

Question		Answer	Marks	AO element	Guidance
19	(a)	<p>have , thin wall / valves , so will , distend / bulge ✓</p> <p>large lumen / wide , as contains , large volume of / slow-moving , blood ✓</p> <p>found closer to the , surface / skin , than arteries ✓</p>	3	AO2.1	ALLOW ORA e.g. arteries are found further away from surface than veins
	(b)	<p>1 (skin has) large surface area for absorption ✓</p> <p>2 (skin has) <u>many</u> / network of , capillaries ✓</p> <p>3 (steroids are) lipid-soluble / non-polar ✓</p> <p>4 (so) can cross phospholipid bilayer ✓</p> <p>5 muscles are close to the skin (surface) so short diffusion , pathway / distance ✓</p>	2 max	AO2.5	ALLOW can cross , cell surface / plasma , membranes

	(c)	(i)	(any number in range) 180 to 279 ✓✓✓	3	AO3.1 AO2.8	<p>ALLOW ANY number between 180 and 279 for 3 marks IGNORE +/-</p> <table border="1" data-bbox="1420 344 2056 504"> <thead> <tr> <th>Year</th> <th>% containing testosterone</th> <th>No of urine samples</th> <th>Number of positive tests</th> </tr> </thead> <tbody> <tr> <td>1988</td> <td>1.7</td> <td>46000</td> <td>782</td> </tr> <tr> <td>1991</td> <td>0.65</td> <td>85000</td> <td>553</td> </tr> </tbody> </table> <p>If incorrect response:</p> <p>ALLOW for 2 marks number testing positive in 1988 – number testing positive in 1991 e.g. 799 - 546 OR e.g. $(1.7 \div 100) \times 47000 - (0.65 \div 100) \times 84000$</p> <p>ALLOW for 1 mark Calculation of number of samples testing positive in EITHER 1988 or 1991 e.g. $(1.7 \div 100) \times 47000$ OR e.g. 1.7% of 46000</p> <p>ALLOW for % testosterone + / - 0.02% ALLOW for number of urine samples +/- 1000</p>	Year	% containing testosterone	No of urine samples	Number of positive tests	1988	1.7	46000	782	1991	0.65	85000	553
Year	% containing testosterone	No of urine samples	Number of positive tests															
1988	1.7	46000	782															
1991	0.65	85000	553															

		<p>Using a 'best-fit' approach based on the science content of the answer, first decide which set of level descriptors, Level 1, Level 2 or Level 3, best describes the overall quality of the answer using the guidelines described in the level descriptors in the mark scheme.</p> <p>Once the level is located, award the higher or lower mark.</p> <p>The higher mark should be awarded where the level descriptor has been evidenced and all aspects of the communication statement (in italics) have been met.</p> <p>The lower mark should be awarded where the level descriptor has been evidenced but aspects of the communication statement (in italics) are missing.</p> <p>In summary:</p> <ul style="list-style-type: none"> • The science content determines the level. • The communication statement determines the mark within a level. 			
(c)	(ii)*	<p>Level 3 (5–6 marks) Full and detailed evaluation including reference to factors that both support and contradict the statement, as well as reference to the issues of validity which affect the data.</p> <p><i>There is a well-developed argument including a good range of evidence. The information presented is relevant and clearly explained.</i></p> <p>Level 2 (3–4 marks) Detailed evaluation including reference to at least one factor that supports and one that does not support the statement.</p> <p><i>There is a reasonable attempt at evaluation including a small range of evidence. The information presented is mostly relevant and clearly explained.</i></p>	6	AO3.2	<p>Indicative scientific points may include...</p> <p><i>Evidence in support of the statement:</i></p> <ul style="list-style-type: none"> • General trend : reduction in % samples with testosterone from start to end of test • From 1988 to 1991, % samples with testosterone decreased as test numbers increased • Increase in number of tests carried out over time • More testing shows , more awareness / scrutiny / acts as deterrent <p><i>Evidence against the statement:</i></p> <ul style="list-style-type: none"> • From 1986 to 1988 there was an increase in % tests with testosterone / number of positive tests • Correlation does not show causation • More tests but more athletes competing

		<p>Level 1 (1–2 marks) Evaluation is attempted including reference to a factor that supports or contradicts the statement, or refers to an issue of validity which affect the data.</p> <p><i>The information is basic and communicated in an unstructured way. The information is supported by limited evidence which may be unclear.</i></p> <p>0 marks No response or no response worthy of credit.</p>			<ul style="list-style-type: none"> • After 1991 / in 1992 and 1993 there was an increase in % tests with testosterone / number of positive tests • Fewer samples with testosterone is not the same as less incidence of abuse • No clear pattern / trend in positive samples • From 1986 to 1994 the number of positive tests increases <p>Issues of validity with data:</p> <ul style="list-style-type: none"> • Only a limited / short time was studied or only valid for the time studied • Other steroids used and not detected • Other drugs mask testosterone levels • Testosterone levels may vary naturally in the population (AW) • No details provided for the method used / modern technology may have improved the sensitivity of the test over time • No detail of a control group • Security of testing / cheating / corruption / bribery • Not turning up for testing / times of testing • Reference to significance of data • No statistical tests / SD bars / range bars • Could be same sport being tested or different sports • Could be same athletes repeatedly tested or different athletes
		Total	14		