Mark scheme

Transport in animals

Biology 0610 · Questions from Paper 3, Paper 4 and Paper 6

Total marks

96

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
7	8	11	11	9	10	13	11	10	6	**96**

Question 1 [7]

1	**(a) (i)**	aorta;	[1]	
	(ii)	coronary artery;	[1]	A – coronary vessel R – coronary vein
	(iii)	no oxygen getting to heart muscle; severe pain / heart attack occurs / heart muscle dies;	Max [1]	A – description of heart attack
	(iv)	wall / muscle of left ventricle much thicker / stronger than wall / muscle of right ventricle; L.V. has to force blood all round body / must create more force / pressure;	[2]	A – ref LV valve 2 flaps, RV valve 3 flaps – 1 mark A – ORA
	(b)	select suitable / named position (of artery); press on artery with fingers; count number of beats per minute / unit time;	Max [2]	R – thumb A – ref to pulse / heart rate meter
			[Total: 7]	

Question 2 [8]

2(a)	*any two from:* narrow lumen **;** thick wall **;** (wall contains) muscle layer **;** contains elastic fibres **;** AVP **;**	**2**	
2(b)	transfer of (named) materials between blood and tissues / transport materials, to / from, cells / transport materials, to / from, blood / AW **;**	**1**	
2(c)	valves **;**	**1**	
2(d)(i)	arrows drawn from the pulmonary artery to the lungs **and** arrow from the lungs to the left atrium **;**	**1**	
2(d)(ii)	***X****:* aorta **;** ***Y****:* heart **;**	**2**	
2(e)	renal artery **;**	**1**	

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Question 3 [11]

3(a)(i)	**A** - pulmonary vein ; **C** - renal artery ; **E** - vena cava ;	**3**	
3(a)(ii)	**A** ;	**1**	**A** any artery except **F**
3(b)	*any three from:* *(arteries have)* thick(er) wall ; thick(er) / more, muscle ; thick(er) / more, elastic layer ; narrow(er) lumen / **AW** ; absence of valves (usually) ; **AVP** ; e.g. convoluted, endothelium / inner layer **AW** / more connective tissue	**3**	
3(c)(i)	phagocytosis ; antibody production ;	**2**	
3(c)(ii)	red blood cells ; plasma ; platelets ;	**2**	

Question 4 [11]

4(a)(i)	left ventricle ; septum ; valve ; right atrium ;	**4**	labels in this order starting clockwise from top right side of the diagram
4(a)(ii)	vena cava ; pulmonary artery ; pulmonary vein ; aorta ;	**4**	
4(b)	*any three from:* stress ; smoking ; genetic (predisposition) ; age ; sex ; AVP ;;; e.g. lack of exercise / high blood pressure / high (blood) cholesterol / diabetes / obesity	**3**	

Question 5 [9]

5(a)	(group of) tissue<u>s</u> working together, to pump blood around the body / AW / performing the (same) function ;	**1**	
5(b)	**1** circulatory ; **2** vena cava ; **3** thinner ; **4** diffusion ; **5** <u>left</u> <u>atrium</u> ; **6** septum ; **7** <u>coronary</u>, artery / arteries ;	**7**	MP1 **A** cardiovascular / circulation MP2 **A** veins MP3 **A** less
5(c)	ECG / electrocardiogram / listening to valves close / AVP ;	**1**	

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Question 6 [10]

6(a)(i)	arrow / (s) from a vena cava through atria and into right ventricle **;**	**1**	
6(a)(ii)	**C**, aorta **;**	**1**	
6(b)(i)	ventricles relax **;** increased volume of ventricles **;** higher blood pressure in, the arteries / **C**, **D** and **E** / aorta and pulmonary artery (than in the ventricles) **; ora**	**1**	
6(b)(ii)	stop back-flow (of blood) / ensure (blood) flows one way **;**	**1**	**I** pressure changes
6(c)	1 (right) ventricle contracts **;** 2 blood pressure increases (in heart) **;** 3 higher blood pressure in ventricles than in arteries **;** 4 semilunar valve / valve **1**, opens **;** 5 blood flows into, **D** / **E** / pulmonary artery **;** 6 semilunar valve closes (when blood in pulmonary artery) **;** 7 **D** / **E**, is a pulmonary artery **;** 8 valve **1** is a semilunar valve **;**	**4**	sequence of events must be in the correct order
6(d)	1 septum **;** *either* 2 separates oxygenated and deoxygenated blood **;** *or* 3 to allow a double circulation **;**	**2**	

Question 7 [13]

7	**(a)**	**J** – aorta ; **K** – pulmonary vein ; **L** – vena cava ; **M** – pulmonary artery ;	[4]	
	(b) **(i)** **1** **2** **3** **4** **5**	**J** – blood goes to the whole body / greater distance ; **M** – blood goes to the lungs / shorter distance ; **J** – blood is pumped by, more muscular, ventricle ; **M** – blood is pumped by, less muscular, ventricle ; greater resistance to blood flow in circulation to the body / ora ;	[max 2]	
	(ii)	(blood in **K** and **L**) travelled through the capillaries ; larger / wider lumen ;	[2]	
	(c) **1** **2** **3** **4** **5** **6** **7**	*Valve N* opens when, atrium contracts ; closes when ventricle contracts ; stops back flow from ventricle to atrium ; *Valve O* opens when ventricle contracts ; closes when ventricle relaxes ; stops back flow from, **J**, to ventricle ; description of way in which valve ‘flaps’ or ‘pockets’ prevent backflow ;	[max 4]	
	(d)	veins ;	[1]	

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Question 8 [11]

8(a)	*ref. to* platelets ; fibrinogen is converted to fibrin / **L** ; fibrinogen is soluble / fibrin is insoluble ; (**L** / fibrin) forms a, mesh / AW ; (**L** / fibrin) traps / AW, blood cells / **J** / **M** ; **J** is a red (blood) cell ; **L** is fibrin ; **M** is a, white (blood) cell / lymphocyte / phagocyte ;	**5**	
8(b)	prevents blood loss / AW ; prevent (named) pathogens entering a wound ;	**2**	
8(c)(i)	observable features (of an organism) ;	**1**	
8(c)(ii)	co-dominance ;	**1**	
8(c)(iii)	I^AI^A ; I^Ai^o ;	**2**	

Question 9 [10]

9(a)	**Q /** pathogen, are recognized as foreign ; **Q /** pathogen, will have specific / unique / AW, antigen ; **S** and **R** are white (blood) cells ; **S** / lymphocytes, make antibodies ; **T** are antibodies ; **T** / antibodies are as specific shape / complementary to, antigen / pathogen / Q ; **T** / antibodies bind to, antigen / pathogen / Q ; ref**.** to forming memory cells ; ref**.** to, active / long-term, immunity ; **R /** phagocytes, engulf, pathogens / antigens ; **R /** phagocytes, have enzymes / digest pathogens OR antigens ; **AVP** ;	**6**	
9(b)	*support of conclusion:* general decrease, from 1942 / vaccination ; cases do not return to pre-vaccine levels / AW ; no cases from 1974 ; *against conclusion:* number of cases increased, (during the 2 years) after the vaccine was introduced / until government made its conclusion ; took 32 years after vaccine introduced before no cases of disease ; but there are (small) peaks (in cases) / fluctuation (in cases) ; comparative data quote ;	**4**	

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Question 10 [6]

10	**1** *independent variable* different intensities of exercise / different exercises / exercise for different lengths of time ; **2** *dependent variable* after / during, exercise measure, heart rate / pulse rate ; **3 and 4** *detail of method* ;; • description of named exercise of different intensities • ensuring heart rate returns to resting rate • use of a heart rate monitor **5, 6 and 7** *constant variables* ;;; • same speed / distance / time, of exercise • same age of people • same sex of people • same, person / fitness level / mass of person / height of person / BMI • same, place / time of day / temperature / weather **8** at least three trials / two more repeats ; **9** relevant safety precaution ;	6	

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