



Mark Scheme (Results)

January 2015

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

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information, please visit our website at www.edexcel.com.

Our website subject pages hold useful resources, support material and live feeds from our subject advisors giving you access to a portal of information. If you have any subject specific questions about this specification that require the help of a subject specialist, you may find our Ask The Expert email service helpful.

www.edexcel.com/contactus

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

January 2015

Publications Code UG040571

All the material in this publication is copyright

© Pearson Education Ltd 2015

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="533 371 978 435">Function</th> <th data-bbox="978 371 1243 435">Structure</th> </tr> </thead> <tbody> <tr> <td data-bbox="533 435 978 512">stores faeces</td> <td data-bbox="978 435 1243 512">I</td> </tr> <tr> <td data-bbox="533 512 978 588">stores bile</td> <td data-bbox="978 512 1243 588">E;</td> </tr> <tr> <td data-bbox="533 588 978 681">absorbs water from undigested food</td> <td data-bbox="978 588 1243 681">B;</td> </tr> <tr> <td data-bbox="533 681 978 774">absorbs the products of digestion</td> <td data-bbox="978 681 1243 774">C;</td> </tr> <tr> <td data-bbox="533 774 978 866">begins the process of protein digestion</td> <td data-bbox="978 774 1243 866">G;</td> </tr> <tr> <td data-bbox="533 866 978 954">produces urea</td> <td data-bbox="978 866 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="1420 308 1608 336">allow names</p> <p data-bbox="1420 580 1637 609">E= gall bladder</p> <p data-bbox="1420 651 1630 715">B= large intestine/colon</p> <p data-bbox="1420 756 1630 820">C= small intestine/ileum</p> <p data-bbox="1420 861 1585 890">G=stomach</p> <p data-bbox="1420 932 1525 960">D=liver</p>	5
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;																
(b)	<ul data-bbox="394 1074 1305 1241" 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

