

**QUESTIONSHEET 1**

- (a) (i) white blood cells; 1  
(ii) plasma; 1  
(iii) heart; 1  
(iv) artery; 1  
(v) veins; 1  
(vi) red blood cells; 1
- (b) veins; 1

**TOTAL 7****QUESTIONSHEET 2**

- (a) (i) artery; 1  
(ii) vein; 1
- (b) towards lungs/away from heart; 1
- (c) B; 1
- (d) amount of oxygen decreases; 1
- (e) left ventricle; 1

**TOTAL 6****QUESTIONSHEET 3**

- (a) (i) 80 beats/minute; 1  
(ii) 75 beats/minute; 1
- (b) activity B; 1
- (c) A - standing;  
B - running;  
C - sitting down;  
D - walking; 4
- (d) exercise requires more energy;  
more oxygen and sugar needed by muscles;  
heart rate increases to supply blood to muscles more rapidly; 3

**TOTAL 10**

**QUESTIONSHEET 4**

(a)	student C;	1
(b)	(i) time for pulse rate to return to normal;	1
	(ii) 4 minutes;	1
(c)	(i) student B;	1
	(ii) 2 of: fastest recovery time/pulse rate returns to normal fastest; lowest resting pulse rate; pulse rate rises least during exercise;	2
(d)	student C;	1
		<b>TOTAL 7</b>

**QUESTIONSHEET 5**

(a)	for respiration/to release energy;	1
(b)	(i) lungs;	1
	(ii) oxygen passes into blood;	1
	(iii) red blood cells;	1
	(iv) carry oxygen; as oxyhaemoglobin;	2
	(v) oxygen passes from blood into body cells;	1
	(vi) diffusion;	1
	(vii) capillary;	1
		<b>TOTAL 9</b>

## QUESTIONSHEET 6

Statement	Arteries	Veins	Capillaries
Carry blood at high pressure	√;		
Usually carry blood with a high oxygen concentration	√;		
Allow substances to pass through their walls into cells			√;
Have valves		√;	
Carry blood away from organs		√;	
Have walls which are one cell thick			√;
Are in close contact with cells of the body			√;
Have a thick muscular wall	√;		
Pick up oxygen from the alveoli in the lungs			√;
Usually carry blood rich in carbon dioxide to the heart		√;	
Supply the heart muscle with oxygen	√;		

TOTAL 11

## QUESTIONSHEET 7

- (a) oxygen; 1
- (b) respiration/to release energy; 1
- (c) 2 of:  
carbon dioxide;  
water;  
urea; 2
- (d) thin walls/one cell thick;  
walls permeable; 2
- (e) (i) artery/arteriole; 1
- (ii) vein/venule; 1
- (f) X; 1

TOTAL 9

**QUESTIONSHEET 8**

- (a) (i) 8; 1  
(ii) 3; 1  
(iii) 1; 1  
(iv) 1; 1  
(v) 7; 1  
(vi) 4; 1  
(vii) 1; 1  
(viii) 8; 1
- (b) 2 of:  
4 has higher concentration of glucose;  
4 has higher concentration of amino acids;  
4 has higher concentration of vitamins/named example;  
4 has higher concentration of minerals/named example;  
6 has higher concentration of urea; 2

**TOTAL 10****QUESTIONSHEET 9**

- (a) A - red blood cell; 1  
C - platelets; 1  
D - white blood cell/phagocyte; 1
- (b) (i) B; 1  
(ii) D; 1  
(iii) B; 1  
(iv) A; 1  
(v) C; 1

**TOTAL 8**

**QUESTIONSHEET 10**

(a)	A - pulmonary artery;	1
	B - aorta;	1
	C - pulmonary vein;	1
(b)	(i) E;	1
	(ii) A;	1
	(iii) D;	1
	(iv) F;	1
	(v) G;	1
(c)	blood at X has high oxygen content; blood at Y has low oxygen content;	2
		<b>TOTAL 10</b>

**QUESTIONSHEET 11**

(a)	(i) B;	1
	(ii) blood at high pressure; arteries have very thick walls/ much muscle in their walls/ elastic tissue;	1 1
(b)	(i) carry blood back to the heart;	1
	(ii) A;	1
(c)	(i) capillaries;	1
	(ii) Any 3 of: to bring food/ glucose to the cells/ to bring oxygen to the cells/ for respiration/ take away carbon dioxide/ waste products;;;	3
	(iii) very thin/ one cell thick; substances can diffuse/ pass easily between cell and capillary;	1 1
(d)	(i) A;	1
	to stop blood flowing backward/ valves only let blood go in one direction towards heart;	1
	the blood is at low pressure;	1
		<b>TOTAL 14</b>

**QUESTIONSHEET 12**

- (a) (i) muscle; 1
- (ii) to contract/ to pump/ to squeeze the blood in the heart and send it round the body; 1
- (iii) to release energy/ respiration/ make ATP; 1
- (b) (i) get less/ be stopped; 1
- (ii) starved of glucose/ oxygen;  
thus can obtain less energy for pumping;  
may cause a heart attack/ heart failure/ ref angina; 3
- (c) stop smoking; 1  
lose weight; 1  
take more exercise; 1
- TOTAL 10**

**QUESTIONSHEET 13**

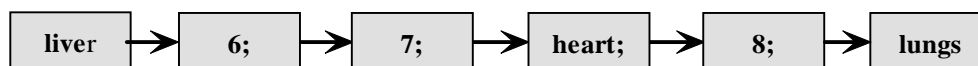
- (a) (i) 1 of:  
glucose;  
amino acids;  
vitamins/named example;  
minerals/named example; 1
- (ii) water; 1
- (iii) adrenaline; 1
- (iv) oxygen; 1
- (b) one circulation between heart and lungs;  
one circulation between heart and body organs; 2

(c)

Blood vessel	Oxygenated blood	Deoxygenated blood
1	4	
3	4;	
4		4;
6		4;
7		4;

4

(d)



4

**TOTAL 14**

**QUESTIONSHEET 14**

- (a) 4.6 dm<sup>3</sup> per minute; 1
- (b) 0.8 dm<sup>3</sup> per minute; 1
- (c)  $\frac{5.4}{100}$  ; 1  
= 0.054 dm<sup>3</sup> per minute; 1
- (d) 5 dm<sup>3</sup> per minute; 1
- (e) as heart rate increases, volume of blood increases; 1  
up to heart rate of 100 beats per minute; 1  
then volume of blood decreases; 1

**TOTAL 8****QUESTIONSHEET 15**

- (a) A - pulmonary artery; 1  
B - aorta; 1  
C - left atrium; 1  
D - left ventricle; 1
- (b) blood enters heart at vena cava; 1  
enters right atrium; 1  
passes into right ventricle; 1  
leaves by pulmonary artery; 1
- (c) 1 of: 1  
blood at 1 has low oxygen content/is deoxygenated/  
blood at 3 has high oxygen content/is oxygenated;  
blood at 1 has high carbon dioxide content/blood at 3 has low carbon dioxide content; 1
- (d) (i) coronary arteries; 1  
(ii) supply heart muscle; 1  
with oxygen and glucose; 1

**TOTAL 12**

**QUESTIONSHEET 16**

(a)	carry oxygen; as oxyhaemoglobin;	1 1
(b)	(i) 5 million;	1
	(ii) 7.8 million;	1
(c)	(i) as altitude increases, number of red blood cells increases;	1
	(ii) at high altitudes increased number of red blood cells allows a person to carry more oxygen; to compensate for reduced oxygen in air;	1 1
		<b>TOTAL 7</b>

**QUESTIONSHEET 17**

(a)	5 correct plots;; (-1 each incorrect plot) points joined by smooth curve;	3
(b)	0.7 minutes/42 seconds;	1
(c)	35°C; 1	
(d)	as temperature increases from 5°C, time for blood to clot falls;	1
	blood clots fastest at 35°C/optimum clotting temperature is 35° C;	1
	above this temperature, time for blood to clot increases;	1
	blood does not clot at 55°C;	1
(e)	blood clotting is controlled by enzymes;	1
	enzymes are denatured/destroyed at high temperatures;	1
		<b>TOTAL 11</b>



**QUESTIONSHEET 18**

- (a) (i) 2 of:  
carbon dioxide;  
amino acids;  
glucose;  
minerals/named example;  
vitamins/named example  
urea;  
hormones/named example 2
- (ii) as oxyhaemoglobin; 1
- (iii) clot seals a wound preventing entry of bacteria; 1
- (iv) phagocytes ingest bacteria; 1
- (v) produce antibodies; 1
- (b) in bone marrow; 1
- TOTAL 7**

**QUESTIONSHEET 19**

- (a)
- | Substance      | Part of the body |        |       |       |            |
|----------------|------------------|--------|-------|-------|------------|
|                | Liver            | Kidney | Lungs | Cells | Intestines |
| Oxygen         |                  |        | 3     | X     |            |
| Carbon dioxide |                  |        | X;    | 4     |            |
| Glucose        |                  |        |       | X;    | 4;         |
| Urea           | 4;               | X;     |       |       |            |
- 6**
- (b) arteries take blood to organs/veins take blood away from organs; 1  
arteries have thick muscular walls/veins have thin walls; 1  
veins have valves/arteries do not have valves; 1
- TOTAL 9**

**QUESTIONSHEET 20**

- (a) kidneys; 1
- (b) brain; 1
- (c)  $\frac{10\,000}{13\,900} \times 100$ ;  
= 71.9%; 2
- (d) more energy required during exercise; 1  
increased rate of respiration; 1  
requires additional oxygen and glucose; 1  
blood flow increases to supply these to muscles faster; 1
- (e) exercise generates additional heat; 1  
increased blood flow to skin to release heat; 1  
vasodilation occurs to cool the body; 1

**TOTAL 11**