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Mark Scheme (Results)

November 2024

Pearson Edexcel International GCSE
In Human Biology (4HB1) 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.

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<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>1</td><td>
<table>
<tr><th>Body processes</th><th>Substance or structure responsible</th></tr>
<tr><td>regulation of water levels in the blood</td><td>ADH</td></tr>
<tr><td>conscious thought</td><td>cerebrum</td></tr>
<tr><td>transport of oxygen</td><td>haemoglobin</td></tr>
<tr><td>urea formation</td><td>liver</td></tr>
<tr><td>control of metabolic rate</td><td>thyroxine</td></tr>
<tr><td>detection of body position</td><td>semicircular canals</td></tr>
<tr><td>reduction of blood flow to the gut</td><td>adrenaline</td></tr>
</table>
</td><td></td><td>7</td></tr>
</table>

Total Marks 7

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Question number	Answer	Notes	Marks
2 (a) (i)	• axes labels; • plots; • scale;	axes correct way round use aty least half of the graph paper for the plotted results ignore extrapolation of line	3
(ii)	line of best fit;		1
(iii)	As time increases pH decreases;	ECF from an incorrectly drawn graph	1
(b)	Any three from: • lipase; • digests/breaks down fat (in milk); • to fatty acids; • which lowers pH/increases acidity;		3
(c)	time;	allow mins/minutes	1
(d)	Any two from: • temperature; • volume/concentration of enzyme/substrate (solution)/volume of milk; • type of milk;	ignore amount	2
(e)	repeat the experiment		1

Total Marks 12

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Question number	Answer	Notes	Marks
3 (a) (i)	Part W - pupil; Part X – retina;	1 mark for each correctly named part	2
(ii)	• sends (electrical) impulses from photoreceptors/rods/cones; • to the brain/CNS; OR • sends (electrical) impulses from brain/CNS; • to iris/ciliary muscles;		2
(iii)	lens becomes thinner/flatter/less convex; less refraction;	allow less light refracted	2
(iv)	Any two from: • shape of cornea restored; • light refracted, onto the retina/correctly/notmally; • correct information sent to the brain; • image/vision not blurred/clear;		2
(b)	• measure the size/diameter of the pupil; • in a dark room; • shine a light into the eye; • measure/compare size/diameter of the pupil;	accept ref to different light intensities	4

Total Marks 12

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Question number	Answer	Notes	Marks
4 (a) (i)	• glucose (units); • linked/joined together;		2
(ii)	insulin;		1
(iii)	glucagon:		1
(b) (i)	• $67.0 \div 1.69^2$; • 23.5/23.4/23.46/23.458;		2
(ii)	healthy weight *less than 18.5 underweight* *18.5 to 24.9 healthy weight* *25 to 29.9 overweight* *30 to 34.9 obese* *35 to 39.9 severely obese* *more than 39.9 morbidly obese*	ECF value in (b)(i)	1
(c)	Any two from: • fatty deposits/plaques/atheroma; • in coronary arteries; • reduced blood flow to heart muscles/tissue; • lack of oxygen/glucose to heart muscle/tissue;		2

Total Marks 9

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Question number	Answer	Notes	Marks
5 (a) (i)	• 13 750 ÷ 7500; • 1:1.83;	Allow 1:1.8/1:2/ 1:1.8333... allow if they do it the other way round ie 7500 ÷ 13750	2
(ii)	• person A has an infection/disease; • Immune response/more white blood cells needed, to produce antibodies/phagocytosis/destroy pathogen/virus/bacteria;	ignore sick ignore fight infection allow alternative correct explanation	2
(iii)	Any two from: • excess bleeding; • poor/no blood clotting; • poor/slow wound healing/more time for pathogens to enter wound;		2
(b) (i)	• tiredness/fatigue/high heart rate/faster breathing; • less oxygen carried/transported (to body cells); • less <u>aerobic</u> respiration; • less energy;		4
(ii)	• HA is dominant; • parents are heterozygous; • HA expressed in heterozygous form; • so only needs one <u>allele</u>;	ignore ref to allele/gene for mpt 1	4

Total Marks 14

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<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>6 (a) (i)</td><td>(cardiac muscle)

• striated/striped;
• branched;
• single/central nucleus;

(voluntary muscle)

• striated/striped;
• unbranched;
• many nuclei;

(involuntary muscle)

• non-striated/striped;
• unbranched;
• single/central nucleus;
• tapered at end;</td><td></td><td>max of 2 for each muscle

6</td></tr>
<tr><td>(ii)</td><td>small intestine/digestive tract/oesophagus/liver/uterus/arteries/veins/iris/sphincter muscles;</td><td>allow any named part of digestive tract</td><td>1</td></tr>
<tr><td>(b) (i)</td><td>1540;
(÷ 20) 77;</td><td>ECF incorrect addition</td><td>2</td></tr>
<tr><td>(ii)</td><td><table><tr><th>Percentage muscle mass (%)</th><th>Tally/frequency</th></tr><tr><td>70</td><td>ll 2</td></tr><tr><td>72</td><td>ll 2</td></tr><tr><td>74</td><td>llll 4</td></tr><tr><td>75</td><td>II 2</td></tr><tr><td>78</td><td>III 3</td></tr><tr><td>82</td><td>~~llll~~ l 6</td></tr><tr><td>84</td><td>l 1</td></tr></table></td><td>1 mark for suitable table, 1 mark for column headings and 1 mark for correctly inputted data and tally
allow just numbers in second column
accept just percentage/% as column heading</td><td>3</td></tr>
<tr><td>(iii)</td><td>82;</td><td>ECF from (ii)</td><td>1</td></tr>
<tr><td>(c)</td><td>• biceps contract;
• triceps relax;
• antagonistic pairs/work antagonistically;
• lower arm/radius pulled upwards;</td><td></td><td>4</td></tr>
</table>

Total Marks 17

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Question number	Answer	Notes	Marks
7 (a)	• measure initial mass (of food)use same mass of food; • measure initial temperature of water; • burn food; • take final temperature of water; • repeat for each food; • compare temperature difference (of water)/results for each food;		6
(b)	• active transport/uptake; • reference to low to high concentration/against concentration gradient;		2

Total Marks 8

Question number	Answer	Notes	Marks
8 (a)	• provides nutrients/named nutrient/oxygen to body cells; • removes waste/named waste from body cells;		2
(b)	• capillaries have small gaps/pores; • water/small molecules/named small molecule forced out; • due to high (hydrostatic) pressure (in capillaries); • at arteriole end;	ignore plasma allow due to high pressure (in capillaries) allow artery	4
(c)	• osmosis; • lower water potential inside cells/higher water potential in tissue fluid;; • water moves from high to low water potential/down a water potential gradient;		3
(d)	• swelling/increase in cell volume; • cells burst/lyse;		2

Total Marks 11

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