

Question	Answers	Extra information	Mark	AO / spec ref.
4(a)(i)	defence against <b>or</b> destroy pathogens / bacteria / viruses / microorganisms	do <b>not</b> allow 'destroy disease' accept engulf pathogen / bacteria / viruses / microorganism  accept phagocytosis  accept produce antibodies / antitoxins  allow immune response	1	AO1 3.2.2d
4(a)(ii)	they are small fragments of cells		1	AO1 3.2.2e
4(b)	liver  kidney(s)	in this order only	1  1	AO1 3.2.2b
4(c)	any <b>two</b> from: <ul style="list-style-type: none"> <li>that it doesn't cause an immune response <b>or</b> isn't rejected / damaged by white blood cells</li> <li>whether it is a long lasting material / doesn't decompose / corrode / inert</li> <li>if it is strong (to withstand pressure)</li> <li>it will open at the right pressure</li> <li>that it doesn't cause clotting</li> <li>that it doesn't leak <b>or</b> it prevents backflow</li> <li>non toxic</li> </ul>	ignore correct size	2	AO3 3.2
<b>Total</b>			6	

Question	Answers	Extra information	Mark	AO / Spec. Ref.
<b>2(a)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• carbon dioxide / CO<sub>2</sub></li> <li>• urea</li> <li>• protein</li> <li>• water / H<sub>2</sub>O</li> <li>• hormones / insulin</li> </ul>	ignore food / waste / alcohol / drugs / enzymes ignore glucose and oxygen  allow <b>two</b> correct hormones for 2 marks allow <b>two</b> correct food components for 2 marks allow antibodies allow antitoxins	2	AO1 321a,322b /c,331a
<b>2(b)(i)</b>	plasma  platelets		1  1	AO1  322a
<b>2(b)(ii)</b>	(cardiac) muscle	allow muscular	1	AO1 321b

Question	Answers	Extra Information	Mark	AO / Spec. Ref
2(c)			6	AO3 32, 321f
Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5 and apply a 'best-fit' approach to the marking.				
<b>0 marks</b>	<b>Level 1 (1–2 marks)</b>	<b>Level 2 (3–4 marks)</b>	<b>Level 3 (5–6 marks)</b>	
No relevant content	There is a description of at least one advantage of the cow tissue valve  <b>or</b> a description of at least one disadvantage of the cow tissue valve.	There is a description of at least one advantage of the cow tissue valve  <b>and</b> at least one disadvantage of the cow tissue valve.	There is a description of the advantages and disadvantages of the cow tissue valve  <b>or</b> a description of several advantages of the cow tissue valve and at least one disadvantage.	
<b>examples of the points made in the response</b> <b>Advantages of cow tissue valve:</b> <ul style="list-style-type: none"> <li>abundant supply of cows</li> <li>so shorter waiting time</li> <li>no need for tissue typing</li> <li>quicker operation</li> <li>less invasive <b>or</b> shorter recovery time</li> <li>cheaper operation costs</li> <li>less operation / anaesthetic risks</li> </ul> <b>Disadvantages of cow tissue valve:</b> <ul style="list-style-type: none"> <li>made from cow so possible objections on religious grounds</li> <li>new procedure so could be unknown risks</li> <li>risks of using a stent eg. blood clots, stent breaking or valve tearing</li> <li>not proven as a long term treatment</li> <li>may be rejected</li> </ul>		<b>extra information</b> ignore information copied directly from the table without value added  ignore can take many years to find a suitable human donor  ignore ethical arguments  allow possible transfer of disease from cow		
<b>Total</b>				<b>11</b>

Question	Answers	Extra information	Mark	AO / Spec. Ref.
<b>6(a)(i)</b>	doesn't have valves	allow veins have valves	1	AO1 3.2.1e
	has a thicker wall <b>or</b> thicker layer of muscle	allow has a smaller lumen ignore references to elastic (in walls)	1	
<b>6(a)(ii)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• (artery has) more oxygen</li> <li>• (artery has) more glucose</li> <li>• (artery has) less carbon dioxide</li> <li>• (artery has) less lactic acid</li> </ul>	ignore reference to pressure accept converse for veins if veins is clearly stated  allow (artery has) more amino acids / fatty acids  ignore urea	2	AO1 3.2.1g
<b>6(b)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• no rejection</li> <li>• abundant supply</li> <li>• low risk of infection</li> <li>• longer shelf life</li> </ul>	ignore side effects  allow no tissue matching required  allow named example ie HIV, CJD  allow less space needed for storage	2	AO2/3 3.2
<b>Total</b>			<b>6</b>	

**Question 10**

Question	Answers	Extra information	Mark	AO / Spec. Ref.
<b>10</b>	<b>Level 3:</b> A detailed and coherent explanation is provided with most of the relevant content, which demonstrates a comprehensive understanding of the human circulatory system . The response makes logical links between content points.		5–6	AO1/1 4.1.1.3 4.1.3.1 4.2.2.2 4.2.2.3
	<b>Level 2:</b> The response is mostly relevant and with some logical explanation. Gives a broad understanding of the human circulatory system. The response makes some logical links between the content points.		3–4	
	<b>Level 1:</b> Simple descriptions are made of the roles of some of the following: heart function, gas exchange, named blood vessels, named blood cells. The response demonstrates limited logical linking of points.		1–2	
	No relevant content.		0	
	<b>Indicative content</b> <ul style="list-style-type: none"> <li>• dual / double circulatory system which means that it has higher blood pressure and a greater flow of blood to the tissues</li> <li>• heart made of specialised (cardiac) muscle cells which have long protein filaments that can slide past each other to shorten the cell to bring about contraction for pumping blood</li> <li>• heart pumps blood to lungs in pulmonary artery so that oxygen can diffuse into blood from air in alveoli</li> <li>• blood returns to heart via pulmonary vein where muscles pump blood to the body via aorta</li> <li>• oxygen carried by specialised cells / RBCs which contain haemoglobin to bind oxygen and have no nucleus so there is more space available to carry oxygen</li> <li>• arteries carry oxygenated blood to tissues where capillaries deliver oxygen to cells for respiration and energy release</li> <li>• thin walls allow for easy diffusion to cells</li> <li>• large surface area of capillaries to maximise exchange</li> <li>• waste products removed eg CO<sub>2</sub> diffuse from cells into the blood plasma</li> <li>• blood goes back to the heart in veins which have valves to prevent backflow</li> <li>• cardiac output can vary according to demand / is affected by adrenaline</li> </ul> <p>accept annotated diagrams</p>			
<b>Total</b>			<b>6</b>	