

Paper 2 (4HB1/02)

Question number	Answer	Mark
1(a)	A	1

Question number	Answer	Mark
1(b)(i)	45 000	1

Question number	Answer	Mark
1(b)(ii)	A description that makes reference to any two of the following points: <ul style="list-style-type: none">• large (1)• increase (1)• more than doubled (1)	2

Question number	Answer	Mark
1(c)(i)	One mark for each of the following: <ul style="list-style-type: none">• abstain from/reduce sexual partners (1)• use condom (1)	2

Question number	Answer	Mark
1(c)(ii)	Antibiotics/named antibiotic	1

Question number	Answer	Mark
1(d)	An explanations that makes reference to any two of the following points: <ul style="list-style-type: none">• lack of barrier (1)• allows fluids to mix (1)• fluids contain bacteria/viruses/fungi (1)	2

Total for Question 1 = 9 marks

Question number	Answer	Additional guidance	Mark
2(a)(i)	Process: (30 ÷ 100) × 1.7 million (1) = 510 000 (1)	allow 2 marks for correct final answer	2

Question number	Answer	Mark
2(a)(ii)	Any two possible suggestions from the following: <ul style="list-style-type: none"> different causes/named example/not all because of osteoporosis (1) different diet in UK (1) effective preventative measures in UK (1) 	2

Question number	Answer	Mark
2(b)	Any two linked explanations from the following: <ul style="list-style-type: none"> increase intake of calcium/phosphate (1) as this forms part of compact bone (1) vitamin D supplement (1) helps uptake of calcium salts (1) increase exercise (1) prevents bones becoming weaker (1) 	4

Question number	Answer	Mark
2(c)(i)	A description that makes reference to the following two points: <ul style="list-style-type: none"> bone structure/mass becomes less (1) bone strength reduced (1) 	2

Question number	Answer	Mark
2(c)(ii)	A suggestion that makes reference to any two of the following points: <ul style="list-style-type: none"> bones internal/cannot be seen (1) therefore only become aware when bone breaks (1) unlikely to be noticed/diagnosed until a fracture occurs (1) 	2

Total for Question 2 = 12 marks

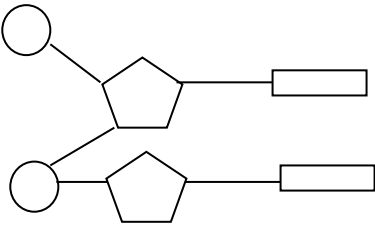
Question number	Answer	Mark
3(a)	<p>A response that makes reference to the following points:</p> <ul style="list-style-type: none"> • form of gene (1) • characteristic (gene) that is expressed (1) 	2

Question number	Answer	Mark
3(b)(i)	<p>man Dd (1)</p> <p>wife Dd/dd (1)</p> <p>son dd and son's wife Dd (1)</p> <p>child 1 (boy) dd and child 2 (girl) Dd (1)</p> <p>man ——— wife</p> <p style="margin-left: 40px;"> </p> <p style="margin-left: 80px;">son ——— son's wife</p> <p style="margin-left: 120px;"> </p> <p style="margin-left: 100px;">┌———┐</p> <p style="margin-left: 80px;">child 1 child 2</p> <p>2 marks for setting out as a family tree (minus 1 for each mistake)</p>	6

Question number	Answer	Additional guidance	Mark
3(b)(ii)	<p>Process:</p> <p>probability of boy = 1 : 1/1 in 2/0.5/50% (1)</p> <p>probability of polydactyly = 1 : 1/1 in 2/0.5/50% (1)</p> <p>probability of boy with polydactyly is 0.5×0.5</p> <p>= 1 : 3/1 in 4/0.25/25% (1)</p>	allow 3 marks for correct final answer	3

Total for Question 3 = 11 marks

Question number	Answer	Mark
4(a)	<p>A description that makes reference to the following points:</p> <ul style="list-style-type: none"> DNA double versus RNA single-stranded (1) DNA contains thymine while RNA contains uracil (1) DNA contains deoxyribose while RNA contains ribose (1) 	3

Question number	Answer	Mark
4(b)	<p>A drawing that includes:</p> <ul style="list-style-type: none"> organic bases attached to correct position on ribose (1) phosphate attached at C3 and C5 (1) 	3

Question number	Answer	Additional guidance	Mark
4(c)(i)	<p>Process:</p> <ul style="list-style-type: none"> 37% must be thymine (1) $100 - (2 \times 37) = 26\%$ must be guanine (G) and cytosine (C) (1) so guanine = $26 \div 2 = 13\%$ of nucleotides (1) 	allow 3 marks for correct final answer	3

Question number	Answer	Mark
4(c)(ii)	<p>An explanation that makes reference to the following points:</p> <p><i>muscle cell</i> adenine 37%/same amount as cheek cell (1) because genetically identical to cheek cell (1)</p> <p><i>red blood cell</i> adenine 0% (1) no nucleus (1) DNA in nucleus/no DNA (1)</p>	5

Question number	Answer	Mark
4(d)	D	1

Total for Question 4 = 15 marks

Question number	Answer	Mark
5(a)	<p>A graph showing:</p> <ul style="list-style-type: none"> vertical axis scale half grid and linear (1) lines drawn connecting points (1) horizontal axis labelled hours and vertical axis labelled grams (1) points plotted correctly (1) key for amylase Q/amylase P (1) 	5

Question number	Answer	Mark
5(b)(i)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> starch digested/broken down to glucose (1) therefore causes water to enter tubing (1) by osmosis (1) 	3

Question number	Answer	Mark
5(b)(ii)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> substrate/starch concentration reduced (1) less for enzymes to digest (1) 	2

Question number	Answer	Mark
5(b)(iii)	<p>An explanation that makes reference to the following points:</p> <p><i>concentration</i> amylase will change the rate of reaction (1)</p> <p><i>pH</i> enzyme activity changes with pH (1)</p>	2

Question number	Answer	Mark
5(c)	To ensure that the mass is not affected by water	1

Question number	Answer	Mark
5(d)	<p>Salivary glands (1)</p> <p>Pancreas (1)</p>	2

Question number	Answer	Mark
5(e)	<p>A description that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • Benedict's test (1) • heat sample (1) • brick red/orange colour shows presence of glucose (1) 	3

Total for Question 5 = 18 marks

Question number	Answer	Mark
6(a)(i)	An answer that makes reference to any two of the following points: <ul style="list-style-type: none"> • maintenance of (1) • a constant internal environment (1) • despite external changes (1) 	2

Question number	Answer	Mark
6(a)(ii)	Liver	1

Question number	Answer	Mark
6(b)	A description that makes reference to any three of the following points: <ul style="list-style-type: none"> • in diet/food as protein (1) • protein is digested (1) • resulting amino acids are absorbed (1) • non-essential amino acids produced by body (1) 	3

Question number	Answer	Mark
6(c)(i)	An explanation that makes reference to the following points: <ul style="list-style-type: none"> • more protein in diet A (1) • therefore more urea in urine (1) • 14.3 g versus 2.1 g (1) • excess amino acids converted to urea then excreted (1) 	4

Question number	Answer	Mark
6(c)(ii)	Does not come from the breakdown of excess amino acids	1

Question number	Answer	Mark
6(d)	Body tissue/muscle increases	1

Total for Question 6 = 12 marks

Question number	Answer	Additional guidance	Mark
7(a)	Reponses in the following order: pressure (1) volume (1) diaphragm (1) down (1) inflating (1)	reject along	5

Question number	Answer	Mark
7(b)(i)	Arrow shows blood is flowing away from lung/alveolus	1

Question number	Answer	Mark
7(b)(ii)	Process: <ul style="list-style-type: none"> width of wall (measured with ruler) is 1 mm (1) scale 18 mm = 0.1 mm (1) actual width = $0.1 \div 18$ (1) 0.0055/0.006 mm (1) 	4

Question number	Answer	Mark
7(b)(iii)	An explanation that makes reference to the following points: <ul style="list-style-type: none"> thin wall (1) therefore short diffusion pathway (1) oxygen/carbon dioxide will pass across in shorter time (1) 	3

Total for Question 7 = 13 marks

TOTAL FOR PAPER = 90 MARKS