

Question Number	Answer	Additional Guidance	Mark
1(a)(i)	<p>1. idea of it being frequently inherited in the family e.g. 1, 7 and 10 all have affected offspring, 9 of the family have the disorder ;</p> <p>2. individual { 1 / 3 / 7 / 10 } must be heterozygous / eq ;</p> <p>3. use of the pedigree diagram to explain mark point 2 ;</p> <p>4. appropriate use recessive allele argument e.g. if it were recessive then 2 would have to be {heterozygous / a carrier} ;</p> <p>5. idea that it is unlikely that the unrelated parents { 8 / 11 } would also be carriers of the affected allele ;</p>	IGNORE 50% are affected 1 ACCEPT 8 of 14 descendants of 1 and 2 2 ACCEPT have one dominant allele	(3)

Question Number	Answer	Additional Guidance	Mark
1(a)(ii)	<p>1. parents gametes displayed correctly (e.g. M, m and m ,m) ;</p> <p>2. correct genotypes of offspring shown ;</p> <p>3. probability matches genotypes shown e.g. 0.5 / $\frac{1}{2}$ / 1 in 2 / 50% ;</p>	1. ACC T gametes shown on a punnett square alone 3. ACCEPT other probabilities if match genotypes shown	(3)

Question Number	Answer	Additional Guidance	Mark
1(b)	<p>Any two pairs from:</p> <p>1. idea that there is a { thick wall / thick layers / thick tunica media / eq } ;</p> <p>2. idea that it needs to { avoid rupture / withstand high pressure / allow expansion / eq } ;</p> <p>3. collagen / elastic fibres ;</p> <p>4. allow expansion / elastic recoil ;</p> <p>5. muscle { layer / fibres / wall / eq } ;</p> <p>6. control the flow of blood / maintain blood pressure / eq ;</p> <p>7. smooth endothelial wall / eq ;</p> <p>8. to reduce { friction / resistance / eq } ;</p> <p>9. narrow lumen ;</p> <p>10.(to maintain) high blood pressure / eq ;</p>	3 and 4 . ACCEPT folded {endothelium / (inner) surface} allows expansion	(4)

Question Number	Answer	Additional Guidance	Mark
2(a) QWC	<p>(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. <i>alveoli</i> one cell thick / thin (<i>epithelium</i>) ; 2. {walls / <i>endothelium</i>} of <i>capillaries</i> { one cell thick / thin} ; 3. <i>Alveoli</i> covered with <i>capillaries</i> / eq ; 4. idea of short (<i>diffusion</i>) distance ; 5. reference to <i>diffusion</i> ; 6. idea of large surface area provided by { <i>alveoli</i> / <i>capillaries</i>} ; 7. idea that <i>concentration gradient</i> maintained by { <i>ventilation</i> / breathing /eq } ; 8 ref. to large numbers of red blood cells OR idea that <i>oxygen</i> combines with <i>haemoglobin</i> ; 9. idea that <i>concentration gradient</i> maintained by blood flow ; 10. {reference to / description of} <i>Fick's Law</i> ; 	<p>QWC emphasis is spelling Penalise once only</p> <p>2. IGNORE capillaries are one cell thick NOT one cell thick membrane, cell wall</p> <p>4. award Mps 4 and 5 if diffusion stated</p> <p>6.IGNORE 'many alveoli'</p> <p>10. Diffusion rate is proportional to the surface area</p>	(5) p

Question Number	Answer	Additional Guidance	Mark
2(b) (i)	<ol style="list-style-type: none"> 1. Idea that blood carries {oxygen / carbon dioxide} ; 2. Idea that blood moving maintains concentration gradient ; 3. Reference to mass flow ; 4. Idea that organs have large surface area to volume ratio ; 	<ol style="list-style-type: none"> 1. CEPT oxygenated blood 3. IGNOR mass transport 4. IGNORE <i>Daphnia</i> has a large surface area 	(2) Exp

Question Number	Answer	Additional Guidance	Mark
2 (b) (ii)	<ol style="list-style-type: none"> 1. idea that one side (of heart) transports blood to the lungs other to the body ; 2. separation of oxygenated and deoxygenated blood / eq ; 3. idea of maintaining concentration gradient ; 4. comment on blood pressures e.g. lower to lungs, higher to body ; 5. Reference to mass flow / supply of O₂ to body cells maximised ; 6. idea of need for a good supply of oxygen as (mammals are) {very active / high rate of metabolism / warm blooded / eq} ; 	5. IGNOR mass transport	(3) p

Question Number	Answer	Additional guidance	Mark
3(a)	Idea that (a change in) one variable (directly) results in the change of another variable ;	ALLOW causes, affects, etc and clear examples Eg increase in blood cholesterol causes an increase in the risk of CVD IGNORE correlation, link, relationship, trend, etc alone	(1)

Question Number	Answer	Additional guidance	Mark
3(b)(i)	<p>1. reference to peptide bonds (joining amino acids);</p> <p>2. between amino group (of one amino acid) and carboxyl group (of another) / eq ;</p> <p>3. the sequence of amino acids is the primary structure of the protein / eq ;</p> <p>4. reference to folding (of primary structure) held together by bonds / eq ;</p> <p>5. {disulfide bridges / eq} / {hydrogen / H} bond / ionic bonds / Van der Waals forces ;</p> <p>6. between the R groups / eq ;</p>	<p>2. AL W from a labelled diagram ALLOW NH₂ and COOH</p> <p>4. AL W ref to alpha helix or beta pleated sheet</p>	(4)

Question Number	Answer	Additional guidance	Mark
3 (b) (ii)	<ul style="list-style-type: none"> 1. HDL is smaller ; 2. HDL contains more protein / eq ; 3. HDL contains less cholesterol / eq ; 	ALLOW converse for LDL	(2)

Question Number	Answer	Additional guidance	Mark
3(c) (i)	<ul style="list-style-type: none"> 1. (risk due to) high blood pressure has fallen overall / eq ; 2. (risk due to) high blood cholesterol has fallen overall / eq ; 3. (risk due to) obesity has risen overall / eq ; 4. obesity was the lowest risk factor but is now the highest / eq ; 5. credit use of manipulated figures ; 	<p>Answers should cover total time period and not just 1980-1990</p> <p>5. only credit overall change figures e.g. 17% drop for high blood pressure 16% drop for high blood cholesterol 10.5% increase in obesity</p>	(3)

Question Number	Answer	Additional guidance	Mark
3(c)(ii)	<p>1. people more aware of the risks / eq ;</p> <p>2. people consuming foods with lower {cholesterol levels / saturated fats / eq} / eq ;</p> <p>3. people consuming foods with more fibre in them / eq ;</p> <p>4. use of statins / eq ;</p> <p>5. more screening / eq ;</p> <p>6. more exercise / eq ;</p>	<p>1. ALLOW more aware of healthy diets</p> <p>4. Use of sterols/named example</p> <p>5. AL W self testing</p>	(2)

Question Number	Answer	Additional guidance	Mark
3(c)(iii)	<p>Any two from:</p> <p>(being) male increase in age lack of exercise / inactivity smoking genetics high alcohol consumption high salt diet high saturated fat intake stress diabetes ;</p>	IGNORE fat, LDL or cholesterol consumption	(1)

Question Number	Correct Answer	Mark
4(a)	<p>1. carbon dioxide produced in respiration / eq ;</p> <p>2. affects {volume / pressure} of gas / eq ;</p> <p>3. allows measurement of oxygen used / eq ;</p>	max (2)

Question Number	Correct Answer	Mark
4(b)(i)	<p>Two marks for correct answer</p> <p>0.8 (mm min^{-1}) ;;</p> <p>if incorrect allow one mark for correct working</p> <p>1. 48 ; OR 1. 12 ;</p> <p>2. $\div 60$ to give answer ; OR 2. $\div 15$ to give answer</p>	(2)

Question Number	Correct Answer	Mark
4(b)(ii)	<p>1. no oxygen available/no oxygen uptake ;</p> <p>2. reference to anaerobic respiration ;</p> <p>3. carbon dioxide produced is absorbed / eq ;</p> <p>4. no (net) change of {volume / pressure} of gas ;</p>	max (2)

Question Number	Correct Answer	Mark
4(b)(iii)	<p>1. {mass / eq} of organism may differ ;</p> <p>2. use same mass / express results per unit mass / eq ;</p> <p>3. temperature changes / eq ;</p> <p>4. control temperature using a water bath / eq ;</p> <p>5. pressure may affect volume of gas / eq ;</p> <p>6. use of control with no organisms, at the same time / eq ;</p>	max (4)