Mark Scheme (Results)

Summer 2024

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

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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) (i)	sensory (neurone/cell);		(1)
(ii)	axon;		(1)
(b) (i)	Part R sweat gland; Part S blood vessels/capillaries/arterioles;		(2)
(ii)	Any two from: • produces sweat/perspiration; • sweat evaporates (from skins surface); • using heat energy (from the blood);		(2)
(iii)	• provides an insulating layer insulation; • traps heat (energy)/to prevent heat loss;	reject keeps body warm	(2)
(c) (i)	• water is too hot/burn hands;		(1)
(ii)	• use a thermometer; • to test the temperature of the water/to make sure the water is not too hot;		(2)
(iii)	• (temperature) receptor;		(1)

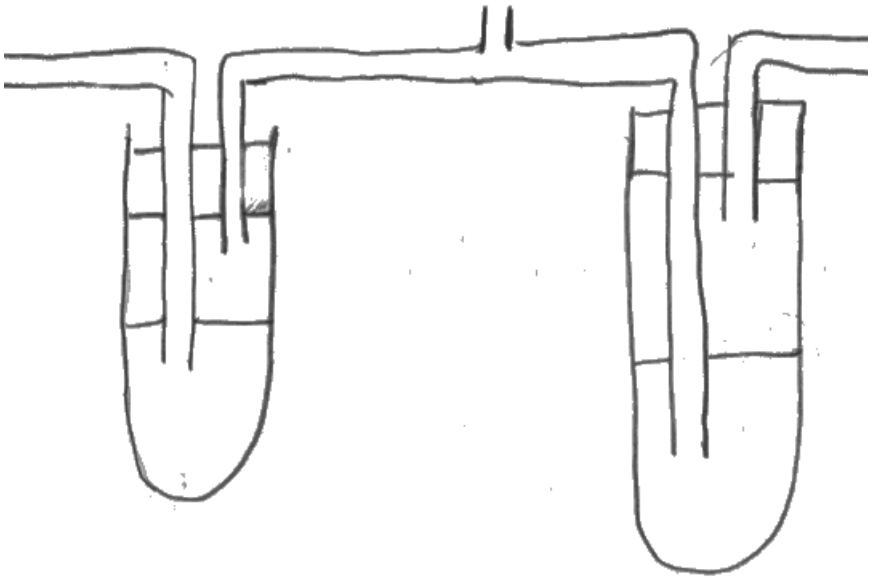
Total for Question 1 = 12 Marks

Question number	Answer	Notes	Marks
2 (a) (i)	• Y axis label and units; • X axis bars identified; • scale; • plots;	line graph score mpt 1-3	(4)
(ii)	1;		(1)
(b)	In the following order: • lag; • exponential; • equal to; • death; • less than; • dying;		(6)

Total for Question 2 = 11 Marks

Question number	Answer	Notes	Marks
3 (a) (i)	nucleus;		(1)
(ii)	allele;		(1)
(iii)	too many fingers/toes;		(1)
(b) (i)	heterozygous/heterozygote/carrier;		(1)
(ii)	Y;		(1)
(c)	Any four from: • double helix/two strands; • consists of nucleotides; • four bases; • each strand held together by hydrogen bonds/bases linked by hydrogen bonds; • complementary base pairing/A-T, G-C;		(4)

Total Question 3 = 9 marks

Question number	Answer	Notes	Marks
4 (a) (i)	• apparatus correctly set up; • long tube in indicator; • short tube above indicator; 		(3)
(ii)	Inhale and exhale gently/sterilise/clean mouthpiece/don't inhale liquid/care in assembling apparatus to avoid breaking glass;		(1)
(b) (i)	exercise/rest for the same length of time/at the same pace for each repeat/same student;		(1)
(ii)	any four from • breathing rate increases (with vigorous exercise); • more oxygen inhaled/supplied; • for aerobic respiration; • more energy released/more ATP; • breakdown of lactic acid; • produced by anaerobic respiration;	ignore ref CO_2	(4)

Total for Question 4 = 9 marks

Question number	Answer	Notes	Marks
5 (a) (i)	any five from • place substrate into a test/boiling tube/beakers; • place test tube in a (hot) water bath; • add enzyme to substrate; • measure time taken for reaction to occur; • use same volume/concentration of enzyme/substrate; • repeat for other temperatures;	Allow a temperature value Allow example of a reaction e.g. colour change, amount of glucose produced reject amount	(5)
(ii)	temperature;		(1)
(b)	• less kinetic energy; • less/fewer collisions (with substrate); • less enzyme-substrate complexes formed/less binding; • lower enzyme activity/rate of reaction;		(4)

Total for question 5 = 10 marks

Question number	Answer	Notes	Marks
6 (a) (i)	3 x 3 x 6; 54 (cm^2)	full marks for correct final answer ecf	(2)
(ii)	3 x 3 x 3; 27 (cm^3)	full marks for correct final answer ecf	(2)
(iii)	54:27; 2:1	ecf for wrong values	(2)
(b)	Any five from • red blood cells contain haemoglobin; • to transport oxygen/binds to oxygen; • blood plasma; • contains dissolved substances; • named substance e.g. nutrients/hormones/CO_2/heat; • transported through blood vessels/named blood vessel;		(5)
(c)	• diffusion; • (nutrients) higher in concentration outside the cell than inside the cell/down a concentration gradient/from high to low concentration;		(2)

Total for Question 6 = 13 marks

Question number	Answer	Notes	Marks
7 (a)	• intercostal muscles contract; • ribs move up and out; • diaphragm contracts and flattens; • air is drawn into the lungs;	ignore ref to internal/external	(4)
(b)	• detect pH of blood/levels of CO_2; • to maintain homeostasis/regulate breathing/heart rate;		(2)
(c) (i)	tidal (volume);		(1)
(ii)	residual (volume);		(1)
(iii)	vital capacity;		(1)

Total for Question 7 = 9 Marks

Question number	Answer	Notes	Marks
8 (a) (i)	• large waste/named waste/objects; • filtered/removed/trapped/separated;	reject refs to molecules	(2)
(ii)	• bacteria/microorganisms present; • require oxygen for <u>aerobic respiration</u>;		(2)
(iii)	methane;		(1)
(b)	• contains nitrates/nitrogen; • for plant growth		(2)

Total for Question 8 = 7 Marks

Question number	Answer	Notes	Marks
9 (a) (i)	A, B, AB;	2 marks for all 3 correct, 1 mark for 1 or 2 correct	(2)
(ii)	any five from • blood type O; • no antigens present; • (person) contains anti-A and anti-B antibodies; • other blood groups have A/B antigens; • immune response if mixed; • causes agglutination of red blood cells;		(5)
(b) (i)	• (faulty allele) carried/found on female sex/X chromosome; • males affected/female carriers/occurs more in males;		(2)
(ii)	• blood fails to clot/excessive bleeding;		(1)

Total for Question 9 = 10 marks

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