



Mark Scheme (Results)

Summer 2025

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

Question number	Answer	Notes	Marks
1 (a)	• urethra; • testes; • uterus; • seminal vesicle; • vagina; • oviduct; • ovary;		7
(b) (i)	• oxytocin causes uterus muscles to contract; • during childbirth/labour; • causes/stimulates lactation/release of milk; • emotional bonding;	Accept produced during sexual intercourse for mp4	3
(ii)	• LH triggers ovulation/release of egg; maintains corpus luteum/ involved in production of progesterone;		2
			Total = 12

Question number	Answer	Notes	Marks
2 (a) (i)	• A = gall bladder; • B = liver; • C = oesophagus; • D = pancreas;	C- accept pancrease	4
(ii)	bile;		1
(iii)	• emulsifies fats/lipids/breaks into small droplets; • increases surface area; • for enzyme/lipase (to act); • neutralises (stomach) acid;		3
(b) (i)	any four from • pancreatic juice; • (into th)e small intestine/duodenum; • protease digests/breaks down proteins; • amylase digests/breaks down starch; • lipase digests/breaks down lipids; • (into) maltose/amino acid/glycerol/fatty acid;	If they do not get mp3, mp4, or mp5 They can get a mark for enzyme/named enzyme	4
(ii)	• insulin; • glucagon;		2
			Total = 14

Question number		Answer	Notes	Marks
3	(a)	• rapid/fast/eq. ; • involuntary/automatic action; • does not involve conscious thought; • protective/prevents (further) damage;	allow instant-mp1 ignore ref to brain ignore sub-conscious ignore unconscious	3
	(b) (i)	• sensory; • relay/intermediate; • motor;	correct positions on diagram	3
	(ii)	correct direction from sensory to motor;	Mark correctly if there are more than 1 arrow, un/le/wrongss they are in opposite direction	1
	(iii)	synapse/synaptic cleft;		1
				Total = 8

Question number	Answer	Notes	Marks												
4 (a) (i)	<table><tr><th>Conc (sugar) in au</th><th>Percentage change in mass</th></tr><tr><td>0.00</td><td>8.0</td></tr><tr><td>0.25</td><td>4.0</td></tr><tr><td>0.50</td><td>-1.0</td></tr><tr><td>1.00</td><td>-7.0</td></tr><tr><td>1.50</td><td>-10.0</td></tr></table> - two row/column table; - concentration (sugar) in au; - percentage/% change in mass; 0.0 to 1.50/1.50-0.00;	Conc (sugar) in au	Percentage change in mass	0.00	8.0	0.25	4.0	0.50	-1.0	1.00	-7.0	1.50	-10.0	Ignore units in the body of the table Accept AU for MP2 Ignore % symbol for MP3	4
Conc (sugar) in au	Percentage change in mass														
0.00	8.0														
0.25	4.0														
0.50	-1.0														
1.00	-7.0														
1.50	-10.0														
(ii)	0.50 (au);	mp3 unit not required for percentage in mass	1												
(iii)	$\frac{104 \times 7}{100}$ = 7.28 g; =7.3;	Allow 4/100 for 1 mark or 0.28	3												
(b)	- change in mass is -1% to +4% 5% range in mass - between 0.25 and 0.5 au; - accept any answer between 0.375- 0.5; <u>an answer of 0.45 scores =4 marks</u>	MP 1-4 are separate MPs unless the answer is 0.45	4												
(c) (i)	- dry the cylinder/ remove water/liquid; - affects mass/wrong mass/heavier/inaccurate mass/eq;	Accept weight	2												
(ii)	any two from - volume of (sugar) solution; - temperature; - surface area of cylinders; - same type of potato;	Ignore amount accept volume of liquid	2												
			Total =16												

Question number	Answer	Notes	Marks
5 (a)	• ACE inhibitor prevents/inhibits action of enzyme; • prevents formation of angiotensin II; • less(angiotensin ii) bind with receptors; • Losartan blocks/binds to receptors; • angiotensin ii cannot bind to receptor;		4
(b)	• arteries/arterioles; • muscles in walls; • can contract/constrict; • narrow lumen; • smaller volume/space(for blood flow);		4
(c)	• in normal/healthy kidney protein not found in urine; • protein is a big molecule; • should not pass through the glomerulus/basement membrane;		2
(d)	• damage to glomerulus/basement membrane; • stronger/intense/eq; <u>contractions</u>; • (which causes) <u>muscle</u> to get thicker;	mp2 must be due to mp1	2
(e)	• detoxification occurs in the liver; • can't break down Losartan if impaired/accumulation /build-up in body/bloodstream/liver; • results in (further) liver damage/liver failure/liver disease;		2
			Total =14

Question number			Answer	Notes	Marks
6	(a)	(i)	• A=rods/cones/retina; • detects light; • converts light energy into electrical energy; • (changed into (nerve) impulses; • B = transmits (nerve) impulses/electrical signals;	At least 1 mark from A and B to get full marks	4
		(ii)	• from (retina) to brain; • bent inwards at cornea/lens; • rays pass through the cornea and converge after the lens; • rays cross in eye (after lens); • inverted image/arrow;	Do not accept bending outwards for MP1 and MP2 Mp3- do not accept rays crossing before the retina	4
	(b)		• use both eyes and one eye; • use of eye patch/eq; • ball thrown same distance/stated distance;; • ball thrown many times; • count how many times ball is caught; • same type/size of ball;		4
	(c)		• misshapen/eq. <u>cornea/lens</u>; • light not focussed correctly/ light scatters/light not refracted properly; • blurred image;		2
					Total =14

Question number	Answer	Notes	Marks
7 (a) (i)	2nd set of parents have genotypes $I^B I^O$ and $I^B I^O$/both parents are $I^B I^O$; - give rise to child $I^O I^O$ which is M; 1st set of parents have genotypes $I^O I^O$ and $I^A I^B$; - can give rise to a child $I^A I^O$ which is N;	Allow 1 mark if the child is matched to the correct parent.	4
(ii)	- parental genotypes $I^B I^O \times I^B I^O$; - offsprings are $I^B I^B$ 2 $I^B I^O$ $I^O I^O$; 75%/0.75/3:1/3 in 4;	accept parental gametes for mp1 if BO and BO parental genotypes are used they can get ecf for MP2. accept offsprings in genetic cross	3
(b)	(prick finger) with pin/needle; - sterile; (smear) blood on <u>slide</u>; - thinly; - dry; - stain;	accept example of sterile Accept MP5 and MP6 in either order	5
			Total =12

