

Q1. (2018)

A)

16	(a)	(i)	marked correctly on diagram ✓	1	1.1	ALLOW centre of X anywhere inside the shaded area
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B)

		(ii)	aorta / arteries✓ lungs✓	2	2 x1.1	
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C)

	(b)	(i)	double (circulation)✓	1	1.1	ALLOW double
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D)

		(ii)	Any two from: increases the pressure of the blood / higher blood pressure✓ increases the flow rate of the blood✓ idea of faster transport of materials✓	2	2 x2.1	ALLOW pushes blood more DO NOT ALLOW pushes more blood unqualified ALLOW to make the blood flow faster IGNORE makes blood flow fast ALLOW more oxygen / glucose to the tissues ALLOW keeps the blood well oxygenated / gets more oxygenated blood ALLOW faster removal of carbon dioxide from blood
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E)

	(c)		left side thicker (than the right side)✓ left pumps blood further✓	2	2 x1.1	ALLOW it's thicker / it's more muscular ALLOW left ventricle thicker than right IGNORE left is bigger ALLOW left pushes blood all around the (rest of the) body / right only pushes to lungs ALLOW left side must generate more pressure IGNORE left side contains blood at high pressure
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F)

	(d)	(i)	Any two from: artery thicker walled/ ORA ✓ artery more muscle tissue/ ORA ✓ artery narrower bore/lumen/ ORA ✓	2	2 x 2.1	ALLOW artery (more) elastic ALLOW artery has smaller area for blood to pass through
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G)

		(ii)	Any one from: veins have valves✓ arteries take blood away from the heart / veins take blood to the heart✓ blood flows faster / higher pressure in arteries /ORA✓	1	1.1	IGNORE valves unqualified ALLOW arteries carry oxygenated / veins carry deoxygenated blood
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Q2 (2018)

A)

19	(a)	(i)	cortex✓	1	1.1	
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B)

		(ii)	urine✓	1	1.1	
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C)

		(iii)	arrow on diagram points downwards from kidney in same line as ureter✓	1	2.1	ALLOW arrow pointing downwards even if not on ureter
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Q3 (2018) – 19c

A)

	(c)	(i)	Bowman's capsule✓	1	1.1	
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B)

		(ii)	glucose present in filtrate but not in urine / more sodium chloride in filtrate than urine / urea/others levels much higher in urine ✓ glucose/sodium chloride must be reabsorbed✓ urea/others excreted in urine✓	3	2.2	2 x 3.2b ALLOW urea/others removed from body
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Q4. (2019)

3			B	1	1.1	
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Q5. (2019)

13			B	1	2.2	
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Q6. (2019)

14			C	1	2.2	
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Q7. (2019)

A)

16	(a)		FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 0.04 (mm) award 2 marks 20 ÷ 500 ✓ = 0.04 (mm) ✓	2	2.2	ALLOW 0.038 – 0.042 ALLOW 19 ÷ 500 OR 21 ÷ 500 ALLOW 40 µm/micrometres ALLOW 0.004 for 1 mark due to incorrect units for measurement
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B)

16	(b)		xylem cell ✓	1	1.1	
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C)

16	(c)		Any two from: dead cells ✓ thick/strengthened cell wall ✓ hollow (lumen) ✓	2	1.1	ALLOW ECF from the cell selected in 16(b) ALLOW lignin present/lignified IGNORE cellulose ALLOW waterproof walls ALLOW forms continuous walls/column for water/ continuous tube IGNORE contain water
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D)

16	(d)		(yes) smallest (size of cell) 8 μm /0.8 thousands of a millimetre ✓ (size is) greater than 0.02 thousands of a millimetre / 0.2 μm ✓	2	2.2	If answer is no award zero marks
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Q8. (2019)

A)

17	(a)	(i)	phloem ✓	1	2.1	
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B)

17	(a)	(ii)	idea that sugar / food / nutrients removed (by the greenfly) ✓ Any one from: So less left for growth ✓ So less for respiration / energy / ATP ✓	2	2.1	IGNORE xylem / root hair IGNORE water / minerals ALLOW so not enough for growth / so unlikely to grow / difficult to grow healthily ALLOW less sugar translocated/transported to other parts
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C)

17	(b)	(i)	Any two from: idea of being more exposed to the wind OR plant in glasshouse is protected from wind/sheltered ✓ moving air increases transpiration/water loss ✓ wind blows the water (vapour) away from the leaf ✓	2	2.1	ALLOW greater humidity in glasshouse ALLOW leaves moved by wind/air movement ALLOW more evaporation/diffusion of water (need comparative statement) ALLOW higher level response e.g. the cells losing water and become plasmolysed if no other marks awarded ALLOW link between wind and water loss for 1 mark
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D)

17	(b)	(ii)	Any three from:	3	3.3a	
			control the temperature ✓ control light intensity ✓ cover the pot/prevent water loss from pot ✓ (balance) to measure plant mass before and after ✓ repeats ✓ set up using a potometer ✓			IGNORE control the heat IGNORE references to time unless linked to potometer ALLOW control amount of light ALLOW control amount of wind e.g. use of fan ALLOW control amount of water given to plants ALLOW measure fresh weight of leaves at regular intervals ALLOW measure water loss ALLOW remove leaves from plant and keep one set of leaves sealed in bag another set in air from fan

E)

17	(c)		MRI / X-ray imaging / new technology allows new evidence to be collected ✓ ideas/explanations have changed to fit new observations/technologies ✓	2	3.1b	ALLOW idea MRI etc. shows precise position of water whereas older techniques give approximate position ALLOW couldn't see what they can see now with new methods ALLOW tissue easily disturbed by injected dyes / AW ALLOW modern methods give more accurate results ALLOW different techniques give different results so different conclusions drawn
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Q9. (2020)

3			D ✓	1	1.1	
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Q10. (2020)

6			C ✓	1	1.1	
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Q11. (2020)

7			D ✓	1	2.1	
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Q12. (2020)

8			B ✓	1	2.2	
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Q13. (2020)

13			B ✓	1	2.1	
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Q14. (2020)

A)

21	(a)	(i)	FIRST CHECK THE ANSWER ON ANSWER LINE If answer = 3 : 1 award 2 marks 24 : 8 or 3 ✓ 3 : 1 ✓	2	2.2	ALLOW answer in the table but answer on answer line takes preference
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B)

		(ii)	higher SA:V ratio faster rate of diffusion / ORA ✓	1	3.2b	ALLOW positive correlation ALLOW reference to less time instead of faster rate IGNORE they are directly proportional
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C)

		(iii)	reduces (total) SA of alveoli/air sacs / reduces SA : Vol ratio of alveoli/air sacs ✓ so diffusion (of oxygen) reduced ✓	2	2 x 3.1a	ALLOW harder for oxygen to diffuse IGNORE oxygen cannot diffuse into the blood in emphysema
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D)

	(b)	sickle red blood cells release/take up/carry/deliver/transport less oxygen ✓ sickle cells have a smaller surface area (to vol ratio) / tend to get stuck in blood vessels/capillaries / cannot pass through blood vessels/capillaries so easily ✓	2	1.1 2.1	IGNORE less oxygen binds to RBCs / sickle cells cannot carry oxygen IGNORE references to smaller volume / less Hb / less space on the RBCs
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E)

	(c)	cells absorb water ✓ by osmosis ✓ red blood cells/cytoplasm swells / increased pressure in the cell/on the cell membrane / <u>cell membrane</u> ruptures/bursts ✓	3	3 x 1.1	IGNORE references to water potential IGNORE just cell bursts
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Q15. (2021)

3		A✓	1	1.1	
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Q16. (2021)

4		A✓	1	1.1	
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Q17. (2021)

5		C✓	1	2.1	
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Q18. (2021)

13		B✓	1	1.1	
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Q19. (2021)

14		B✓	1	1.2	
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Q20. (2021) – 18c

	(c)	(Root hairs) absorb water ✓ (Root hairs) absorb minerals ✓ Plant might wilt / grow slower / less photosynthesise ✓	3	3 x 2.1	IGNORE plant survival
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Q21. (2022)

4	D✓		1	1.1	
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Q22. (2022)

10	C✓		1	2.2	
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Q23. (2022)

11	B ✓	1	2.1	
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Q24. (2022)

15	B ✓	1	2.2	
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Q25. (2022)

A)

17	(a)	(i)	Any valve correctly labelled ✓	1	1 x 1.1	
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B)

		(ii)	Either atrium correctly labelled ✓	1	1 x 1.1	
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C)

		(iii)	Pumps blood to the body ✓ Needs a bigger pressure / blood has to travel further ✓	2	1 x 1.1 1 x 2.1	Assume answer refers to left ventricle if not stated ALLOW right ventricle pumps blood to the lungs ALLOW stronger contraction/force ALLOW ORA about right ventricle throughout
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D)

	(b)		First check answer on answer line. If answer = 180 award 2 marks 3 x 60 ✓ = 180 ✓	2	2 x 2.2	
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E)

	(c)		Idea as the time spent exercising increases, the resting heart rate gets lower ✓	1	1 x 3.2b	ALLOW ORA for less hours of exercise increases the resting heart rate IGNORE healthier ALLOW higher levels answers with an alternative correct conclusion
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F)

	(d)		(Veins do not have) a narrow lumen ✓	1	1 x 1.1	ALLOW veins have a wide/large lumen
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G)

	(e)		Blood travels through pump/heart twice ✓ On full circuit around body ✓	2	2 x 1.1	ALLOW idea that there are two pumps / idea that blood is pumped twice ALLOW idea that blood passes separately to lungs and body/has systemic and pulmonary circuit ALLOW description for 2 marks – blood passes through the heart and goes to the lungs, returns to the heart, and then goes to the rest of the body.
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Q26. (2022)

18	(a)		4	4 x 1.1	6 correct lines = 4 5/4 correct lines = 3 3 correct lines = 2 2 correct lines = 1 DO NOT ALLOW more than 1 line from each box
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Q27. (2023)

2	B	1	2.1	
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Q28. (2023)

3	C	1	1.1	
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Q29. (2023)

4	D	1	1.1	
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Q30. (2023)

5	D	1	1.1	
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Q31. (2023)

7	D	1	1.1	
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Q32. (2023)

11	D	1	2.1	
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Q33. (2023)

A)

24	(a)	<table><tr><th>Feature</th><th>Arteries</th><th>Capillaries</th><th>Veins</th></tr><tr><td>Have valves along their length</td><td></td><td></td><td>✓</td></tr><tr><td>Have a very thick wall</td><td>✓</td><td></td><td></td></tr><tr><td>Have a wide lumen</td><td></td><td></td><td>✓</td></tr></table>	Feature	Arteries	Capillaries	Veins	Have valves along their length			✓	Have a very thick wall	✓			Have a wide lumen			✓	3	3 x 1.1	One mark for each correct row
Feature	Arteries	Capillaries	Veins																		
Have valves along their length			✓																		
Have a very thick wall	✓																				
Have a wide lumen			✓																		

B)

	(b)	Effect: backflow of blood will not be prevented / blood could collect/pool in the veins ✓ Symptom: legs may swell/be painful / have itchy skin ✓	2	2 x 2.1	ALLOW reduced blood flow back to heart/from legs ALLOW blood clots / (muscle) cramps / varicose veins / numbness
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C)

	(c)	<p>First check the answer on answer line If answer = 319 200 award 2 marks</p> <p>5320 / 4560 / 76 x 70 x 60 ✓</p> <p>319 200 ✓</p>	2	2 x 1.2	
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D)

	(d)	<p>Biconcave shape / large surface area ✓ For faster/rapid/maximum uptake/diffusion (of oxygen) ✓</p> <p>OR</p> <p>No nucleus ✓ So more space for haemoglobin/oxygen ✓</p> <p>OR</p> <p>Are small/flexible ✓ So can squeeze/pass/move/fit through capillaries/small blood vessels ✓</p>	2	2 x 1.1	IGNORE to contain/transport more oxygen
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Q34. (2024)

3	C	1	2.1	
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Q35. (2024)

5	D	1	1.1	
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Q36. (2024)

8	D	1	1.1	
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Q37. (2024)

9	C	1	1.1	
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Q38. (2024)

10	B	1	1.1	
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Q39. (2024)

A)

21	(a)	(Valves) stop the backflow of blood/ensure blood flows in one direction ✓	1	1.1	
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B)

	(b)	Blood/pressure builds up (in the legs) ✓	1	2.1	<p>ALLOW reduces blood flow (away from legs)</p> <p>ALLOW blood flow backwards</p> <p>IGNORE vein swells up</p>
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C)

	(c)	(i)	<p>First check the answer on the answer line If answer = 578 or 577.76 award 2 marks</p> <p>$\frac{(1256 \times 46)}{100}$ ✓</p> <p>= 578 / 577.76 ✓</p>	2	2 x 2.2	<p>ALLOW 577 / 577.8 for one mark</p>
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D)

		(ii)	<table><tr><th>Conclusion</th><th>True</th><th>False</th></tr><tr><td>More females than males develop varicose veins.</td><td>✓</td><td></td></tr><tr><td>Varicose veins are more common in people under the age of 25.</td><td></td><td>✓</td></tr><tr><td>The age range 50-54 has the greatest number of cases of varicose veins.</td><td></td><td>✓</td></tr><tr><td>There are almost double the number of people with varicose veins in the age range 55-59 compared to 65-69.</td><td>✓</td><td></td></tr></table>	Conclusion	True	False	More females than males develop varicose veins.	✓		Varicose veins are more common in people under the age of 25.		✓	The age range 50-54 has the greatest number of cases of varicose veins.		✓	There are almost double the number of people with varicose veins in the age range 55-59 compared to 65-69.	✓		2	2 x 3.2b	<p>All correct = 2 marks Two or three correct = 1 mark One correct = 0 marks</p> <p>DO NOT ALLOW more than 1 tick for each row.</p>
Conclusion	True	False																			
More females than males develop varicose veins.	✓																				
Varicose veins are more common in people under the age of 25.		✓																			
The age range 50-54 has the greatest number of cases of varicose veins.		✓																			
There are almost double the number of people with varicose veins in the age range 55-59 compared to 65-69.	✓																				

E)

	(d)	<p>Any one from:</p> <p>(To see if other scientists) can replicate/reproduce/further develop the work ✓</p> <p>To check/prove the method/data/results/mistakes ✓</p> <p>To uphold standards / prevent unethical practice/bias ✓</p> <p>Recognition of work ✓</p>	1	2.1	<p>ALLOW comment/feedback on work/identify mistakes/misinformation IGNORE share views DO NOT ALLOW accurate results/anomalies</p> <p>ALLOW can see the value of the research</p>
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