



Mark Scheme (Results)

Summer 2017

Pearson Edexcel International GCSE
in Human Biology (4HB0) Paper 01



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

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

Summer 2017

Publications Code 4HB0_01_1706_MS

All the material in this publication is copyright

© Pearson Education Ltd 2017

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 (a)	<p>B; W and Y</p> <p>The only correct answer is B</p> <p>A is not correct because they are not ligaments</p> <p>C is not correct because they are not ligaments</p> <p>D is not correct because they are not ligaments</p>			1
(b)	<p>B; pituitary gland</p> <p>The only correct answer is B</p> <p>A is not correct because the hormones are not released by this gland</p> <p>C is not correct because the hormones are not released by this gland</p> <p>D is not correct because the hormones are not released by this gland</p>			1

AHB01 2017 | May/June | Paper 1 | GradeMax

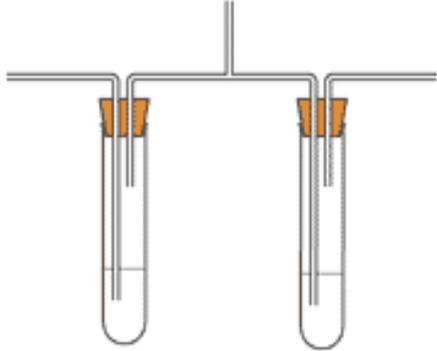
<p>(c)</p>	<p>A; 0.62%</p> <p>The only correct answer is A</p> <p>B is not correct because the calculation does not produce this figure</p> <p>C is not correct because the calculation does not produce this figure</p> <p>D is not correct because the calculation does not produce this figure</p>			<p>1</p>
<p>(d)</p>	<p>D; vaccinations</p> <p>The only correct answer is D</p> <p>A is not correct because it is not involved in catching disease</p> <p>B is not correct because it is not involved in catching disease</p> <p>C is not correct because it is not involved in catching disease</p>			<p>1</p>

<p>(e)</p>	<p>C; carbon dioxide + water → glucose + oxygen</p> <p>The only correct answer is C</p> <p>A is not correct because carbon dioxide and water are not used</p> <p>B is not correct because carbon dioxide and water are not used</p> <p>D is not correct because carbon dioxide and water are not used</p>			<p>1</p>
<p>(f)</p>	<p>C: receptor → sensory neurone → relay neurone → motor neurone → effector</p> <p>The only correct answer is C</p> <p>A is not correct because the impulse does not pass to the receptor and sensory neurone initially</p> <p>B is not correct because the impulse does not pass to the receptor and sensory neurone initially</p> <p>D is not correct because the impulse does not pass to the receptor and sensory neurone initially</p>			<p>1</p>

<p>(g)</p>	<p>A; It results in a higher than normal level of disease in a certain area.</p> <p>The only correct answer is A</p> <p>B is not correct because it does not make reference to higher level of disease</p> <p>C is not correct because it does not make reference to higher level of disease</p> <p>D is not correct because it does not make reference to higher level of disease</p>			<p>1</p>
<p>(h)</p>	<p>B; Q and R</p> <p>The only correct answer is B</p> <p>A is not correct because both bones are not part of the axial skeleton</p> <p>C is not correct because both bones are not part of the axial skeleton</p> <p>D is not correct because both bones are not part of the axial skeleton</p>			<p>1</p>

4H/IBO | 2017 | May/June | Paper 1 | GradeMax

<p>(i)</p>	<p>D; ultraviolet light from the Sun</p> <p>The only correct answer is D</p> <p>A is not correct because it is not a mutagen</p> <p>B is not correct because it is not a mutagen</p> <p>C is not correct because it is not a mutagen</p>			<p>1</p>
<p>(j)</p>	<p>C; skin</p> <p>The only correct answer is C</p> <p>A is not correct because it is not an excretory organ</p> <p>B is not correct because it is not an excretory organ</p> <p>D is not correct because it is not an excretory organ</p>			<p>1</p>
				<p>Total 10</p>

Question number	Answer	Accept	Reject	Marks
2 (a)	<ul style="list-style-type: none"> • test tubes correct way round (alternate long/short or vice versa); • mouth piece correctly attached to each delivery tube; • long tubes in the limewater; 			3
2 (b)	<ul style="list-style-type: none"> • limewater; 	Accept hydrogencarbonate/bicarbonate indicator		1
2 (c)	<ul style="list-style-type: none"> • measuring cylinder 	Accept pipette/syringe		1
2 (d)	<ul style="list-style-type: none"> • limewater/indicator solution goes cloudy; • more quickly in (the test tube with) exhaled air; • more carbon dioxide in exhaled air; 	Hydrogencarbonate goes yellow;		3
2 (e)	<ul style="list-style-type: none"> • same volume of limewater in each tube; • reference to taking more time/less cloudy if more liquid is present; 	Ignore references to temperature ORA		2
				Total 10

4HB01 2017 | May/June | Paper 1 | GradeMax

Question number	Answer	Accept	Reject	Marks
3 (a) (i)	<ul style="list-style-type: none"> more energy in chicken nuggets; 55 kJ (per 100 g); 	ORA	Reject produces energy	2
(ii)	<ul style="list-style-type: none"> chips; contains more fat/more energy/more calories/kJ; manipulation of data e.g. 20 g per 100 g more than chicken nuggets fat stored in the body; energy/calorie/kJ intake exceeds demand; 		Reject produce more energy Ignore values quoted from table	4 max
(b) (i)	<ul style="list-style-type: none"> calcium required for bones / development of bones/skeletal system of fetus; maintain teen/bone density/strength of pregnant woman; 	References to reducing risk of osteoporosis		2
(ii)	<p>line labelling the placenta; placenta;</p> <p>OR</p> <p>line labelling to the cervix; cervical plug;</p>			2

4HB01 2017 | May/June | Paper 1 | GradeMax

	OR line labelling amnion; amnion											
(c)	<table border="1"> <tr> <td>is easily digestible</td> <td>✓</td> </tr> <tr> <td>contains no cholesterol</td> <td></td> </tr> <tr> <td>contains antibodies</td> <td>✓</td> </tr> <tr> <td>contains no fat</td> <td></td> </tr> </table>	is easily digestible	✓	contains no cholesterol		contains antibodies	✓	contains no fat				2
is easily digestible	✓											
contains no cholesterol												
contains antibodies	✓											
contains no fat												
				Total 12								

Question number	Answer	Accept	Reject	Marks
4 (a)	<ul style="list-style-type: none"> (solution A) 80 °C; (solution B) 40 °C 			2
(b)	<ul style="list-style-type: none"> time/how long; for blue-black colour to disappear/turn orange; 	Accept colour change		2
(c)	<ul style="list-style-type: none"> carbohydrase/amylase/enzyme breaks down starch / carbohydrate; to glucose/maltose; 	Allow sugar		2
(d)	<ul style="list-style-type: none"> optimum pH for amylase/carbohydrase is 7 / neutral / pH too low/acidic; carbohydrase/amylase would denature; reference to change in active site/no enzyme-complex formed; 	Allow 7.5/slightly alkaline		2
(e)	<ul style="list-style-type: none"> volume/concentration of solutions (A/B) / carbohydrase / amylase / starch/carbohydrate; stirring/non-stirring; 	Accept amount		1
				Total 9

Question number	Answer	Accept	Reject	Marks
5 (a) (i)	<ul style="list-style-type: none"> 60 – 40; 20;; 	Incorrect values from graph in a subtraction but correct answer to their calculation = 1 mark		2 max
	<ul style="list-style-type: none"> more men than women die from lung cancer overall; steeper rise in deaths from lung cancer in men (between 1930 and 1990) drop in lung cancer deaths in males from 1990 whereas slight increase/remains stable in women; 	Allow reverse argument for females for all marking points		2 max
(b) (i)	<ul style="list-style-type: none"> tar; 	Allow correct named chemical eg benzene		1
(ii)	<ul style="list-style-type: none"> evidence collected over time; from a large group of people; made up from smokers and non-smokers; data compared; variables/named variables kept constant; 			3 max
(iii)	<ul style="list-style-type: none"> carbon monoxide binds to red blood cells / haemoglobin; reduces the amount of oxygen in the blood; fetus receives less oxygen; less aerobic respiration/less energy; for growth of baby; 			2

(c)	<ul style="list-style-type: none"> • alveoli/air sacs damaged/alveoli fuse; • less surface area (in lungs); • for gas exchange/oxygen diffusion; • reference to less oxygen in blood; • build up of carbon dioxide in blood; • less energy/aerobic respiration; 	Accept alveoli join together		<p style="text-align: center;">3 max</p> <p style="text-align: right;">Total 13</p>
-----	--	------------------------------	--	---

Question number	Answer	Accept	Reject	Marks
6 (a)	(i) W cornea; X pupil; Y iris;			3
	(ii) In either order: <ul style="list-style-type: none"> • cornea • lens 	Allow W and Z in either order		2
	(iii) <ul style="list-style-type: none"> • ciliary muscle relaxed; • suspensory ligaments taught/stretched; • lens shape less curved/thinner/flatter; 	Reject radial/circular muscles		3
	(b) <ul style="list-style-type: none"> • avoid touching eyes; • clean/wash hands; • avoid sharing towels/use clean towels/pillows/face creams/makeup/eye medication/eye glasses; • use medication/eye drops; • do not use swimming pools; 			2 max
(c)	(i) In the following order: <ul style="list-style-type: none"> • sticks bacteria to cells/protection; • allows substances to exit/enter cells; • provides support/shape to cell/prevents cell lysis/bursting; • movement; 			4
	(ii) <ul style="list-style-type: none"> • antibiotics/retained antibiotic; 			1
				Total 15

Question number	Answer	Accept	Reject	Marks
7 (a) (i)	<ul style="list-style-type: none"> • (solution) B; • water moves out of red blood cell; • by osmosis; • red blood cell shrivelled/shrinks/gets smaller; 			3 max
(ii)	<ul style="list-style-type: none"> • solution C; • same concentration as the solution inside red blood cells; • movement of water in both directions equal; • reference to maintaining health/viability/shape of red blood cells; 			3 max
(b)	<p>In the following order:</p> <ul style="list-style-type: none"> • platelets; • red blood cells; • agglutinate; • antigens; • antibodies; • white blood cells; 			6
				Total 12

Question number	Answer	Accept	Reject	Marks
8 (a)	<ul style="list-style-type: none"> decreases/declines/falls/drops; 	Remains fairly constant		1
(b)	<ul style="list-style-type: none"> greenhouse gas; contributes to global warming/greenhouse effect; leading to climate change/rise in sea levels/flooding 	Allow other valid consequence of global warming		2
(c)	<ul style="list-style-type: none"> more fossil fuels burned/greater number of large industries set up; 	Incorrect values from graph in a division calculation and multiplied by 100 but correct answer to their calculation = 2 marks Allow 6%		1
(d)	<ul style="list-style-type: none"> 118 000 / 2000 000; ×100; 5.9%; 			3
(e)	<ul style="list-style-type: none"> acid rain; acidification of waterways/soil; death of aquatic life/plants/fish/coral/increase in lung diseases/narrowed example/damages lungs / erosion of buildings/damages leaves/reduces photosynthesis; 			2 max
				Total 9

Question number	Answer	Accept	Reject	Marks
9 (a) (i)	<ul style="list-style-type: none"> • 0 – 1/1 ½ years; 			1
	<ul style="list-style-type: none"> • height/mass/weight/head circumference; 			1
	<ul style="list-style-type: none"> • 10 (years) 			1
	<ul style="list-style-type: none"> • production of reproductive hormones/growth hormones; • during puberty; 			2
	<ul style="list-style-type: none"> • development of body hair; • voice deepens/ larynx enlarges ; • height increase/muscle development/broaden shoulders; • growth of sex organs/named sex organ; • production sperm/testosterone/erectons; 			2 max
(b)	<p>Two from</p> <p>Oestrogen:</p> <ul style="list-style-type: none"> • repair/thickening of uterus lining (following menstruation); • inhibition of LH; • influences LH production; <p>AND</p>		Reject uterus wall	2 max

	progesterone:					
	<ul style="list-style-type: none"> • suppress levels of FSH/LH; • maintains thickness of uterus lining; 				2	
9	(c)	(i)	<ul style="list-style-type: none"> • stimulate a follicle/egg to develop/helps to increase number of eggs that mature 			1
		(ii)	<ul style="list-style-type: none"> • pituitary (gland) 			1
		(iii)	<ul style="list-style-type: none"> • causes ovulation/encourages (more) eggs to be released; • from the ovary; 			2
					Total 15	

Question number	Answer	Accept	Reject	Marks
10 (a) (i)	<p>D; two recessive alleles</p> <p>The only correct answer is D</p> <p>A is not correct because it would not give the correct phenotype</p> <p>B is not correct because it would not give the correct phenotype</p> <p>C is not correct because it would not give the correct phenotype</p>			1
(ii)	<ul style="list-style-type: none"> • (person 3) Tt/tT/heterozygous; • (person 8) tt/homozygous recessive; 			2
(iii)	<ul style="list-style-type: none"> • two/some children have Tay-Sachs; • each have inherited 2 recessive alleles/each child is homozygous recessive; • one faulty allele from person 3/from each parent; • both parents (3 and 4) are heterozygous/carriers/Tt; • person 3 can't be TT/homozygous dominant because no children would have Tay-Sachs; 			3 max
(iv)	<ul style="list-style-type: none"> • parental genotypes Tt and tt; • parental gametes T t t t; • offspring genotypes Tt Tt tt tt; 	<p>Reject mp1 if sex chromosomes are included</p> <p>Ecf from mp2 onwards;</p>	<p>Reject answers not using T and t for alleles.</p>	5

(b)	<ul style="list-style-type: none"> • offspring phenotypes normal, normal, Tay-Sachs, Tay-Sachs; • 1:1/50%/1 in 2/ ½ ; <ul style="list-style-type: none"> • loss of muscle mass/movement/coordination/loss of balance/muscle cramp/spasms/weakened muscles/slow reactions; • paralysis; • loss of vision; • slurred speech; 	ignore sex chromosomes if given		2 max
(c)	<ul style="list-style-type: none"> • (gene) mutation; • Insertion of bases/bases/T/A/C have been added; • (leading to) order of bases changed; 	Allow frameshift		2 max Total 15

Total for paper 120 marks

4HB0 | 2017 | May/June | Paper 1 | GradeMax

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom