passes <math>X^h</math> to child;</li> </ul>	Do not allow Punnett square or genetic diagram	<b>(3)</b>

**(Total for Question 12 = 12 marks)**

