Mark Scheme (Results)

Summer 2019

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

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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.

Paper 1: Subject Human Biology

Question Number	Answer	Mark
1		(6)

	Feature					
Blood component	**has a nucleus**	**contains haemoglobin**	**carries hormones**	**engulfs pathogens**	**produces antibodies**	**helps blood clotting**
red blood cell		✓				
phagocyte	✓			✓		
lymphocyte	✓				✓	
platelets						✓
plasma	;	;	✓ ;	;	;	;

Total 6 Marks

Paper 1: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
2(a)	Any two from: carbohydrates/proteins/lipids/mineral salts (or named example)/fibre;;	Ignore named examples (1 mark for each two correct)	**(2)**

Question Number	Answer	Additional guidance	Mark
2(b)	Any two from: • lack of it causes scurvy; • (lack of vitamin C causes) damage to membranes/bleeding gums; • makes connective tissue/maintains/strengthens cell linings/gums/sticks/joins cells/tissues together;		**(2)**

Question Number	Answer	Additional guidance	Mark
2(c)(i)	Any five from: • Add fresh juice/long-life juice (to a test tube); • add DCPIP drop by drop/slowly; • until blue colour disappears/solution turns colourless; • count number of drops/measure volume of DCPIP added; • repeat (to obtain mean); • compare volumes of DCPIP added;		**(5)**

Question Number	Answer	Additional guidance	Mark
2(c)(ii)	Any two from: • volume of juice; • temperature; • concentration DCPIP;	Allow amount for mp1. Ignore concentration	**(2)**

Total 11 marks

Paper 1: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
3(a)	D; (virus)		**(1)**

Question Number	Answer	Additional guidance	Mark
3(b)	Any three from: • wear protective masks/clothes/goggles; • avoid contact with bodily fluids / avoid direct contact with infected person; • isolate/quarantine infected person; • safe burial; • disinfect surfaces to kill pathogen;		**(3)**

Question Number	Answer	Additional guidance	Mark
3(c)	Any three from: • few pathogens enter body at infection; • large numbers required to cause symptoms; • incubation; • need to reproduce/increase numbers; • time taken to do this;	Ignore reference to virus spreading	**(3 max)**

Question Number	Answer	Additional guidance	Mark
3(d)	• symptoms include severe diarrhoea / vomiting; • loss of water/salts/dehydration; • ORT replaces water/rehydrates/replaces salts;		**(3)**

Question Number	Answer	Additional guidance	Mark
3(e)	• causative pathogen found in bats/bats are vectors/carriers; • causes no ill effects/symptoms/disease;		**(2)**

Total 12 Marks

Paper 1: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
4(a)(i)	A protein;		**(1)**

Question Number	Answer	Additional guidance	Mark
4(a)(ii)	A the molecules are too large;		**(1)**

Question Number	Answer	Additional guidance	Mark
4(a)(iii)	• more glucose in blood/filtrate; • as little/no insulin to lower blood glucose levels/glucose not converted to glycogen; • not all/too much to be reabsorbed; • some found in urine;		**(3)**

Question Number	Answer	Additionalguidance	Mark
4(a)(iv)	$\frac{25 \times 100}{53}$; 47%;	Full marks for correct final answer Allow 47.2% / 47.17 Ecf allow one mark for correct answer using incorrect figures in calculation	**(2)**

Question Number	Answer	Additional guidance	Mark
4(b)	Any five from: Advantages • transplant permanent/carried out once; • can return to normal life; • not connected to machine for long periods/no need for frequent hospital visits; Disadvantages • risk of rejection; • risk of infection (during/after surgery)/reduced immunity; • difficulties in finding donor/long waiting lists for donor;		**(5 max)**

Total 12 Marks

Paper 1: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
5(a)	• correct labels on correct axes; • correct/appropriate scale; • correct plotting; • suitable lines; • lines labelled;	Allow line of best fit	**(5)**

Question Number	Answer	Additional guidance	Mark
5(b)	12.5 - 2.5; 10;	ECF from 5a	**(2)**

Question Number	Answer	Additional guidance	Mark
5(c)	Any three from: • exercise requires more energy; • from respiration; • more heat released raising body temperature; • more sweat released to cool body;	Reject energy produced/made Ignore anaerobic respiration	**(3 max)**

Total 10 Marks

Paper 1: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
6(a)	• holds DNA/chromosomes/genetic information in nucleus; • controls what enters and leaves nucleus / allows movement of substances/named substance out of/into the nucleus/exchange of substances between nucleus and cytoplasm;		**(2)**

Question Number	Answer	Additional guidance	Mark
6(b)	B CCG;		**(1)**

Question Number	Answer	Additional guidance	Mark
6(c)	threonine;		**(1)**

Question Number	Answer	Additional guidance	Mark
6(d)	Any six from: • tRNA has anticodons; • translation; • of mRNA; • amino acids carried by tRNA; • joined together; • by peptide bonds; • forming polypeptide/protein; • (final) protein released;	Mp3 must be in context of translation	**(6)**

Question Number	Answer	Additional guidance	Mark
6(e)	• causes change in base sequence/genetic code/named type of mutation; • of DNA;		**(2)**

Total 12 Marks

Paper 1: Subject Human Biology

Question Number	Answer	Additional guidance	Mark
7(a)	Any four from: • volume of lactose/sugar solution used; • concentration of lactose/sugar solution; • volume of enzyme solution used; • concentration of enzyme; • type of enzyme used; • how to measure amount/concentration of lactic acid / apparatus to measure amount / concentration of lactic acid;	Allow amount	**(4)**

Question Number	Answer	Additional guidance	Mark
7(b)(i)	25 °C;	accept 20 °C to 45 °C	**(1)**

Question Number	Answer	Additional guidance	Mark
7(b)(ii)	Any two from: • too few results/temperatures investigated / temperatures are too far apart/large gaps between temperatures; • peak/maximum lactic acid production could be below 25°C / could be above 25°C;		**(2)**

Question Number	Answer	Additional guidance	Mark
7(c)	Any three from: • little/no increase in lactic acid concentration / lactic acid concentration would reach a maximum/peak/become constant; • enzyme denatures (due to decrease in pH); • all substrate converted/broken down/used up; • so reaction /slows down/stops;		**(3)**

Question Number	Answer	Additional guidance	Mark
7(d)	Any five from: • not possible (to be completely certain); • due to (low) number of pH/temperature values tested/more pH/temperature values need to be tested; • pH5 appears to be optimum pH; • because most sugar broken down/converted at this pH; • optimum pH could be between 5-8/2-5; • optimum temperature not known; • no repeats carried out/no means calculated; • anomalies not identified; • there could be other components in milk that increase enzyme activity/control variables not taken into account;	Allow value stated within ranges given	**(5)**

Total 15 Marks

Paper 1: Subject Human Biology

<table>
<tr><th>Question Number</th><th>Answer</th><th>Additional guidance</th><th>Mark</th></tr>
<tr><td>8(a)</td><td>
<table>
<tr><th rowspan="2">Organ</th><th rowspan="2">Mass in kg</th><th colspan="2">Rate of blood flow in cm³ per minute</th></tr>
<tr><th>through the whole organ</th><th>per 100g of the organ</th></tr>
<tr><td>kidneys</td><td>0.3</td><td>1200</td><td>400</td></tr>
<tr><td>skeletal muscles</td><td>25.0</td><td>750</td><td>3</td></tr>
<tr><td>liver</td><td>1.5</td><td>1500</td><td>100</td></tr>
</table>
kidney 1200÷3;
400;

skeletal muscle 250 × 3;
750;
</td><td>correct answer award full marks

Ecf for each calculation allow correct answer to wrong figures</td><td>(4)</td></tr>
</table>

Question Number	Answer	Additional guidance	Mark
8(b)	Any four from: • (receives blood from) hepatic artery; • (receives blood from) hepatic portal vein; • homeostasis; • reference to blood sugar regulation; • detoxification (of alcohol)/urea formation/deamination;	For mp 1 and 2 allow receives blood from two vessels for one mark	**(4)**

Question Number	Answer	Additional guidance	Mark
8(c)	Any four from: • less blood flow to kidney/liver; • increased blood flow to skeletal muscles; • (muscles have) greater energy demand/more energy needed/to reduce oxygen debt/lactic acid; • (so) more oxygen/glucose needed; • for (aerobic) respiration;		**(4)**

Total 12 Marks

Paper Total 90 Marks