

Paper 1 (4HB1/01)

Question number	Answer	Mark
1(a)	<p>In the following order:</p> <ul style="list-style-type: none"> Alzheimer's (1) 65 (1) stroke (1) forgetfulness (1) confusion (1) <p>} either order</p>	5

Question number	Answer	Mark
1(b)(i)	<p>A description that makes reference to two of the following points:</p> <ul style="list-style-type: none"> greatest number of people with dementia in England (1) lowest number of people with dementia in Northern Ireland (1) manipulation of data, e.g. 605 208 more people with dementia in England compared to Wales (1) 	2

Question number	Answer	Additional guidance	Mark
1(b)(ii)	<p>Process:</p> <ul style="list-style-type: none"> $800\,000 \times (2 \div 5)$ (1) 320 000 (1) 	allow 2 marks for correct final answer	2

Question number	Answer	Additional guidance	Mark
1(b)(iii)	<p>A suggestion that makes reference to any of two of the following points:</p> <ul style="list-style-type: none"> poor diet (in early life)/high fat diet (1) smoking/reference to atmospheric pollution (1) leading to stroke (1) lack of blood/oxygen to brain (1) people living longer so more chance of it developing (1) 	allow reference to genetic inheritance where greater number of people to pass on genes that predispose to dementia	2

Total for Question 1 = 11 marks

Question number	Answer	Mark
2(a)	<p>A bar chart showing:</p> <ul style="list-style-type: none"> two bars for each student plotted correctly (1) a key to clearly indicate resting pulse and pulse after two minutes of exercise (1) horizontal and vertical axes with labels and units (1) an appropriate scale (1) 	4

Question number	Answer	Additional guidance	Mark
2(b)	<p>Process: $(64 + 82 + 76 + 90) \div 4$ (1) $= 78$ (1)</p>	allow 2 marks for correct final answer	2

Question number	Answer	Mark
2(c)	A suggestion that makes reference to pulse rate at rest/pulse rate after exercise not repeated or incorrect reading of pulse at rest/following exercise	1

Question number	Answer	Mark
2(d)	<p>Any three of the following possible reasons:</p> <ul style="list-style-type: none"> gender differences (1) differences in body mass (1) reference to health of lungs/heart/fitness of students (1) different exercises carried out (1) 	3

Question number	Answer	Additional guidance	Mark
2(e)	<p>A description that makes reference to any two of the following points:</p> <ul style="list-style-type: none"> place two fingers gently, not thumb (1) on wrist/neck (1) count for 15 seconds (1) 	<p>do not award radial pulse if linked to neck</p> <p>do not award carotid pulse if linked to wrist</p> <p>allow reference to digital pulse meter for first bullet point</p> <p>allow number of pulses within a set timeframe to work out pulse rate per minute</p>	2

Total for Question 2 = 12 marks

Question number	Answer	Mark
3(a)(i)	D	1

Question number	Answer	Mark
3(a)(ii)	W = (inferior) vena cava (1) X = aorta (1)	2

Question number	Answer	Additional guidance	Mark
3(a)(iii)	A description that makes reference to the following two points: <ul style="list-style-type: none"> blood vessel W carries deoxygenated blood (1) and contains more carbon dioxide (1) 	or reverse argument blood vessel X	2

Question number	Answer	Additional guidance	Mark
3(b)(i)	Thicker wall/narrower lumen/elastic muscle tissue	ignore reference to pressure	1

Question number	Answer	Mark
3(b)(ii)	An explanation that makes reference to any two of the following points: <ul style="list-style-type: none"> small lumen so high blood pressure maintained (1) muscular wall that contracts forcing blood forward (1) contains elastic tissue which recoils (1) 	2

Question number	Answer	Additional guidance	Mark
3(b)(iii)	Process: <ul style="list-style-type: none"> $(10 \div 50) = 0.2 \text{ mm}$ (1) $(0.2 \times 1000) = 200 \mu\text{m}$ (1) 	allow 2 marks for correct final answer	2

Question number	Answer	Mark
3(c)(i)	<p>An explanation that makes reference any four of the following points:</p> <ul style="list-style-type: none"> • ACE inhibitor blocks action of angiotensin converting enzyme/ACE (1) • prevents angiotensin I from binding to ACE (1) • angiotensin I not converted to angiotensin II (1) • blood vessels remain dilated/vasodilation/vasoconstriction prevented (1) • production of ADH reduced (1) • less water in blood (1) • lower blood pressure (1) 	4

Question number	Answer	Mark
3(c)(ii)	To reduce the risk of stroke/heart attack/heart disease/kidney failure	1

Total for Question 3 = 15 marks

Question number	Answer	Mark
4(a)	Adult (stem cells)	1

Question number	Answer	Mark
4(b)	No rejection or same tissue type	1

Question number	Answer	Mark
4(c)	W = nucleus (1) X = cell membrane (1) Y = cytoplasm (1)	3

Question number	Answer	Mark
4(d)	A description that makes reference to any of the three following points: <ul style="list-style-type: none"> • (stem cells) differentiate/become specialised (1) • (stem cells) divide (1) • by mitosis (1) • forming genetically identical cells (1) 	3

Question number	Answer	Mark
4(e)	A description that makes reference to any three of the following points: <ul style="list-style-type: none"> • burn/wound healed more quickly (1) • takes less time to treat (1) • chemicals needed to produce tissue (1) • less risk of contamination (1) 	3

Question number	Answer	Mark
4(f)	A description that makes reference to two of the following points: <ul style="list-style-type: none"> • extracting embryonic stem cells (1) • may harm embryos (1) • potential life (1) 	2

Total for Question 4 = 13 marks

Question number	Answer	Mark
5(a)(i)	(red blood cells) are a similar size/diameter as the lumen of the capillary	1

Question number	Answer	Mark
5(a)(ii)	<p>An explanation that makes reference to any three of the following points:</p> <ul style="list-style-type: none"> • more diffusion of oxygen (into cells) (1) • slower flow (of red blood cells) (1) • because more time for diffusion to take place (1) • greater surface area in contact with capillary walls/shorter diffusion distance (1) 	3

Question number	Answer	Mark
5(b)	<p>An explanation that makes reference to any three of the following points:</p> <ul style="list-style-type: none"> • less oxygen transported (to baby) (1) • (due to) presence of carbon monoxide(1) • has a higher affinity for red blood cells than oxygen or binds more strongly to red blood cells or binds irreversibly to red blood cells (1) • forms carboxyhaemoglobin (1) • less aerobic respiration/less energy released (in baby) (1) • less growth (1) 	3

Total for Question 5 = 7 marks

Question number	Answer	Mark
6(a)(i)	<p>An explanation that makes reference to the following linked points:</p> <ul style="list-style-type: none"> • similar/same shape to the substrate (1) • therefore complementary in shape to the enzyme (1) • binds to the active site (1) • enzyme is lock and substrate is the key/according to lock and key hypothesis (1) 	3

Question number	Answer	Mark
6(a)(ii)	<p>A description that makes reference to any two of the following points:</p> <ul style="list-style-type: none"> • lowers activity (of enzyme) (1) • takes longer to reach maximum rate of reaction (1) • no effect at maximum substrate concentration (1) 	2

Question number	Answer	Mark
6(b)	<p>A description that makes reference to any three of the following points:</p> <ul style="list-style-type: none"> • this is non-competitive inhibition (1) • binds at a place on the enzyme other than the active site (1) • changes shape of enzyme/active site (1) • substrate cannot bind to enzyme/active site (1) • irreversible (1) 	3

Question number	Answer	Additional guidance	Mark
6(c)(i)	<p>Process: $(3\,900\,000\,000 \div 100) \times 21$ (1) $= £820\,000\,000$ (1)</p>	<p>award 2 marks for correct final answer</p> <p>allow £819 000 000 for both marks</p>	2

Question number	Answer	Mark
6(c)(ii)	B	1

Question number	Answer	Mark
6(d)	<p>A description that makes reference to the following points:</p> <ul style="list-style-type: none"> • immobilised enzyme bound to cardboard strip (1) • urine passed over strip including the enzyme (1) • glucose binds to immobilised enzyme if present converting it to hydrogen peroxide/gluconic acid (1) • causes a colour change/visible colour to appear (1) 	4

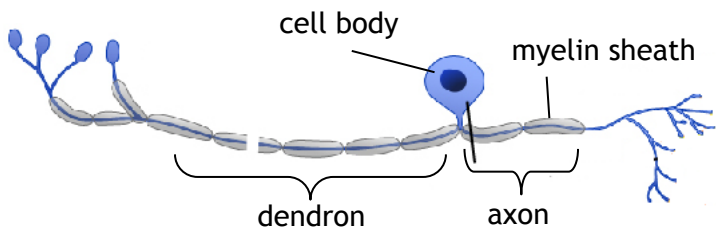
Total for Question 6 = 15 marks

Question number	Answer	Mark
7(a)	Mouse	1

Question number	Answer	Mark
7(b)	<p>A description that makes reference to any three of the following points:</p> <ul style="list-style-type: none"> reference to instrument producing sound (1) at a range of frequencies (1) from low to high pitch (1) indication of when sound can/cannot be heard (1) 	3

Question number	Answer	Additional guidance	Mark
7(c)(i)	<p>K = hammer (1)</p> <p>L = anvil (1)</p> <p>M = stirrup (1)</p>	<p>allow:</p> <p>malleus (1)</p> <p>incus (1)</p> <p>stapes(1)</p>	3

Question number	Answer	Mark
7(c)(ii)	<p>A description that makes reference any two of the following points:</p> <ul style="list-style-type: none"> amplifies sound signals (1) transmit sound/vibrations (1) from eardrum (1) to cochlea/oval window (1) 	2

Question number	Answer	Mark
7(d)	<p>Diagram (1)</p> <p>axon (1)</p> <p>cell body (1)</p> <p>dendron (1)</p> <p>myelin sheath (1)</p> 	5

Question number	Answer	Mark
7(e)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • hearing is reduced (1) • (because) impulse not instigated/information from cochlea not detected (1) • therefore impulses not transmitted (1) • to temporal lobe/auditory cortex (1) • to brain/CNS (1) 	3

Total for Question 7 = 17 marks

TOTAL FOR PAPER = 90 MARKS