



Mark Scheme (Results)

November 2025

Pearson Edexcel International GCSE in Human Biology
4HB1/02

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November 2025

Question Paper Log Number P78967A

Publication Code 4HB1_02_2511_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.

Question number	Answer	Notes	Marks																																																
1 (a)	<table><tr><th rowspan="2">Feature</th><th colspan="6">Molecule</th></tr><tr><th>protein</th><th>DNA</th><th>glycogen</th><th>lipid</th><th>starch</th><th>Vitamin C</th></tr><tr><td>decolourises DCPIP</td><td></td><td></td><td></td><td></td><td></td><td>✓;</td></tr><tr><td>is found only in the nucleus</td><td></td><td>✓;</td><td></td><td></td><td></td><td></td></tr><tr><td>consists of glucose units</td><td></td><td></td><td>✓;</td><td></td><td>✓;</td><td></td></tr><tr><td>consists of a chain of amino acids</td><td>✓;</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>glycerol forms part of the molecule</td><td></td><td></td><td></td><td>✓;</td><td></td><td></td></tr></table>	Feature	Molecule						protein	DNA	glycogen	lipid	starch	Vitamin C	decolourises DCPIP						✓;	is found only in the nucleus		✓;					consists of glucose units			✓;		✓;		consists of a chain of amino acids	✓;						glycerol forms part of the molecule				✓;			Only 1 ✓ in the correct box for rows 1,2, 4 and 5 Maximum of 2 ✓ in the correct boxes for row 3. They lose a mark for every extra ✓	6
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(b)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none">• add powder into test/boiling tube;• add/dissolve in water;• add Benedict's (reagent);• heat/warm in water bath/place in water bath at any temperature 60 and above;• green/yellow/orange/brick-red colour shows presence of reducing sugar/stays blue not a reducing sugar;	mark each point independently mp1-accept beaker MP4-accept heat using Bunsen burner	5																																																
(c)	glucose; maltose;	accept fructose; lactose; galactose; apply list rule for each answer line	2																																																
			Total 13																																																

Question number	Answer	Notes	Marks
2 (a) (i)	<ul style="list-style-type: none"> axes correct way round, linear scale and plotted on half of grid; labelled and units; points plotted correctly; points joined with a ruler; 	ignore extrapolations	4
(ii)	$15\,000 \div 100\,000 = 0.15$; 0.15×22 ; $= 3$; or $22 \div 100\,000 = 0.00022$ $0.00022 \times 15,000$; $= 3$	accept 3.3 for three marks allow 1 mark for any number $\div 100\,000$	3
(b) (i)	An explanation that includes the following: <ul style="list-style-type: none"> extra chromosome/three chromosomes; (position) 21; 		2
(ii)	An explanation that includes the following: <ul style="list-style-type: none"> female; 2 X chromosomes; (at position) 23; 		3
(iii)	An explanation that makes reference to three of the following: <ul style="list-style-type: none"> there is an extra chromosome/chromosome mutation/changes the number of chromosomes;; cystic fibrosis is a change in base sequence/order; of DNA; gene mutation/faulty allele/example of point mutation; 		3
			Total 15

Question number	Answer	Notes	Marks
3 (a)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> • amylase digests/breaks down starch/does not break down protein/protease breaks down protein; • meat contains protein/does not contain carbohydrate/starch/starch not in diet ; 		2
(b)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • improves reliability; • allows a mean/average to be calculated; • allows anomalous results to be identified/one dog may not be representative /many different types of dogs; 	<p>mp1-ignore accuracy ignore validity</p> <p>mp3- a single dog might have a disease</p>	3
(c)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • not contaminated; • with food/bacteria/eq; • which might affect results/ invalid results/ inaccurate results; 		3
(d)	$\frac{16 \times 306}{100}$ $= 48.96/49;$	allow 1 mark for 16.32/16.3/16	2
(e)	<p>An explanation that makes reference to the following:</p> <ul style="list-style-type: none"> • only small %/16% effective; • bacteria still on saliva; 		2
(f) (i)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> • prevent/inhibits/kills bacterial(on teat)/prevents puppies getting infected/eq; 		1
(ii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> • prevents bacteria from infecting wound/prevents infection./ helps/speeds up wound healing; 		1
			Total 14

Question number	Answer	Notes	Marks
4 (a)	<p>An answer that makes reference to three of the following:</p> <ul style="list-style-type: none"> constant/steady/stable/set point; (maintained); internal environment; (despite) external/internal changes; negative feedback; 		3
(b) (i)	<p>A description that makes reference to the following:</p> <ul style="list-style-type: none"> change/increase/decrease/high/low ; glucose ; 		2
(ii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> pancreas; islets of Langerhans/beta cells/alpha cells; 		2
(iii)	<p>An answer that makes reference to the following:</p> <ul style="list-style-type: none"> (in the) blood; plasma; 	blood plasma= 2 marks	2
(iv)	<p>An explanation that makes reference to five of the following:</p> <ul style="list-style-type: none"> (blood) glucose level rises; insulin secreted/released; liver cells; glucose converted to glycogen; (glucose)level falls); (Negative) feedback; glucagon secreted; insulin secretion stopped/inhibited; <p>or</p> <ul style="list-style-type: none"> (blood) glucose level decreases; glucagon secreted; liver cells; glycogen converted to glucose; (glucose)level increases; {Negative) feedback; insulin secreted; glucagon secretion stopped/inhibited; 		5
			Total 14

Question number	Answer	Notes	Marks
5 (a) (i)	<ul style="list-style-type: none"> ciliated; epithelium; 	accept cilia(cell) ciliated epithelial = 2 marks squamous epithelial=1 mark squamous ciliated epithelial =1 mark	2
	(ii) An answer that makes reference to the following: <ul style="list-style-type: none"> secrete/produce mucus; 		1
	(iii) An explanation that makes reference to the following: <ul style="list-style-type: none"> group of similar cells/cells with same structure; working together; perform/carry out a specific/particular/eq function; 	Ignore same cell	3
	(iv) (measured length) = 30/31 (mm); = 30000/31 000 (µm); 31 000/30 000 ÷ 10; 3 × 10 ³ / 3.1 × 10 ³ ;	accept 3 cm/3.1cm If the measurement is incorrect, ecf from mp 2 If no mark, then 1 mark for ×1000 or ÷10	4
(b)	A description that makes reference to five of the following: <ul style="list-style-type: none"> destroys/paralyses/shortens/fewer cilia; excess mucus production; mucus not moved /swept up eq.; accumulates in lungs/airways/ named part of airway,/ blocked airways; coughing; greater risk of infection /pneumonia; cancer; COPD/emphysema. bronchitis; 	mp1-do not accept kills cilia	5
			Total 15

Question number	Answer	Notes	Marks
6 (a)	A = urethra; B = prostate gland; C = vas deferens/sperm duct; D = testis;	mp3-accept sperm tube mp4-ignore epididymis mp4-accept testicles	4
(b)	An explanation that makes reference to four of the following: <ul style="list-style-type: none"> • (medium) for sperm to swim; • fructose used in (sperm) respiration; • supplies/releases energy/ATP for swimming/movement; • sperm reaches ovum/oviduct/ sperm fuse with ovum; • alkaline/neutralise acids; 	accept sugar/glucose	4
			Total 8

Question number	Answer	Notes	Marks
7 (a)	A = label pointing to glomerulus/ Bowman's capsule; B = label pointing to proximal convoluted tubule; C = label pointing to collecting duct;	A line on any part of the glomerulus or Bowman's capsule. B- a line on any part from the base of the Bowman's capsule to the top of the loop of Henle. C- a line on the collecting duct. Accept the short extensions(branches at the sides)	3
(b)	An answer that makes reference to five of the following: <ul style="list-style-type: none"> • higher the ADH level the lower the rate of urine production; • collecting duct becomes more permeable; • increases reabsorption of water/ more water absorbed into blood; • (so)decreases urine production; • when ADH level is 7.5/constant urine production is constant/2.1; • when ADH level rises from (7.5)to 17.0/22.0 urine production decreases. • 7.5-17 decrease by 0.6/17-22 decreases by 0.2/7.5-22 decreases by 0.8; 	accept converse throughout	5
(c)	An explanation that makes reference to three of the following: <ul style="list-style-type: none"> • to reabsorb/absorb into blood; • nutrients/water/glucose/amino acid/ions/named ions/eq.; • supplies nutrients/named nutrients/oxygen to (kidney cells); • remove waste/carbon dioxide(from kidney cells); • maintains gradient; 		3
			Total 11