

# Mark Scheme (Results)

January 2013

International GCSE Human Biology  
(4HB0) Paper 01

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

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