



Mark Scheme (Results)

January 2015

Pearson Edexcel International GCSE in
Human Biology (4HB0) Paper 02

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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	Accept	Marks
1 (a) (i)	<ul style="list-style-type: none"> • TB/typhoid/gonorrhoea; 	any named disease caused by bacteria;	1
(ii)	<ul style="list-style-type: none"> • athlete's foot/thrush/ringworm; 	any named disease caused by fungi;	1
(b) (i)	<ul style="list-style-type: none"> • parasite; 		1
(ii)	<ul style="list-style-type: none"> • glucose; • amino acids; • fatty acids/glycerol; 		2

Question number	Answer	Notes	Marks
1 (iii)	<ul style="list-style-type: none"> • Y = white blood cell/leucocytes/phagocytes/neutrophil; • Z = red blood cell/erythrocyte; 	reject lymphocytes reject RBC	2
(iv)	<ul style="list-style-type: none"> • Y has a nucleus/contains genes/chromosomes/DNA, (Z does not); • Y irregular in shape, Z has a fixed/biconcave shape; • Y does not have haemoglobin, (Z has haemoglobin); • Y is larger/Z smaller; 	Allow protects body from disease	2
(v)	<ul style="list-style-type: none"> • Y engulfs/destroys bacteria/pathogens,(Z does not); • Y does not carry oxygen, (Z carries oxygen); 		2

Question Number	Answer	Notes	Marks
(vi)	<ul style="list-style-type: none"> • platelets/thrombocytes; 		1
(vii)	<ul style="list-style-type: none"> • blood clotting; • prevents excessive loss of blood/drop in blood pressure; • seals wound; • prevents entry of pathogenic/disease causing organisms; 	Allow reduces risk of infection	3
			Total 15

Question number	Answer	Accept	Marks
2 (a) (i)	carbon dioxide;		1
	(ii) (change from clear/colourless) to milky/white precipitate formed/turns cloudy;		1
(b)	<ul style="list-style-type: none"> • bacteria using oxygen; • as they are carrying out (aerobic) respiration; • carbon dioxide released; • is absorbed by limewater; • the amount/volume of gas/air in the flask decreases; • pressure decreases; • atmospheric air pressure forces a change in level of liquid; 		4

Question number	Answer	Accept	Marks
2 (c) (i)	<ul style="list-style-type: none"> • (external) temperature; 		1
(ii)	<ul style="list-style-type: none"> • change in temperature would change volume/pressure of air/gas in apparatus/affect rate of respiration; • would change fluid level in capillary tube; 	accept ref to decrease/increase in temp	2
(d)	<ul style="list-style-type: none"> • same apparatus/repeat; • without soil in bag/heated soil to destroy bacteria/without bacteria; • note results; • compare with original; • no change/different change to original; 	Allow description of same set-up of apparatus	3
			Total 12

Question number	Answer	Notes	Marks
3	<ul style="list-style-type: none"> • two strands; • coiled/spiral; • forms double helix; • made up of nucleotides; • containing sugar/phosphate/(four) bases; • adenine, guanine, cytosine and thymine; • two strands held together by base pairing; • hydrogen bonding between base pairs; • adenine pairs with thymine; • cytosine pairs with guanine; • made up of sections called genes; 	<p>Accept ladder-shape</p> <p>For marking point 1 allow for 1 mark a diagram of a ladder</p> <p>For marking points 1,2,3 allow for 3 marks a diagram of a double-helix</p>	<p style="text-align: center;">8</p> <p style="text-align: right;">Total 8</p>

Question number	Answer	Accept	Marks
4 (a)	<ul style="list-style-type: none"> • neither dominant nor recessive/neither dominant over the other; • appearance/characteristic/phenotype is a mixture of both/both expressed; 		2
(b)	<ul style="list-style-type: none"> • allele/characteristic carried on X/sex chromosome; • passed onto offspring/next generation; 	Ignore Y chromosome	2

Question number	Answer	Accept	Marks
4 (c)	<p>man</p> <p>woman</p> <p>$I^A I^O$</p> <p>$I^B I^O$;</p> <p>gametes I^A I^O I^B</p> <p>I^O;</p> <p>fertilisation $I^A I^O$ $I^B I^O$ $I^A I^B$</p> <p>$I^O I^O$;</p> <p>phenotype group A group B group AB</p> <p>group O;</p>	<p>Allow 2 marks max for Punnett square</p>	<p>4</p>
(d) (i)	25%/1 in 4/ 1:3/ one in four/ 1 in 4/ 0.25;		1
(d) (ii)	50%/1:1 / half / one in two /1 in 2/ 0.5;		1
			Total 10

Question number	Answer	Accept	Marks														
5 (a) (i)	<table border="1" data-bbox="533 371 1243 954"> <thead> <tr> <th data-bbox="533 371 978 432">Function</th> <th data-bbox="978 371 1243 432">Structure</th> </tr> </thead> <tbody> <tr> <td data-bbox="533 432 978 509">stores faeces</td> <td data-bbox="978 432 1243 509">I</td> </tr> <tr> <td data-bbox="533 509 978 585">stores bile</td> <td data-bbox="978 509 1243 585">E;</td> </tr> <tr> <td data-bbox="533 585 978 683">absorbs water from undigested food</td> <td data-bbox="978 585 1243 683">B;</td> </tr> <tr> <td data-bbox="533 683 978 780">absorbs the products of digestion</td> <td data-bbox="978 683 1243 780">C;</td> </tr> <tr> <td data-bbox="533 780 978 873">begins the process of protein digestion</td> <td data-bbox="978 780 1243 873">G;</td> </tr> <tr> <td data-bbox="533 873 978 954">produces urea</td> <td data-bbox="978 873 1243 954">D;</td> </tr> </tbody> </table>	Function	Structure	stores faeces	I	stores bile	E;	absorbs water from undigested food	B;	absorbs the products of digestion	C;	begins the process of protein digestion	G;	produces urea	D;	<p data-bbox="1417 308 1608 336">allow names</p> <p data-bbox="1417 579 1637 608">E= gall bladder</p> <p data-bbox="1417 647 1630 715">B= large intestine/colon</p> <p data-bbox="1417 754 1630 821">C= small intestine/ileum</p> <p data-bbox="1417 861 1581 890">G=stomach</p> <p data-bbox="1417 930 1525 959">D=liver</p>	5
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produces urea	D;																
(b)	<ul data-bbox="394 1074 1305 1238" style="list-style-type: none"> • peristalsis; • alternate contraction of (longitudinal and circular) muscles; • contracting behind food/pushes/squeezes food along; 		3														
			Total 8														

Question number	Answer	Accept	Marks
6 (a)	<ul style="list-style-type: none"> • water will pass from B/to A (by osmosis); • lower water potential in side A/higher water potential in B; • greater percentage (of water); 		3
(b)	<ul style="list-style-type: none"> • no change/stays at 0%; • too big to pass through membrane; 		2
6 (c)	<ul style="list-style-type: none"> • percentage of protein will decrease/protein solution more dilute; • water moves in from side B/more water in side A; 		2
			Total 7

