9. Transport in animals

9.3 Blood vessels

Paper 3 and 4

Marking Scheme

Q1.

(a)	artery / wall, labelled ; lumen labelled ;	**2**	
(b)	<table><tr><th>type of vessel</th><th>relative thickness of wall</th><th>relative diameter of lumen</th></tr><tr><td>artery</td><td>thick</td><td>narrow</td></tr><tr><td>vein</td><td>thin</td><td>wide</td></tr></table> ;;	**2**	one mark for each correct row
(c)	valves ;	**1**	

(e)	capillaries ;	**1**	
(f)	carbon dioxide circled ; urea circled ;	**2**	

Q2.

(a)(i)	*any three from:* capillaries / coronary artery / coronary vein / pulmonary artery / aorta / pulmonary vein / vena cava / left ventricle / right ventricle / left atrium / right atrium / septum / (named) valve / AVP ;;;	**3**	
(a)(ii)	presence of valves ; thinner wall ; thinner muscle layer / AW ; thinner elastic layer / AW ; wider lumen /AW ; AVP ;	**3**	
(a)(iii)	carries blood, away from the heart ;	**1**	

Q3.

(a)(i)	wide / large, lumen / AW ; thin wall ; vessel is flattened / AW ; valves present ;	**2**	
(a)(ii)	vertical arrow pointing upwards (in longitudinal section only) ;	**1**	

Q4.

(a)

structure / function	arteries
blood at high pressure	✓ ;
blood towards heart	
thick wall	✓ ;
narrow lumen	✓ ;
valves	

3

Q5.

(d)

name of blood vessel	letter
aorta	**B** ;
pulmonary artery	**G** ;
renal vein	**E** ;
vena cava	**F / D** ;

4

Q6.

(e)

total of four from:

arteries to max 3

1 *idea of* arteries have thick walls to, withstand / cope with / deal with, high pressure ;
2 arteries have (thick layer of) elastic tissue to, stretch / recoil (due to the changing pressure) ;
3 arteries have (thick layer of) muscular tissue to change pressure ;
4 arteries have narrow(er) lumen to maintain high pressure ;

5 veins have valves to prevent backflow of blood (due to low pressure) ;
6 veins have, thin walls / large lumen, to provide less resistance to blood flowing at low pressure / allow large volumes of blood / AW ;
7 veins have thin walls so blood is moved by contraction of (surrounding) muscles / AW ;

4

(f)

name of the organ	name of the artery that brings blood to the organ
lungs	pulmonary (artery) ;
kidney ;	renal artery
liver	hepatic (artery) ;

3

Q7.

(c)(i)	**C** ; **A** ; **D** ; **B** ;	**4**	
(c)(ii)	hepatic portal vein ;	**1**	

Q8.

(b)	*one mark per row:* function / type of blood vessel / letter on Fig. 5.1 regulates blood flow by constricting and dilating / arteriole / artery / **P** **N** ; collects blood from a network of the narrowest blood vessels / venule / **K** ; withstands the highest blood pressure / artery / **N** ; allows the transfer of substances to and from tissue fluid / capillary / **J** ; transports blood towards the heart / vein / venule / **M** **K** ; redirects blood under the surface of the skin / shunt vessel / **L** ;	**6**	
(c)	renal artery ; coronary artery ;	**2**	

(d)	*any four from:* stent ; (small) mesh / gauze, tube inserted in artery ; opens / supports, (narrow / weak) artery ; (balloon) angioplasty / dilatation ; (tube / catheter with) balloon inserted into artery ; inflate balloon to widen artery ; by-pass ; (another / shunt) blood vessel, joined to / grafted to / replaces, artery ; AVP ; e.g. aspirin / warfarin / ref to treatment of clots	**4**	**A** blood vessel for artery throughout