GradeMax

Pearson

Mark Scheme (Results)

Summer 2026

Pearson Edexcel International GCSE in Human Biology

4HB1/02

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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.

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>1 (a)</td><td>
<table>
<tr><th>Information</th><th>Molecule</th></tr>
<tr><td>found in chromosomes</td><td>DNA;</td></tr>
<tr><td>is a reducing sugar</td><td>maltose;</td></tr>
<tr><td>contains glycerol</td><td>lipid;</td></tr>
<tr><td>a storage carbohydrate in the liver</td><td>glycogen;</td></tr>
<tr><td>is an enzyme</td><td>pepsin;</td></tr>
<tr><td>helps to control blood glucose levels</td><td>glucagon;</td></tr>
</table>
</td><td></td><td>(6)</td></tr>
<tr><td>(b)</td><td>substance in test/boiling tube;
add Benedict's reagent;
heat/warm in water bath/ Bunsen burner/;
red (precipitate) is positive result;</td><td>mp2-ACCEPT Benedict’s solution
mp4-ACCEPT green, yellow, orange</td><td>(4)</td></tr>
<tr><td></td><td></td><td></td><td>Total 10</td></tr>
</table>

Question number	Answer	Notes	Marks
2 (a) (i)	A = mitochondria; B = ribosome/(rough) ER;		(2)
(ii)	A = aerobic respiration; B = protein synthesis/translation;	B-**IGNORE** reference to transport	(2)
(b)	• mitochondria/ribosomes only present in cytoplasm/not present in nucleus; • chromosomes/nucleolus would be present in nucleus/not present in cytoplasm;		(2)
(c)	• greater resolution/detail; • greater magnification; • mitochondria/ribosomes/ER are small; • wouldn't be seen using a light microscope/only seen with an electron microscope;		(4)
(d) (i)	• group/collection of similar cells; • (working together) for a particular function;		(2)
(ii)	• group of (different)tissues; (working together) for a particular function;	mp1-**REJECT** similar	(2)
			Total 14

Question number	Answer	Notes	Marks
3 (a)	• use a spirometer; • breath in and out/inhale and exhale, into mouthpiece; • ref to pen/marker/pencil; • ref to rotating/rolling, drum/ graph paper; • ref soda lime/medical grade oxygen;		(4)
(b)	sterilise mouthpiece/use disposable mouthpiece;		(1)
(c)	Accept 0.5 -0.75dm^3;		(1)
(d)	• time for drum to move one square = 20 ÷ 7 = 2.9 s; • total time between J and K = 2.9 × 19 = 55.1 s; • rate per minute = (60 ÷ 55.1) × 9 ; • = 10 breaths per minute; or • 20 seconds =7 squares; • 1 minute =7×3 =21 squares; • 19 squares= 9 breaths; • 21÷19×9=9,947 Allow 9.8, 9.9/9.947/9.95/10 for four marks	If there are no marks **ALLOW** 9 breaths/minute for 1 mark	(4)
(e)	• 20 squares difference; • 20 ÷ 4 = 5 dm^3;	ecf from mp1	(2)
(f)	• closer together/greater frequency/more peaks/ more troughs; • greater amplitude/ higher peaks/lower troughs/ greater distance between peaks and troughs/eq.;	higher amplitude and frequency= 2 marks	(2)
			Total 14

Question number	Answer	Notes	Marks
4 (a)	• compulsive (drug) taking/can't stop taking drug/dependence on a substance/eq.; • reference to brain/mental health/phycological effects;		(2)
(b)	• symptoms such as sickness/racing heart/sweating/stress/nausea/vomiting/diarrhoea /eq; • when stop taking drugs;		(2)
(c)	• conversion into morphine by an enzyme; • enzyme more/less active in some people/more or less enzyme;	no/ less/more enzyme to convert codeine into morphine=2 marks	(2)
(d)	• already contains paracetamol; • could overdose/ above safe dose;		(2)
i (e) (i)	• may cross placenta; • enter developing embryo/fetus;	**IGNORE** baby enters fetus via placenta=2 marks	(2)
(ii)	• may enter breast milk/present in breast milk; • pass to feeding baby;		(2)
(f)	won't be able to excrete it;		(1)
			Total 13

Question number	Answer	Notes	Marks
5 (a)	• diffusion; • active transport;	mp1- **ACCEPT** facilitated diffusion	**(2)**
(b) (i)	• x and y axes labelled with units; • axes correct way around; • suitable scale/plotted on at least half of grid; • correct plots;	mp4- tolerance of half-square	**(4)**
(ii)	Straight line going through the points;		**(1)**
(iii)	• temperature; • volume of (sucrose) solution/water; • type/part of potato; • time (left in test tube); • same surface area/dimensions;	**IGNORE** amount	**(2)**
(iv)	• liquid/water/sucrose solution removed; • larger /affect/inaccurate mass;		**(2)**
(c) (i)	any **three** from • at 0.2 au and 0.0 au water passes into potato/cells; • down a water potential gradient/high water potential to low water potential; • as water potential outside of cells is high(er)/low(er) inside cells; • increases mass;		**(3)**
(ii)	0.23-0.28/ au;	**ALLOW** correct reading from graph if answer is not 023-0.28	**(1)**
			Total 15

Question number	Answer	Notes	Marks
6 (a) (i)	W = sweat gland; X = hair/hair follicle; Y = blood vessel/capillary;	**IGNORE** reference to other plod vessels	**(3)**
(ii)	any **six** from • when hot W secretes (more) sweat; • onto skin (surface); • (sweat) evaporated; • takes heat away/heat transferred/cooling effect; • vasodilation of Y/dilation of Y; • brings more blood/heat to the skin; • heat lost by radiation;	**ALLOW** thermal energy for heat mp7-**ACCEPT** convection	**(6)**
(iii)	any **two** from • protection from microorganisms/physical damage/UV radiation/mechanical shock; • sensory role/touch/reception/pressure/pain; • excretion;	**IGNORE** protect organs mp2-**ACCEPT** sensation	**(2)**
(b)	• contracts/relaxes; • raise hair/flatten hair;		**(2)**
			Total 13

Question number	Answer	Notes	Marks
7 (a)	• disease causing; • microorganism/bacterium/virus;	**IGNORE** organism	**(2)**
(b) (i)	• artificial; • active;	any order	**(2)**
(ii)	• stop virus reproducing; • (so) no disease/infection/not infected;	mp1-**ACCEPT** replicating or multiplying	**(2)**
(c)	Any **five** from: • when (vaccine) is injected; • (vaccine contains) antigens; • causes (primary)immune response; • formation of antibodies; • and memory cells; • rapid response /rapid production of antibodies; • more production of antibodies;		**(5)**
			Total 11