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Mark Scheme (Results)

Summer 2016

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

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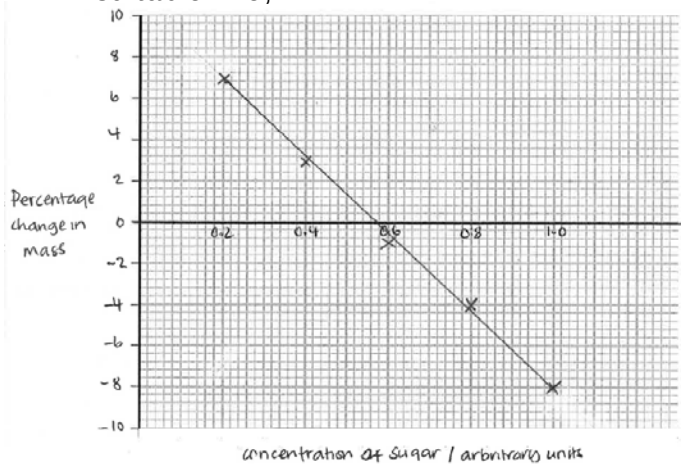
General Marking Guidance

- 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)		C; (16 chromosomes)			1
(b)		A; (balance)			1
(c)		A;			1
(d)		D; (protein)			1
(e)		B; (gonorrhoea)			1
(f)		B: (a cell wall)			1
(g)		C; (pancreas)			1
(h)		B; (between the two lungs)			1
(i)		C; (sulfur dioxide)			1
(j)		A;			1
					Total 10

Question number		Answer	Accept	Reject	Marks
2 (a)		**The human heart consists of four chambers. The upper two chambers are** **called the** ...atria**;...and they .**receive**;..blood from the veins.** **The lower chambers are the .....**ventricles;**..... . The right lower chamber pumps blood to the** .....lungs;..... **, whilst the left lower chamber pumps blood to the** .....body;..... **.** **The wall of the heart is made of ....**cardiac muscle**;.... and the chamber with the thickest wall is the .....**left ventricle**..... .** **At rest, the average heart beats at about ....**seventy**..... times a minute.**			8
(b) (i)		A = vena cava; B = pulmonary artery; C = aorta; D = pulmonary vein;	Accept A= superior/inferior vena cava		4
(ii)		• semi-lunar valve closed; • bicuspid open;	Ignore any drawing on the right-hand side of diagram		2

(iii)		• semi-lunar; • bicuspid/mitral;	atrioventricular		2 Total 16

Question number		Answer	Accept	Reject	Marks
3 (a) (i)		<table><tr><td>concentration (of sugar) in au;</td><td>% change (in mass) ;</td></tr><tr><td>appropriate order/high to low/low to high;</td><td>figures correctly matching those in first column;</td></tr></table>			4
(ii)		• suitable scale on axes ; • correct axes labels with sugar concentration on X axis; • correct plots; • suitable line; 	Max 2 marks if bar chart drawn (mp 1 and 2) Ignore extrapolated lines		4
(iii)		• Accept value from candidate's graph ± 0.5 square			1

Question number		Answer	Accept	Reject	Marks
(b) (i)		• osmosis;			1
(ii)		Two of • movement of water; • down a water potential gradient; • movement dependent on concentration of sugar / from low to high concentration of sugar;			2
(iii)		• to dry them/remove water; • so results not affected/no extra mass due to water;			2
(iv)		two of • temperature; • surface area/ length/ diameter / size (of cylinder)/ use same cork borer; • volume/amount of sugar solution; • cylinders from same potato;	Ignore mass		2
					Total 16

Question number		Answer	Accept	Reject	Marks
4 (a)		• two bones come together;			1
(b) (i)		A = synovial fluid; B = ligament; C = cartilage;			3
(ii)		A • lubrication; • assist smooth movement of joint/reduces friction;			2
		B • holds two bones together/prevents dislocation; • allows movement;			2
		C • reduces friction/allows smooth movement/stops bones rubbing together; • shock absorber/cushions;			2 Total 10

Question number		Answer	Accept	Reject	Marks
5 (a) (i)		• 37 °C; • <u>body</u> temperature; • optimum conditions; • for enzyme activity;	Allow numbers between 37 and 37.5		3
(ii)		• control/compare results; • to prove that bacteria are needed/ cause the change to indicator; • boiling destroys/denatures enzymes/destroys bacteria; • unable to convert glucose to acid;			3
(b)		Any two of • food broken down; • by bacteria; • into glucose; • glucose converted (by bacteria) into (lactic) acid;			2 Total 8

Question number		Answer	Accept	Reject	Marks
6 (a) (i)		• x 65; • 65 mg;			2
(ii)		• $\frac{88}{1600}$ x 100; • 5.5% ;			2
(iii)		• microscopic plants microscopic animals fish humans; • arrows from left to right between each pair;			2
(b)		Any 4 of • more organisms in chain; • more energy lost; • lost in respiration/movement; • most of energy doesn't reach humans/is not passed on; • accumulation of poisonous insecticides;	ORA		4
					Total 10

<table>
<tr><th>Question number</th><th></th><th>Answer</th><th>Accept</th><th>Reject</th><th>Marks</th></tr>
<tr><td>7 (a)</td><td></td><td>Blood glucose concentration is regulated by ....negative;..... feedback

involving hormones secreted by the ..islets of Langerhans;... found in the

pancreas. These contain alpha cells which detect reduced blood glucose

concentration, which as a result will secrete ...glucagon;.. .

This hormone returns the blood glucose concentration to normal by

stimulating the conversion of ...glycogen;.... to ..glucose;... .

The beta cells detect a raised blood glucose concentration and secrete the

hormone ....insulin;... which returns blood glucose levels to normal.</td><td></td><td></td><td>6</td></tr>
<tr><td>(b)</td><td></td><td>four of

<table><tr><th>nervous</th><th>hormonal</th></tr><tr><td>fast(er) response</td><td>slow(er) response;</td></tr><tr><td>uses nerves for transport</td><td>uses blood (circulation);</td></tr><tr><td>short term effect</td><td>long lasting effect;</td></tr><tr><td>limited area of effect</td><td>widespread;</td></tr><tr><td>electrical</td><td>chemical;</td></tr></table></td><td></td><td></td><td>4

Total 10</td></tr>
</table>

Question number		Answer	Accept	Reject	Marks
8 (a) (i)		Any three from • cells stick together; • cells block <u>capillaries</u>; • reduced blood flow/blood cannot flow freely/reduced surface area of red blood cells; • resulting in less oxygen transported; • less respiration/less energy/less activity/tired/prone to strokes/heart attack;			3
(ii)		• resistant to malaria;			1
(b) (i)		• tree shows presence of male carrier/both male and female carriers; • can't have male carriers if condition is sex linked; • (equal number of) males and females have condition;			2
(ii)		• heterozygous/description of heterozygous; • (faulty) allele not expressed/characteristic/condition not shown;			2
(iii)		• Nn;			1

(iv)		Any three from • person H; • as both his parents are carriers/heterozygous/have one faulty allele; • must have nn/ be homozygous recessive to have condition/show symptoms; • he must receive one allele from each parent;			3 Total 12

Question number		Answer	Accept	Reject	Marks
9 (a) (i)		A = sweat gland; B = hair; C = (blood) capillary/capillary loops;			3
(ii)		• causes hair to stand/moves hair on contraction;			1
(iii)		• hair/B lies flat; • capillary/C becomes wider/dilates;	allow vasodilation Ignore references to blood vessel moving		2
(iv)		Any four from • less air trapped by hairs; • air is an insulator/less insulation/allows convection; • more blood in capillary; • blood flows closer to skin surface; • blood carries heat (energy); • allows more heat to be lost from surface/allows body to cool down;			4
(b) (i)		• shivering;			1

(ii)		Any three from • contraction requires energy; • increased (aerobic) respiration; • heat generated as a by-product; • circulated in blood to raise body temperature;			3 Total 14

Question number		Answer	Accept	Reject	Marks
10 (a)		A = head/nucleus; B = tail/flagellum;			2
(b)		• carries genes/DNA/chromosomes/genetic material; • helps it to swim/move;			2
(c)		Any two from • ovum has more food; • for embryo; • easier/greater surface area for sperm to find/attach; • easier for sperm to penetrate/fertilise;			2 Total 6

Question number		Answer	Accept	Reject	Marks
11 (a)		A = trachea; B = bronchus;			2
(b) (i)		• 150 – 133; • 17dm^3;			2
(ii)		• lactic acid/lactate;			1
(iii)		Any three from • more lactic acid produced; • needs to be broken down/removed/oxidised; • by liver; • more oxygen required for process;			3
					Total 8

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