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Mark Scheme (Results)

January 2022

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.

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Question number	Answer	Notes	Marks
1 (a) (i)	B; (pulmonary artery) *A it is not the aorta* *C it is not the pulmonary vein* *D it is not the vena cava*		1
(ii)	A; (aorta) *B it is not the pulmonary artery* *C it is not the pulmonary vein* *D it is not the vena cava*		1
(iii)	in at top left and out through vessel; in at top right and out through vessel;		2
(iv)	valves; prevent blood flowing other way/backflow;		2
(b) (i)	chamber width in cm P 1.0; Q 0.2; R 0.2; S 1.5;	1 correct = 1 mark 2 correct = 2 marks 3/4 correct = 3 marks	3
(ii)	An answer that makes reference to three of the following: • The width corresponds to the amount of muscle; • S pumps blood furthest distance/whole body; • P pumps blood to lungs/short distance; • Q/R only receives blood/doesn't have to pump it very far/to ventricles;		3

Total : 12 marks

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Question number	Answer	Notes	Marks
2 (a) (i)	• sample placed in test tube; • Benedict's solution added; • heat in a water bath; • blue to brick red if glucose present/stays blue if absent;		4
(ii)	• sample from tubing placed in test tube/on spotting tile; • iodine solution added; • brown to blue-black if present/stays brown if absent;		3
(iii)	• remove any starch/glucose; • spilt when putting solution into tubing; • to avoid contamination/doesn't affect result/investigation/ensure results are valid;		3
(b)	• water in tube, positive for glucose but negative for starch • contents of tubing should test positive for starch and glucose; • Visking tubing has pores/partially permeable; • size(of pores) allows glucose to pass; • starch can't pass;		5

Total : 15 marks

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Question number	Answer	Notes	Marks
3 (a) (i)	A = synovial fluid; B = synovial membrane;		2
(ii)	• lubricate joint; • for easier movement/to reduce friction;		2
(b) (i)	• one section covering ball; • one section covering semi-circular part of bone; •		2
(ii)	• movement not smooth/bones rub together/friction/less shock absorbing; • painful;		2
(c)	• tendons attach to muscles; • attached to bone/lower arm; • muscle/biceps/triceps contracts; • generates pull on tendons/lower arm/bone; • tendons inelastic;	attaches muscles to bones = 2	5

Total : 13 marks

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Question number	Answer	Notes	Marks
4 (a)	• maintain a constant/stable/optimum; • internal environment; • despite changes in the external environment;		3
(b) (i)	B; (glucagon) *A is secreted by the kidneys* *C is insulin and reduces blood glucose* *D is testosterone and it is secreted by the testes .*		1
(ii)	C; (insulin) *A is secreted by the kidneys* *C is glucagon and increases blood glucose* *D is testosterone and it is secreted by the testes.*		1
(iii)	P = glycogen; Q = glucose; R = fat/lipid; S = respiration;		4
(c)	• low levels of blood glucose; • reduce insulin release; • until balance/correct/normal level is reached/increases blood glucose; • secretion of insulin starts again/glucagon stopped;	accept reverse argument for glucagon	4

Total : 14 marks

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Question number	Answer	Notes	Marks
5 (a)	• change in base sequence; • causes change in protein synthesis; • causes change in phenotype;		3
(b) (i)	• axes labelled with units; • suitable scale; • correct plots; (3 x 2) • bars of equal width;		5
(ii)	• 43 000 × 0.0015; • = 64.5; • 65;		3
(c)	• extra chromosome at pair 21; • diploid number 47; • female because 2 X chromosomes; • at pair 23;		4

Total : 15 marks

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Question number	Answer	Notes	Marks
6 (a) (i)	• vas deferens cut; • sperms can't pass/not released (to outside); • don't reach vagina/uterus/ovum; • fertilisation can't occur;		4
(ii)	• fluid still passed; • from prostate gland; • this can contain HIV;		3
(b) (i)	X on testes;		1
(ii)	• sperm <u>and</u> ova/male and female gametes; • both have haploid/(n) chromosomes; • fuse at fertilisation; • diploid (2n) number restored;		4

Total 12 marks

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Question number	Answer	Notes	Marks
7 (a) (i)	carbon hydrogen and oxygen;		1
(ii)	nitrogen	Allow sulfur	1
(iii)	19.6 - 12; 7.6 g	Allow ECF	2
(iv)	protein 1.2 g × 17 = 20.4 kJ; lipid 4.8 g × 37 = 177.6 kJ; total = 198 kJ;	Allow ECF for 2nd and 3rd mark	3
(b)	add alcohol to fish; add water; cloudy/milky appearance/emulsion indicates lipid;		3

Total 10 marks

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