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Mark Scheme (Results)

November 2020

Pearson Edexcel International GCSE
In Human Biology (4HB1)
Paper 01

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November 2020
Publications Code 4HB1_01_2011_MS
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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></th><th colspan="4">Region of alimentary canal</th></tr>
<tr><th>Feature</th><th>mouth</th><th>stomach</th><th>Small intestine</th><th>large intestine</th></tr>
<tr><td>starts protein digestion</td><td></td><td>✓;</td><td></td><td></td></tr>
<tr><td>starts carbohydrate digestion</td><td>✓;</td><td></td><td></td><td></td></tr>
<tr><td>has a pH 2</td><td></td><td>✓;</td><td></td><td></td></tr>
<tr><td>has villi</td><td></td><td></td><td>✓;</td><td></td></tr>
<tr><td>absorbs most water</td><td></td><td></td><td></td><td>✓;</td></tr>
<tr><td>connects with bile duct</td><td></td><td></td><td>✓</td><td></td></tr>
</table>
</td><td></td><td>6</td></tr>
</table>

Total 6 marks

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Question number	Answer	Notes	Marks
2 (a) (i)	better transfer of heat to water (1)		1
(ii)	any two from • safety goggles/glasses (1) • water may spit (1) • use test tube holder (1) • to avoid burning hands (1)	reason linked to precaution	2
(b) (i)	• 28 x 12 x 4.2 (1) • 1411/1411.2J (1) • 1400J (1)	error carried forward full marks for correct answer	3
(ii)	• some energy lost to air/absorbed by tube/needle (1) • some converted to light (1) • food not fully burnt;		3
(c)	• use same mass of food (1) • same volume of water (1) • use same thin tube (1) • burn food same distance from tube (1)		4

Total 13 marks

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Question number	Answer	Notes	Marks
3 (a) (i)	• correct labelling of axes (1) • suitable scale (1) • X and Y axis correct way round (1) • plotting (2)	minus 1 for each incorrect plot	5
(ii)	Any two from • few at lower end/150-151/top end/160 (1) • majority in middle/154-157 (1) • increases to 154-155 then decreases (1)		2
(b)	Any three from • nutrition (1) • sex (1) • age (1) • genes/genetically based (1)		3

Total 10 marks

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<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>4 (a)</td><td><table><tr><td>Blood group</td><td>A</td><td>B</td><td>AB</td><td>O</td></tr><tr><td>Antigen</td><td>A</td><td>B</td><td>A and B</td><td>none</td></tr></table></td><td>all four correct = 2
1-3 correct = 1</td><td>2</td></tr>
<tr><td>(b)</td><td>• agglutination (1)
• blocks vessels (1)
• causes death (1)</td><td></td><td>3</td></tr>
<tr><td>(c)</td><td>recipient blood group A = A and O (1)
recipient blood group B = B and O (1)
recipient blood group AB = AB, O, A and B/allgroups (1)
recipient blood group O = O (1)</td><td></td><td>4</td></tr>
<tr><td>(d)</td><td>• 10 + 4 = 14% (1)
• $\frac{14 \times 750}{100}$ (1)
• = 105 (1)</td><td>full marks for correct answer</td><td>3</td></tr>
</table>

Total 12 marks

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Question number	Answer	Notes	Marks
5 (a)	any three from • rapid response (to a stimulus) (1) • involuntary/automatic (1) • no brain involvement (1) • protective (1)		3 max
(b)	• A = motor (1) • B = relay/association/connector (1) • C = sensory (1)		3
(c) (i)	• fewer branches/dendrons/dendrites (1) • shorter branches/ dendrons/dendrites (1) • fewer knobs/synapses (1)	R axons	3
(ii)	• transmits impulse (1) • across synapse/(synaptic) cleft (1) • stimulates impulse in next neurone (1)		3
(iii)	• secreted by synapses/synaptic knob (1) • fewer synapses/knobs (1) • less secreted by remaining synapses/knobs (1)		3

Total 15 marks

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Question number	Answer	Notes	Marks
6 (a) (i)	sucrase/invertase (1)		1
(ii)	• enzyme is a protein (1) • biuret test (1) • purple if protein present/remains blue if absent (1)		3
(iii)	• reusable (1) • stable (1)		2
(b) (i)	• allows glucose molecules to pass (1) • prevents larger/other molecules/ blood cells from passing (1)		2
(ii)	• breaks down/converts glucose (1) • into hydrogen peroxide (1) • which activates electrode (1) • more glucose results in more hydrogen peroxide (1)		4

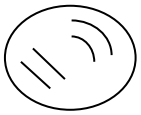
Total 12 marks

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Question number	Answer	Notes	Marks
7 (a) (i)	aerobic respiration (1)		1
(ii)	• shorter (1) • fatter/wider/thicker (1)		2
(iii)	• shortening causes tension/pull (1) • tendon inelastic (1) • pulls on radius/bone (1)		3
(b)	• ball and socket indicated labelled bone (1) • capsule/ligament labelled (1) • cartilage labelled (1) • synovial fluid labelled (1) • synovial membrane labelled (1) • overall appearance of diagram (1)		6

Total 12 marks

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Question number	Answer	Notes	Marks
8 (a) (i)	chromosomes (1)		1
(ii)	 (1)  (1)		2
(b) (i)	complementary bases pair up 3 DNA double helix unwinds 1 strands separate 2 two DNA strands form 4		1
(c) (i)	thymine/T (1)	R thiamine/thyamine	1
(ii)	guanine/G/cytosine/C (1)		1
(c)	any four from • allows formation of gametes (1) • haploid (1) • allows variation to occur (1) • which allows species to evolve (1) • allows diploid number to be maintained (1) • at fertilisation (1)		4

Total 10 marks

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