



Mark Scheme (Results)

January 2013

International GCSE 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 visit our qualifications websites at [www.edexcel.com](http://www.edexcel.com) or [www.btec.co.uk](http://www.btec.co.uk) for our BTEC qualifications.

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).

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson. Their contact details can be found on this link: [www.edexcel.com/teachingservices](http://www.edexcel.com/teachingservices).

You can also use our online Ask the Expert service at [www.edexcel.com/ask](http://www.edexcel.com/ask). You will need an Edexcel username and password to access this service.

## **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](http://www.pearson.com/uk)

January 2013

Publications Code UG034696

All the material in this publication is copyright

© Pearson Education Ltd 2013

Question number	Answer	Marks
1 (a)	C;	1
(b)	A;	1
(c)	B;	1
(d)	A;	1
(e)	B;	1
(f)	D;	1
(g)	C;	1
(h)	A;	1
(i)	C;	1
(j)	C;	1
	<b>Total</b>	<b>10</b>

Question number	Answer	Marks
2 (a)	Benedict's;	1
(b) (i)	Measuring cylinder;	1
(i1)	Line/bottom of meniscus on 5;	1
(c)	Two from: Use water bath/heat tubes in a beaker of water; Point tube away from people; Wear safety goggles; tie long hair back;	2
(d)	Glucose present in food Y; Glucose not present in food X;	2
	<b>Total</b>	<b>7</b>

Question number	Answer	Marks
3 (a)	Line to animal X from both plant A and plant B; Ignore direction of arrow heads line to animal Y from plant B + arrow head to animal;	2
(b)	Animal X/Animal Y;	1
(c)	Increase; Because more food; Accept converse argument	2
(d)	Two from:  Respiration/movement/excretion/egestion/heat;;  Accept idea that energy remains in non-digestible material.	2
	<b>Total</b>	<b>7</b>

Question number	Answer	Marks
4 (a) (i)	8;	1
(ii)	A incisor; B canine; D molar;	3
(b)	A bites/cuts food ; D grinds or chews food;	2
(c)	Bacteria/ microorganisms; Sugar/ maltose /any other named sugar; (lactic) acid; enamel;	4
	<b>Total</b>	<b>10</b>

Question number	Answer	Marks
5 (a) (i)	Haemoglobin;	1
(ii)	Biconcave; Greater surface area;	2
(b) (i)	Release of antibodies; In response to antigens/idea of binding to antigens	2
(ii)	Reasonable irregular shape; Nucleus drawn <u>and</u> labelled; Cytoplasm/cell membrane labelled;	3
(iii)	Idea of surrounding/engulf/ingest bacterium; (digestive) enzyme released (from phagocyte)/digest bacterium;	2
	<b>Total</b>	<b>10</b>

Question number	Answer	Marks
6 (a)	A radius; B humerus; D scapula/shoulder blade; F ulna	4
(b)	synovial; Do not accept hinge or ball and socket	1

Question number	Answer	Marks
6 (c) (i)	C biceps; E triceps;	2
(ii)	Two from: C relaxes; E contracts; Antagonistically; Description of what this means - as one contracts, the other relaxes/opposite;	2
<b>Total</b>		<b>9</b>

Question number	Answer	Marks
7 (a)	Pinna; Eardrum/tympanum/tympanic membrane; Stapes/stirrup; Cochlea; Auditory nerve;	5
(b)	Ciliary muscles contract; Suspensory ligaments relax;	2
(c)	Three from: Motor neurone; (Electrical) impulses; Synapse between neurone/nerve and leg muscle; Neurotransmitter across gap/synapse;	3
(d)	Four from: Increased heart rate; Blood flows faster; More oxygen; (More) glucose (transported to cells); respiration; More energy released;	4
<b>Total</b>		<b>14</b>

Question number	Answer	Marks
8 (a) (i)	The maximum volume of air that the lungs can hold/breathe in / breathe out;	1
(ii)	Two from: Able to exercise for longer / more exercise; Because can take in more oxygen; Needed for respiration / energy;	2
(b)	Breathe out into the rubber tube (after taking a deep breath in); The decrease in water level indicates the vital capacity;	2
(c) (i)	3.5;	1
(ii)	4.2;	1
(iii)	3.1 / result 2 for student B;	1
(d)	Student C has the largest vital capacity; The larger the vital capacity the more oxygen can be taken in / the stronger the muscles associated with the lungs;	2
<b>Total</b>		<b>10</b>

Question number	Answer	Marks
9 (a)	Minerals /mineral salts; Fibre;	1 1
(b)	Two from: Idea of taking in more energy; More protein; For growth (of the fetus);	2
(c)	Five from: C compare food high in carbohydrate with food high in protein; O both solid or liquid; R idea of repeating/more than one sample of each; M1 method such as heating food/using burning food to heat water; M2 reference to time heated/time of experiment; S same size of food sample/same amount of water heated/distance from burning food to water, etc;	5
<b>Total</b>		<b>9</b>

Question number	Answer	Marks
10 (a) (i)	<p>A Bowman's capsule;  B first/proximal convoluted tubule;  C collecting duct;</p>	<b>3</b>
(ii)	<p>Three from:  ultrafiltration;  small molecules squeezed into Bowman's capsule;  under pressure;  large molecules held back;  such as proteins</p>	<b>3</b>
(b) (i)	<p>50%;  Award 1 mark if 28/56 is seen</p>	<b>2</b>
(ii)	<p>Idea that urea is a waste product;  Mention that glucose is required/stored for energy</p>	<b>2</b>
(iii)	<p>Two from:  amounts (of Na and glucose) reabsorbed are large / most are reabsorbed;  active transport;  energy / ATP used;  against a concentration gradient;</p>	<b>2</b>
(c)	<p>Three from:  Acts as pituitary (to release less ADH)  Decreased permeability of (kidney) tubules;  Less water reabsorbed;  Into the blood;</p>	<b>3</b>
	<b>Total</b>	<b>15</b>

Question number	Answer	Marks
11 (a)	Two from: Arterioles dilate; (because) blood diverted to the skin; more heat lost (to the environment);	2
(b)	Evaporation of sweat; Requires (latent) heat from the body; or converse Or Hairs lie flat; Less (insulating layer) of air trapped; or converse Or Shivering; Releases heat from respiration;	2
(c) (i)	Maintenance/keeping the same or optimum; Internal environment (of the body);	2
(ii)	Three from: When blood glucose gets too high/low; Insulin/glucagon gets released; From the pancreas; Blood glucose change is reversed / back to normal;	3
<b>Total</b>		<b>9</b>

Question number	Answer	Marks
12 (a)	Alternative form of a gene;	1
(b)	Need two faulty alleles: If it was dominant, then only one allele would be required;	2
(c)	Parental genotype Hh; Hh; Gametes H h (H) (h); Offspring genotype HH, Hh (Hh) hh; 25%/1/4, 1:3;	4
(d)	Sickle cell trait have one allele for sickle cell and one normal allele; Offspring could have two normal alleles which means they could be susceptible to malaria; Offspring could have two sickle cell alleles which means that they could have sickle cell disease;	3
<b>Total</b>		<b>10</b>



Further copies of this publication are available from  
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467

Fax 01623 450481

Email [publication.orders@edexcel.com](mailto:publication.orders@edexcel.com)

Order Code UG034696 January 2013

For more information on Edexcel qualifications, please visit our website  
[www.edexcel.com](http://www.edexcel.com)

Pearson Education Limited. Registered company number 872828  
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE



Llywodraeth Cynulliad Cymru  
Welsh Assembly Government

