



Mark Scheme (Results)

January 2015

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

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 UG040568

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	Notes	Marks
1 (a)	B 3 1 4 2;		1
(b)	A sunlight;		1
(c)	D tendons;		1
(d)	C glucose breaks down to release energy;		1
(e)	C distance of objects can be judged more accurately;		1
(f)	A coughing and sneezing;		1
(g)	A 1		1
(h)	B an effector		1
(i)	D vitamin D		1
(j)	C testis;		1
			Total 10

Question number	Answer	Notes	Marks
2 (a) (i)	<p>three bones touching eardrum (tympanum) and oval window at either end;</p> <p>labels, hammer, anvil and stirrup/malleus, incus and stapes;</p> <p>drawn in correct sequence;</p>		3
(ii)	<p>Receive/transfer vibration of <u>eardrum/tympanum</u>;</p> <p>across middle ear;</p> <p>to oval window/cochlea;</p> <p>amplifies vibrations;</p>	<p>Accept protects against excessive noise</p> <p>Accept soundwaves</p>	2

Question number	Answer	Notes	Marks																
3	<table border="1"> <thead> <tr> <th>Description of food substance</th> <th>Food substance</th> </tr> </thead> <tbody> <tr> <td>contains carbon hydrogen oxygen and nitrogen</td> <td>protein;</td> </tr> <tr> <td>can't be digested by humans</td> <td>cellulose;</td> </tr> <tr> <td>digestion starts in the mouth</td> <td>starch;</td> </tr> <tr> <td>stored in the liver</td> <td>glycogen;</td> </tr> <tr> <td>essential for growth</td> <td>protein;</td> </tr> <tr> <td>in high amounts can lead to high blood pressure</td> <td>salt;</td> </tr> <tr> <td>gives a positive Benedict's test</td> <td>glucose;</td> </tr> </tbody> </table>	Description of food substance	Food substance	contains carbon hydrogen oxygen and nitrogen	protein;	can't be digested by humans	cellulose;	digestion starts in the mouth	starch;	stored in the liver	glycogen;	essential for growth	protein;	in high amounts can lead to high blood pressure	salt;	gives a positive Benedict's test	glucose;	R ref to lipids	7
Description of food substance	Food substance																		
contains carbon hydrogen oxygen and nitrogen	protein;																		
can't be digested by humans	cellulose;																		
digestion starts in the mouth	starch;																		
stored in the liver	glycogen;																		
essential for growth	protein;																		
in high amounts can lead to high blood pressure	salt;																		
gives a positive Benedict's test	glucose;																		
			Total 7																

Question number	Answer	Notes	Marks
4 (a)	X = <u>renal artery</u> ; Y = <u>renal vein</u> ; Z = <u>ureter</u> ;		3
(b) (i)	urine;		1
(b) (iii)	bladder;		1
(c) (i)	line into cortex and labelled F;		1
(c) (ii)	Any four from many Bowman's capsules/glomeruli; large amount of (ultra)filtration; large surface area available; for reabsorption of water; and other solutes/glucose/amino acids/ions/minerals; (efficient) removal of waste/toxic products/urea;		4
			Total 10

Question number	Answer	Notes	Marks
5 (a) (i)	90%;		1
(ii)	48%	Accept 47% to 49%	1
(iii)	brain/head well developed/grown at birth; continues to develop during first few years; needed for co-ordination of body activities;		2
5 (b) (i)	growth to age of 5; little/no growth (from 5) to 10/13; rapid growth between 12 and 21; no growth after 20/21; correct ref to percentage differences;		4
(ii)	early years not capable of reproduction as not capable of looking after child; puberty occurs; release of (sex) hormones/named sex/growth hormone; individual now capable of reproduction (and looking after a child		3
			Total 11

Question Number	Answer	Notes	Marks																
6 (a) (i)	<table border="1" style="width: 100%; text-align: center;"> <tr> <td>56-60</td> <td>61-65</td> <td>66-70</td> <td>71-75</td> <td>76-80</td> <td>81-85</td> <td>86-90</td> <td>91-95</td> </tr> <tr> <td>1</td> <td>4</td> <td>2</td> <td>7</td> <td>3</td> <td>7</td> <td>4</td> <td>2</td> </tr> </table>	56-60	61-65	66-70	71-75	76-80	81-85	86-90	91-95	1	4	2	7	3	7	4	2		3
56-60	61-65	66-70	71-75	76-80	81-85	86-90	91-95												
1	4	2	7	3	7	4	2												
(ii)	<p>(minus one mark for each incorrect answer)</p> <p>axes labelled;</p> <p>suitable scale;</p> <p>independent variable on X axis and dependent on the Y axis;</p> <p>correct plots;</p>		5																
(b)	<p>student remains seated/inactive before investigation;</p> <p>suitable location i.e. wrist/neck;</p> <p>use of electronic devices (pulse rate monitor)/ fingers placed lightly over pulse;</p> <p>use of stopwatch/stopclock;</p> <p>count;</p> <p>count again/repeat;</p> <p>calculate rate/read off result from monitor;</p>		5																

Question Number	Answer	Notes	Marks
6 (c)	Any five from results, heart rate /pulse would have been higher; exercise requires more energy/respiration; more oxygen required; blood travels faster to supply extra oxygen/ more carbon dioxide removed; anaerobic respiration occurs; more oxygen to repay oxygen debt ; break down of lactic acid;		5

Total 18

Question number	Answer	Notes	Marks																
7(a)	<table border="0"> <thead> <tr> <th>Structures</th> <th>Processes</th> </tr> </thead> <tbody> <tr> <td>fallopian tube</td> <td>ova are produced</td> </tr> <tr> <td>ovary</td> <td>fertilisation takes place</td> </tr> <tr> <td>placenta</td> <td>sperm cells are produced</td> </tr> <tr> <td>seminal vesicle</td> <td>seminal fluid is produced</td> </tr> <tr> <td>testes</td> <td>oxygen passes into the fetus</td> </tr> <tr> <td>uterus</td> <td>receives penis during intercourse</td> </tr> <tr> <td>vagina</td> <td>the embryo implants</td> </tr> </tbody> </table> <p>(minus 1 for each incorrect answer)</p>	Structures	Processes	fallopian tube	ova are produced	ovary	fertilisation takes place	placenta	sperm cells are produced	seminal vesicle	seminal fluid is produced	testes	oxygen passes into the fetus	uterus	receives penis during intercourse	vagina	the embryo implants		6
Structures	Processes																		
fallopian tube	ova are produced																		
ovary	fertilisation takes place																		
placenta	sperm cells are produced																		
seminal vesicle	seminal fluid is produced																		
testes	oxygen passes into the fetus																		
uterus	receives penis during intercourse																		
vagina	the embryo implants																		
(b)	<p>colostrums transferred;</p> <p>contains many antibodies;</p> <p>gives immunity (to many diseases);</p> <p>avoid risk of using contaminated water/reduces risk of infection/no need to sterilise bottles;</p> <p>at correct temperature;</p> <p>bonding between mother and baby;</p>	Allow cheap;	4																

Total 10

Question number	Answer	Notes	Marks
8 (a)	grasses/shrubs;		1
(b)	grouse/field vole/seed-eating birds/red deer/insect;		1
(c)	insect-eating bird;		1
(d)	grasses/shrubs at beginning and insect-eating birds at end; insects and spiders in the middle in correct order;		2
(e)	the transfer of energy/nutrients/chemicals;	allow flow	1
(f)	Any four from less food for spiders/frogs/insect-eating birds; they reduce in numbers/die out; increase in grasses/shrubs because fewer/no insects to eat them; more food for grouse/field voles/seed-eating birds/red deer; they increase in numbers; more wild cats because more grouse / field voles ; more hawks and owls because of more field voles/ seed-eating birds;		4
			Total 10

Question number	Answer	Notes	Marks
9 (a) (i)	biceps;	Reject flexor	1
(ii)	triceps;	Reject extensor	1
(b) (i)	R = hinge;	Reject synovial joint	2
(ii)	S = ball and socket;	Reject synovial joint	
(ii)	synovial (fluid);		1
(iii)	reduces friction/allows joint to move freely/lubricates joint/smooth movement;		1
(iv)	S has 360 degree movement/3 planes/circular;		2
	R moves through 180 degrees/up <u>and</u> down/one plane;		
9 (c)	each joint requires a fixed end;		2
	otherwise movement of forearm less effective/pronounced/less movement/less co-ordinated;		
			Total 10

Question number	Answer	Notes	Marks
10 (a)	A = trachea; B = bronchus; C = thorax/ribs/intercostal muscles/pleural membrane;		3
(b)	move rubber sheet down; balloons inflate;		2
(c)	no contraction/movement of glass bell jar/contraction of intercostal muscles in humans; in humans ribs move (upwards and outwards); greater pressure/volume change in humans;		2
			Total 7

Question number	Mark er Type	Answer				Marks												
11 (a)		<table border="1"> <thead> <tr> <th></th> <th>Diffusion</th> <th>Osmosis</th> <th>Active transport</th> </tr> </thead> <tbody> <tr> <td>ATP required (yes/no)</td> <td>no;</td> <td>no;</td> <td>yes;</td> </tr> <tr> <td>Direction of movement in relation to concentration gradient</td> <td>down/with/high to low;</td> <td>down/with/high to low;</td> <td>up/against/low to high;</td> </tr> </tbody> </table>					Diffusion	Osmosis	Active transport	ATP required (yes/no)	no;	no;	yes;	Direction of movement in relation to concentration gradient	down/with/high to low;	down/with/high to low;	up/against/low to high;	6
	Diffusion	Osmosis	Active transport															
ATP required (yes/no)	no;	no;	yes;															
Direction of movement in relation to concentration gradient	down/with/high to low;	down/with/high to low;	up/against/low to high;															
(b)		Any two from: increases the rate; molecules move faster/more kinetic energy; hitting the membrane more frequently;				2												
					Total 8													

Question number	Marker Type	Answer	Notes	Marks
12	2 clip	negative; pancreas; glucagon; glucose; liver; insulin; glucose; homeostasis;	allow sugar	8
				Total 8

