Transport in Animals

Mark Scheme

Level	IGCSE
Subject	Biology
Exam Board	CIE
Topic	Transport in Animals
Sub-Topic	
Paper Type	Alternative to Practical
Booklet	Mark Scheme

Time Allowed: **64 minutes**

Score: **/53**

Percentage: **/100**

Question	Answer	Marks	Comments
1 (a) (i)	*two sites marked on Fig 2.1:* wrist / neck / groin / temple / finger / toe / elbow / thumb / arm pit / back of knee **;;**	max [2]	
(ii)	arteries near surface or skin **/** arteries can be pressed against bone or hard structure beneath **/** AW **;**	[1]	
(b)	apply pressure (using finger) to pulse site / AW **;** count pulse **/** number of beats per unit time / AW **;**	[2]	
(c) (i)	65 +/ – 1 [mm] **;**	[1]	
(ii)	(65 +/– 1 / 125 = 0.51 – 0.53 [mm])	[1]	ecf from **(c) (i)**
(iii)	take multiple (more than one) readings for diameter across different positions **;** calculate average length and use this value in calculation **;**	[2]	

<table>
<tr><th>Question</th><th>Answer</th><th>Marks</th><th>Comments</th></tr>
<tr><td>(iv)</td><td>
<table>
<tr><td>feature</td><td></td><td>artery</td></tr>
<tr><td>shape</td><td></td><td>oval / AW</td></tr>
<tr><td>wall</td><td></td><td>thick</td></tr>
<tr><td>(detail of) layers</td><td>smooth / single layer / AW</td><td>uneven / two or more layers / AW</td></tr>
<tr><td>lumen / inner space / internal diameter / AW ;</td><td>large / circular</td><td>/ oval
;;;</td></tr>
</table>
</td><td>max [4]</td><td>1 mark for all 3 correct features
1 mark for each pair of appropriate differences</td></tr>
<tr><td>(d) (i)</td><td>heart / pulse rate taken before and after exercise ;
heart / pulse rate taken immediately after exercise ;
exercise – same type / same length of time / AW ;
students – same age / gender / clothing / AW ;
repeat for each type of student / use groups of students ;</td><td>max [4]</td><td></td></tr>
</table>

Question	scheme	Marks	Comments
(ii)	table drawn with (ruled) lines and distinct columns / rows **;** *correct headings:* type of student / AW **;** pulse / heart rate before and after exercise with unit for pulse rate, i.e. beats per min / bpm / beats per unit time in the heading / s **;** increase / difference in pulse rate / average pulse rate for all students **;**	max [3]	
		[Total 20]	

<table>
<tr><th>Question</th><th>Answers</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>2 (a) (i)</td><td>Drawing: O quality mark – clear complete lines, shape and larger than photograph, no shading;
L more than 1 layer of wall recognised;
D asymmetric right side / inside layer folded – detail;

Any two labels if correct:
lumen / space / hole;
muscles;
thick(er) wall / AW;
elastic (wall / fibres);
connective tissue (outer layer);
<u>folded</u> inner layer / endothelium / lining;</td><td>[5]</td><td>Score the drawing by a vertical row of ticks or crosses in order O, L and D shown to the uncluttered side of the drawing.
A. if circles are incomplete to show more than one layer.
If drawn only the vein, Y – award O only. Accept lumen label.
If a compass or equivalent has used – do not award O mark.
Look for ‘bulge’ in wall of blood vessel not the ‘floating’ bit in the middle.

Lumen = AW e.g. ‘room for blood’ I. blood alone.
A. correct terms referring to tunica adventitia = outer layer; tunica media = muscle + elastic tissue; tunica intima = endothelium.
I. reference to ‘smooth’ ‘longitudinal’ ‘stretching layer. ‘radial’. R. striated / cardiac.
I. cytoplasm / cell wall / cell membrane / nucleus.
If inner layer or wall, must have <u>folded</u>. Endothelium alone = 1 mark.
If both blood vessels are drawn, mark the artery only.
Longitudinal views – mark the end section only.</td></tr>
<tr><td>(ii)</td><td>X – <u>artery</u>;</td><td>[1]</td><td>A. arteries. or arteriole or specific named artery. Mark in list order. R. vein.</td></tr>
<tr><td>(iii)</td><td><table>
<tr><td>feature</td><td>X – artery</td><td>Y – vein</td></tr>
<tr><td>shape in section</td><td>round</td><td>oval</td></tr>
<tr><td>wall thickness</td><td>thick</td><td>thin</td></tr>
<tr><td>lining</td><td>folded / AW</td><td>smooth / AW</td></tr>
<tr><td>tissue</td><td>(more) muscle / elastic</td><td>less</td></tr>
<tr><td>lumen size</td><td>small / AW</td><td>large / AW</td></tr>
</table></td><td>[max 2]</td><td>‘thick muscular wall‘ = 2

marks from either side depending on approach. Not comparative.

If capillary points are made… ignore – question is to distinguish between X and Y.</td></tr>
</table>

(b) (i)	14, 15, 16, 17, 17, and 18 in table	[1]	all numbers correct in table.
(ii)	**A**xes – orientations and labels; **S**cales – linear scale, to fill more than half the printed grid; **P**lot – all correct; **L**ine – joined point to point with ruled lines;	[4]	(**X** – mass of weight g and **Y** – increase in mm) +/- half a small square. ecf – from table. All plotted points (11) to be included on the graph. If plot internal diameter (2nd column) allow: **A** and **L** – Max 2. **A.** smooth curve passing through most points. **R.** extrapolation of line beyond 100g. **R.** thick lines. Straight line, non linear scale allow **A** only if correct. Score the drawing by a vertical row of ticks or crosses in order **A**, **S**, **P** and **L**. Histogram – **A**, **P** only.
(iii)	original size, shape or position / decrease / contract; (*reason*) elasticity must be linked to return in size / recoil; thick wall / elastic tissue / AW; AVP e.g. ref blood pressure / pulsation ;	[max 3]	**I.** expansion / damaged / overstretched. **I.** reference to elastic limit and to overstretching.
		[Total: 16]	

3 **(a) (i)** Any site where pressing against bone / cartilage a pulse can be measured; [MAX 1]

(ii) **1** artery; (**R** vein and capillary)
2 surge / wave / AW of blood;
3 near the surface;
4 pressure against bone or cartilage; [MAX 2]

(b) calculation x 4 for rate per minute; [72, 76, 68]
mean calculated; [72] (allow ecf for correct mean from incorrect figures) [2]

(ii) reliability / reduce error / show anomalies AW;
(ignore accuracy and fair test) [1]

(iii) **Two** from:
Exercise / physical work / activity; increase heart beat rate / demand for extra supply of blood / oxygen/ glucose / energy (for muscles);
Relaxation / sleeping / inactivity; decreases heart beat rate/ lowers demand for blood supply AW;
Adrenaline / stress / anxiety/ fear / fright; increases hbr; AW
alcohol; slows hbr;
coffee / caffeine; increases hbr;
smoking / nicotine; increases hbr;
illness / raised body temperature; increases hbr
being fit; lowers hbr;
I references to: diet / body mass / age / external temperature
mark across the rows [MAX 4]

(c) graph
S – suitable scale to fill over half of printed grid;
P – plotted correctly;; *allow +/- 0.25 cm / 1/4 square*
(one error – 1 plot mark, if two errors – neither plot mark. Allow ecf from (b)(i).)
B – bars separate, not touching;
C – columns of equal width; [5]

(ii) higher body mass / heavier – slower heart beat rate or converse;
A negative correlation [1]

(d) lower body mass + higher heart rate + link to shorter life span / higher body mass + lower heart rate + link to longer life span;
all three factors are required [1]

[Total: 17]