

# Mark Scheme (Results)

Summer 2016

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

## **Edexcel and BTEC Qualifications**

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at <http://www.edexcel.com> or [www.btec.co.uk](http://www.btec.co.uk). Alternatively, you can get in touch with us using the details on our contact us page at [www.edexcel.com/contactus](http://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: <http://www.pearson.com/uk>

Summer 2016

Publications Code 4HB0\_02\_1606\_MS

All the material in this publication is copyright

© Pearson Education Ltd 2016

## 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	Reject	Marks
1				7

Total question 1 = 7 marks

Question number	Answer	Accept	Reject	Marks
2 (a) (i)	experiment 1 = 4.5s; experiment 2 = 30s;			1 1
(ii)	25.5s;	ecf		1
(iii)	Any two from <ul style="list-style-type: none"> <li>• exhaled air contains more carbon dioxide;</li> <li>• produced during respiration;</li> <li>• removed by lungs;</li> </ul>	inhaled air contains less carbon dioxide for 1 mark		2
(iv)	One from <ul style="list-style-type: none"> <li>• care not to suck up liquid;</li> <li>• care not to break glass;</li> <li>• sterilise/clean tube A/B/mouthpiece;</li> </ul>			1
(v)	<ul style="list-style-type: none"> <li>• bicarbonate indicator more sensitive to carbon dioxide;</li> <li>• change in colour clearer/more easily seen;</li> <li>• more accurate/easier to time colour change;</li> </ul>			2

2 (b) (i)		<b>longer time</b>	<b>shorter time</b>	<b>the same time</b>	do not accept more than one tick on each row		1
	experiment 1		✓				1
(ii)	Any three from						3
	<ul style="list-style-type: none"> <li>• more exercise requires more respiration/energy;</li> <li>• more carbon dioxide released/carbon dioxide exhaled/inhaled faster;</li> <li>• bicarbonate indicator changes colour quicker;</li> </ul>						

**Total question 2 = 13 marks**

Question number	Answer	Accept	Reject	Marks
3	<p>Any 8 from</p> <ul style="list-style-type: none"> <li>• larvae/worms pass into water/found in water;</li> <li>• from (infected) snails;</li> <li>• larvae swim in water;</li> <li>• enter through skin/body of people in water;</li> <li>• larvae develop into adult worms;</li> <li>• inside blood vessels;</li> <li>• of various organs/named organs;</li> <li>• feed on (red) blood (cells);</li> <li>• worms mate/reproduce/breed;</li> <li>• release eggs;</li> <li>• pass out in urine/faeces;</li> </ul>			

**Total question 3 = 8 marks**

Question number	Answer	Accept	Reject	Marks												
4 (a)	<table border="1"> <thead> <tr> <th data-bbox="405 277 758 313">Description</th> <th data-bbox="758 277 1110 313">Word</th> </tr> </thead> <tbody> <tr> <td data-bbox="405 313 758 386">duct carries both urine and sperm</td> <td data-bbox="758 313 1110 386">urethra;</td> </tr> <tr> <td data-bbox="405 386 758 423">produces sperm</td> <td data-bbox="758 386 1110 423">testis;</td> </tr> <tr> <td data-bbox="405 423 758 496">where fertilised ovum is implanted</td> <td data-bbox="758 423 1110 496">uterus</td> </tr> <tr> <td data-bbox="405 496 758 570">produces part of seminal fluid</td> <td data-bbox="758 496 1110 570">seminal vesicle;</td> </tr> <tr> <td data-bbox="405 570 758 672">where sperm is deposited during intercourse</td> <td data-bbox="758 570 1110 672">vagina;</td> </tr> </tbody> </table>	Description	Word	duct carries both urine and sperm	urethra;	produces sperm	testis;	where fertilised ovum is implanted	uterus	produces part of seminal fluid	seminal vesicle;	where sperm is deposited during intercourse	vagina;			5
Description	Word															
duct carries both urine and sperm	urethra;															
produces sperm	testis;															
where fertilised ovum is implanted	uterus															
produces part of seminal fluid	seminal vesicle;															
where sperm is deposited during intercourse	vagina;															
(b) (i)	<p><u>FSH</u> Two from</p> <ul style="list-style-type: none"> <li>• stimulates oestrogen production;</li> <li>• development of follicle/egg/ovum;</li> <li>• use in IVF to increase fertility ;</li> </ul>			2												
(ii)	<p><u>Oestrogen</u> Two from</p> <ul style="list-style-type: none"> <li>• thickens/repairs uterus <u>lining</u>/endometrium;</li> <li>• use in contraception to prevent pregnancy;</li> <li>• inhibits FSH production;</li> <li>• stimulates LH production;</li> <li>• causes female secondary sex characteristics / named characteristic;</li> </ul>			2												



(iii)	<u>Oxytocin</u> <ul style="list-style-type: none"><li>• contraction of uterus muscles at birth;</li><li>• milk release;</li></ul>			2
-------	---	--	--	---

**Total question 4 = 11 marks**

Question number	Answer	Accept	Reject	Marks
5 (a) (i)	A = large intestine; C= small intestine/ileum;			1 1
(ii)	bile;			1
(b)	Any four from <ul style="list-style-type: none"> <li>• bile unable to pass (into duodenum)</li> <li>• fats/lipids not emulsified;</li> <li>• reduced/slower fat digestion/fat not digested/broken down;</li> <li>• by lipase;</li>   <li>• acid from stomach not neutralised;</li> <li>• enzymes/named enzyme not at optimum pH/reduced enzyme activity;</li> <li>• reduced digestion of proteins/carbohydrates/starch;</li> </ul>			4
(c)	<ul style="list-style-type: none"> <li>• surface area (for absorption) reduced;</li> <li>• less absorption (of products/named products of digestion);</li> <li>• a described effect on body e.g. lack of energy/poor haemoglobin production;</li> </ul>			3

Total question 5 = 10 marks

Question number	Answer	Accept	Reject	Marks
6 (a)	arrow towards hand in artery and away from hand in vein;	accept arrow in the tube before or after box in right direction		1
(b) (i)	glomerulus;			1
(ii)	<ul style="list-style-type: none"> <li>• larger surface area;</li> <li>• for faster diffusion/more blood filtered/blood filtered more quickly/allows more time for blood to be filtered;</li> <li>• increase in amount of substances diffusing (into liquid);</li> </ul>			2
(c)	<ul style="list-style-type: none"> <li>• more urea/nitrogenous compounds;</li> <li>• more salt/named salt/ion;</li> </ul>			2
(d)	<p>Any three from</p> <ul style="list-style-type: none"> <li>• no (glucose) concentration gradient/equal (glucose) concentration either side of tubing;</li> <li>• prevents loss/diffusion of glucose;</li> <li>• from blood/tubing into liquid X;</li> <li>• otherwise blood glucose reduced;</li> <li>• respiration affected/glucose needed for respiration/less respiration;</li> </ul>			3

(e)	(i)	red blood cells/erythrocyte;			1
	(ii)	check that no red blood cells /erythrocytes have been lost/to check that no blood enters liquid x;			1

**Total question 6 = 11 marks**



