Question number	Answer	Notes	Marks
1 (a)	thick(er) <u>wall</u>; more elastic (tissue); more muscle (tissue); smaller lumen / hole / less space / less single layer of cells / eq; no valves;	ignore references to function ignore smaller diameter / less surface area unless qualified allow converse	Max 3
(b) (i)	less/no) muscle(s); <u>contract</u>ion; squeeze vein / push blood / eq;		Max 2
(ii)	red (blood cells) / erythrocytes;		1
(iii)	(less/no) oxygen / oxygenated blood; heart / brain / organ / body / cells / tissues / eq; <u>respiration</u> / <u>respire</u> / <u>respiring</u>;	ignore gas exchange	2
		Total	

Question number	Answer	Notes	Marks
2 (a)	potometer;		1
(b)	transpirati / evaporation / diffusion;		1
(c)	1 cut under water; 2 water tight / air tight / seal / eq; 3 how bubble introduced; 4 dry leaves / eq; 5 measure distance bubble moves / length of bubble eq; 6 scale / ruler / cm / eq; 7 time / second / minute / hour / day; 8 repeat;		Max 4
(d) (i)	blows water away / removes water / eq; (maintains) diffusion gradient / conc. gradient / eq;		2
(ii)	stomata close / pores close;	ignore guard cells	1
(iii)	less surface / area; (fewer) idea of reduced number of stomata / pores;		2
(e)	fan / hairdryer / outdoors / put in a draught / put in open window / eq;		1
		Total	**12**

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>3 (a)</td><td>
<table>
<tr><th>Name of blood vessel</th><th>Diameter of the lumen in mm</th><th>Thickness of the wall in mm</th></tr>
<tr><td>vena cava;</td><td>30.0</td><td>1.5</td></tr>
<tr><td>capillary;</td><td>0.006</td><td>0.001</td></tr>
<tr><td>aorta;</td><td>25.0</td><td>2.0</td></tr>
</table>
</td><td>2 for all 3 correct
1 for 1 or 2 correct</td><td>2</td></tr>
<tr><td>(b) i)

(ii)

(iii)</td><td>a rta;

vena cava;

capillary;
one cell thick / thin (wall/membrane) / short diffusion distance / low pressure / slow blood flow / eq;</td><td>

ignore 0.001mm thick / small / ref to surface area to volume

reject ref to thin cell wall

wrong named blood vessel = 0 for whole item</td><td>1

1

2</td></tr>
</table>

Total 6 marks

Question number	Answer	Notes	Marks
4 (a) (i)	trachea / wind pipe / cartilage; alveoli / alveolus / air sacs;	reject air pockets	2
(b) (i)	X – oxygen / O_2; Y - carbon dioxide / CO_2;		2
(ii)	8.4;		1
(iii)	B diffusion;		1
		Total	6

Question number	Answer	Notes	Marks
5 (a) (i)	250 000;		1
(ii)	32;; allow one mark for 80 000 in working		2
(b)	1. rare / random; 2. change / damage / eq; 3. DNA / gene / allele / genetic code / eq;	random change in cells =2	2
(c)	1. less surface area; 2. slower diffusion / less diffusion / less gas exchange; 3. less oxygen / less carbon dioxide;	ignore less room allow converse for X	2
(d)	1. blocked / narrowed / clogged / eq; 2. coronary artery; 3. lot; 4. at / cholesterol; 5. less blood to heart; 6. less oxygen / less oxygenated; 7. muscle (cells); 8. less respiration / anaerobic respiration; 9. lactic acid / angina; 10. heart attack / heart stops / cardiac arrest / eq;		5

(Total = 12 marks)