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# Mark Scheme (Results)

January 2018

Pearson Edexcel International GCSE

In Human Biology (4HB0) Paper 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	Notes	Marks
1 (a)	B; malaria is caused by a protozoan organism		1
(b)	A; 20%		1
(c)	C; ADH increases the amount of water reabsorbed into the blood		1
(d)	C; water vapour		1
(e)	A;		1
(f)	B; relax contract		1
(g)	D; glycerol fatty acid		1
(h)	B;		1
(i)	C; destroy bacteria		1
(j)	A; vitamin A		1
			Total 10

Question number	Answer	Notes	Marks
2 (a)	Two of <ul style="list-style-type: none"> <li>• more oxygen in inhaled air/less in exhaled air;</li> <li>• allows candle to burn for longer;</li> <li>• oxygen is used in respiration;</li> </ul>	Allow 21% in inhaled air and 16 % in exhaled air	2
(b) (i)	<ul style="list-style-type: none"> <li>• more carbon dioxide in exhaled/less in inhaled air;</li> <li>• exhaled air warmer/inhaled cooler;</li> <li>• exhaled air wetter/moister/inhaled drier;</li> </ul>		3
(b) (ii)	<ul style="list-style-type: none"> <li>• two tubes containing limewater;</li> <li>• breathe out into one and breathe in through the other;</li> <li>• tube with exhaled air/more CO<sub>2</sub> goes cloudy (first);</li> </ul> <p><b>or</b></p> <ul style="list-style-type: none"> <li>• use a thermometer;</li> <li>• breathe out over it/record temperature of exhaled air;</li> <li>• take room temperature to compare;</li> </ul> <p><b>or</b></p> <ul style="list-style-type: none"> <li>• use cobalt chloride/anhydrous copper sulphate paper;</li> <li>• breathe out over paper;</li> <li>• hold second piece in atmosphere and compare colours;</li> </ul>	Credit annotated diagrams	3
(c) (i)	cilia;		1
(ii)	<ul style="list-style-type: none"> <li>• nucleus labelled;</li> <li>• (cell) membrane labelled;</li> <li>• cytoplasm labelled;</li> </ul>		3

(iii)	trachea/bronchus;	Accept bronchi	1
(iv)	<ul style="list-style-type: none"><li>• cell drawn with same general shape;</li><li>• cilia reduced in size/non-existent;</li></ul>	Ignore labels	2
			Total 15

Question number	Answer	Notes	Marks
3	homeostasis; 37°C; enzymes; hypothalamus; vasoconstriction; erector; sweat; negative;		1 1 1 1 1 1 1 1
			Total 8

Question number	Answer	Notes	Marks
4 (a)	<ul style="list-style-type: none"> <li>• ileum/small intestine/duodenum;</li> <li>• maltase present ;</li> <li>• pH8/alkaline;</li> <li>• reference to partial permeability;</li> </ul>		4
(b) (i)	<ul style="list-style-type: none"> <li>• sample of distilled water in test/boiling tube;</li> <li>• add (drops of) Benedict's solution;</li> <li>• heat in a water bath/wearing goggles/pointing away from eyes;</li> <li>• colour change (blue) to (brick) red;</li> </ul>		4
(b) (ii)	<p>Three of</p> <ul style="list-style-type: none"> <li>• maltose digested/broken down;</li> <li>• by maltase;</li> <li>• into glucose;</li> <li>• (glucose) diffused/passes down a concentration gradient/passed out of tube/through wall of tube;</li> </ul>		3
(c)	<p>Four of</p> <ul style="list-style-type: none"> <li>• human at 37°C/maintained at optimum/body temperature;</li> <li>• blood supply;</li> <li>• muscle layers/peristalsis;</li> <li>• lacteal/villi present;</li> <li>• alimentary canal is long/greater surface area;</li> <li>• enzymes produced/more enzymes;</li> </ul>		4
			Total 15



Question number	Answer	Notes	Marks
5 (a)	axes labelled correctly;  suitable scales; correct plots; suitable lines; hormones identified;	Max 3 marks if axes wrong way round	5
(b) (i)	menstruation/period;		1
(b) (ii)	ovulation;		1
(c) (i)	<ul style="list-style-type: none"> <li>• initial decrease between days 1 and 8;</li> <li>• goes up and down (after initial decrease);</li> <li>• increase starts between days 8-12;</li> <li>• decrease starts between days 24-28;</li> </ul>		3
(c) (ii)	3 of <ul style="list-style-type: none"> <li>• increase in thickness;</li> <li>• allows implantation (of fertilised ovum/embryo);</li> <li>• non-fertilised ovum must be removed;</li> <li>• along with the lining;</li> </ul>		3
(d)	<ul style="list-style-type: none"> <li>• temperature increases at ovulation;</li> <li>• sexual intercourse at that time;</li> <li>• ensures ovum available for fertilisation/increased chance of fertilisation;</li> </ul>		3
			Total 16

Question number	Answer	Notes	Marks
6	6 of <ul style="list-style-type: none"><li>• balance/means of weighing;</li><li>• test tube/boiling tube/calorimeter;</li><li>• thermometer;</li><li>• Bunsen burner/lighter/oil burner / wick;</li><li>• measuring cylinder/burette/pipette;</li><li>• needle/pin;</li><li>• goggles/safety glasses;</li><li>• clamp stand;</li></ul>	ALLOW water	6
			Total 6

Question number	Answer	Notes	Marks
7 (a)	P R (Q) U S T;;;	one mark for P and R before Q <b>and</b> U S T after Q one mark for correct order of P R and one mark for correct order for U S T	3
(b) (i)	arteries;	Accept reverse argument	1
(ii)	<ul style="list-style-type: none"> <li>• large cross sectional area in capillaries/many capillaries;</li> <li>• less resistance to flow;</li> </ul>		2
(iii)	capillaries;		1
(iv)	Four of <ul style="list-style-type: none"> <li>• walls one cell thick/thin walls / shorter diffusion distance;</li> <li>• gives large surface area;</li> <li>• low blood pressure;</li> <li>• results in slow flow rate;</li> <li>• reference to pores;</li> <li>• allows for exchange of substances;</li> <li>• reference to more/faster diffusion</li> </ul>		4
(v)	<ul style="list-style-type: none"> <li>• carbon dioxide;</li> <li>• urea/ammonia;</li> </ul>		2
			Total 13

Question number	Answer	Notes	Marks															
8 (a) (i)	<ul style="list-style-type: none"> <li>wrong type causes agglutination / clumping;</li> <li>blocks blood vessels/named blood vessel;</li> </ul>		2															
(ii)	<table border="1" data-bbox="408 584 1046 949"> <thead> <tr> <th>Blood group of person</th> <th>Can donate blood to people of blood group</th> <th>Can receive blood from people of blood group</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>A and AB;</td> <td>A and O;</td> </tr> <tr> <td>B</td> <td>B and AB;</td> <td><b>B and O</b></td> </tr> <tr> <td>AB</td> <td><b>AB</b></td> <td>all groups;</td> </tr> <tr> <td>O</td> <td>all groups;</td> <td>O;</td> </tr> </tbody> </table>	Blood group of person	Can donate blood to people of blood group	Can receive blood from people of blood group	A	A and AB;	A and O;	B	B and AB;	<b>B and O</b>	AB	<b>AB</b>	all groups;	O	all groups;	O;		6
Blood group of person	Can donate blood to people of blood group	Can receive blood from people of blood group																
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O	all groups;	O;																
(b) (i)	<ul style="list-style-type: none"> <li>equally dominant /or equiv;</li> <li>both expressed in phenotype /or equiv;</li> </ul>		2															
(ii)	<ul style="list-style-type: none"> <li><math>I^A I^B</math>;</li> <li><math>I^B I^B</math>; <math>I^B I^O</math>;</li> <li><math>I^O I^O</math>;</li> </ul>		4															
(iii)	<ul style="list-style-type: none"> <li>parents <math>I^A I^O</math> <math>I^B I^O</math>;</li> <li>gametes <math>I^A</math> <math>I^O</math> <math>I^B</math> <math>I^O</math>;</li> <li>fertilisation <math>I^A I^B</math> <math>I^A I^O</math> <math>I^B I^O</math> <math>I^O I^O</math>;</li> <li>phenotype AB A B O;</li> </ul>		4															
(iv)	<ul style="list-style-type: none"> <li>1/4 /25%/0.25/1:3;</li> <li>as they are genetically identical;</li> </ul>		2															
			Total 20															

Question number	Answer	Notes	Marks
9 (a)	structure X = cartilage structure Y = marrow;		2
b)	<ul style="list-style-type: none"><li>• long bone;</li><li>• ball that articulates with socket at one end;</li><li>• (broader/wider surface at other end) to form a hinge joint;</li></ul>		3
			Total 5

Question number	Answer	Notes	Marks												
10 (a)	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td data-bbox="424 300 635 405"></td> <td data-bbox="635 300 842 405">Nervous co ordination</td> <td data-bbox="842 300 1054 405">Hormonal co ordination</td> </tr> <tr> <td data-bbox="424 405 635 479">type of message</td> <td data-bbox="635 405 842 479">electrical;</td> <td data-bbox="842 405 1054 479">chemical;</td> </tr> <tr> <td data-bbox="424 479 635 553">route of transfer</td> <td data-bbox="635 479 842 553">neurones/ nerve cells;</td> <td data-bbox="842 479 1054 553">Blood / plasma;</td> </tr> <tr> <td data-bbox="424 553 635 627">speed of transfer</td> <td data-bbox="635 553 842 627">fast;</td> <td data-bbox="842 553 1054 627">slow;</td> </tr> </table>		Nervous co ordination	Hormonal co ordination	type of message	electrical;	chemical;	route of transfer	neurones/ nerve cells;	Blood / plasma;	speed of transfer	fast;	slow;	One mark for each correct box	6
	Nervous co ordination	Hormonal co ordination													
type of message	electrical;	chemical;													
route of transfer	neurones/ nerve cells;	Blood / plasma;													
speed of transfer	fast;	slow;													
(b) (i)	<ul style="list-style-type: none"> <li>• structure A = cell body;</li> <li>• structure B = axon;</li> </ul>		2												
(ii)	<ul style="list-style-type: none"> <li>• transmit impulse;</li> <li>• to CNS/brain/spinal cord/relay neurone from receptor;</li> </ul>		2												
(iii)	<p style="margin-left: 20px;">2 of</p> <ul style="list-style-type: none"> <li>• neurotransmitter/chemical (secreted);</li> <li>• <u>diffuses</u> across synapse/gap;</li> <li>• triggers/stimulates new impulse in next cell/binds to receptors;</li> </ul>		2												
			Total 12												



