Heart Disease - Mark Scheme

Q1.

Question Number	Answer	Additional guidance	Mark
(a)(i)		Max 2 marks for structural features only. Functions need to be in correct context	
	1. Idea that there is a {thick wall / lots of collagen / thick layers / thick tunica media / eq} ;	1. ALLOW idea of folded wall	
	2. Idea that it needs {to avoid rupture / to withstand high pressure / eq} ;	2. IGNORE damage alone ALLOW stretch to accommodate more blood	
	3. {elastic / muscular / eq} {layer / fibres / wall/ eq} ;		
	4. Control the flow of blood / maintain blood pressure / elastic recoil / eq ;	4. ALLOW to squeeze blood along	
	5. smooth endothelial wall / eq ;	5. ALLOW smooth lining	
	6. to reduce {friction / resistance / eq} ;		
	7. semi lunar valve present ;	7. IGNORE no valves ALLOW aortic valve	
	8. to prevent backflow (during diastole) ;		
	9. large lumen ;	9. IGNORE narrow lumen	
	10. idea of accommodating large volumes of blood / eq ;		
	11. branches ;		
	12. to supply blood to different parts of the body (including coronary arteries) / eq ;		(3)

Question Number	Answer	Additional guidance	Mark
(a)(ii)	1. capillary walls are one cell thick / eq ; 2. no {elastic tissue / collagen / muscle / multiple layers / eq } in the capillary (walls) ; 3. no valves in capillaries ; 4. capillaries have a very narrow lumen / eq ; 5. capillaries are porous / have pores;	ALLOW converse statements ALLOW statements that only mention capillary or vein – but do not credit same mark point twice 1. and 4. IGNORE capillaries are one cell thick alone	**(2)**

Question Number	Answer	Additional guidance	Mark
(b)(i)	1. idea that the area of dead heart muscle will be {downstream of the atheroma / in region normally supplied by the blocked artery / eq} ; 2. idea that each artery supplies (cells) with {oxygen / glucose / oxygenated blood } ; 3. idea that {cells / muscle / tissue / eq} (supplied by the blocked vessel) will die due to lack of {energy / respiration} ; 4. idea that if the atheroma is located {near the end of an artery / in a small artery } then the area of dead muscle will be small ;	 4. ALLOW converse	 **(3)**

Question Number	Answer	Additional guidance	Mark
(b)(ii)	1. shaded area should not extend above position B ; 2. shaded area should be around all the vessels on the right side of the diagram but not overlap with those on the left ;		**(2)**

Q2.

Question Number	Answer	Mark
(a)(i)	C ;	**(1)** comp

Question Number	Answer	Mark
(a)(ii)	A ;	**(1)** comp

Question Number	Answer	Mark
(a)(iii)	B ;	**(1)** comp

Question Number	Answer	Additional Guidance	Mark
(b)(i)	1. idea of {reduced blood flow / bleeding} ; 2. {less/no} {oxygen /glucose} (reaches brain) ; 3. idea of {less/no} (aerobic) respiration ; 4. idea of {less / no} ATP produced ; 5. idea that brain needs lots of {energy / ATP} to function ; 6. lactic acid produced (from anaerobic respiration); 7. lactic acid {inhibits enzymes / toxic / eq } ;	IGNORE brain cell death 1. ACCEPT no blood 2. ACCEPT no oxygenated blood and this gets Mp1 as well 3. ACCEPT anaerobic respiration (instead) 3. & 4 ACCEPT clearly linked ideas e.g. "cells will not receive enough oxygen for respiration" will gain mp 2 and 3.	**(3)** exp

Question Number	Answer	Additional Guidance	Mark
(b)(ii)	Any **two** from: 1. less saturated fat / less cholesterol ; 2. less salt ; 3. {less / moderate /eq} alcohol ; 4. Increase activity e.g. more / regular exercise, less sedentary job ; 5. reduce stress / eq ; 6. reduce smoking ; 7. reduce {body weight / BMI / obesity} / maintain healthy BMI / eq ;	Mps awarded if change correctly qualified e.g. IGNORE salt unqualified 1.IGNORE just 'better' diet, less fat	**(2)** grad

Q3.

Question Number	Answer	Additional guidance	Mark
(a)	1. lower blood cholesterol / eq ; 2. idea of inhibition of cholesterol synthesis in liver ; 3. reduce risk of CVD / eq ;	3. ACCEPT atherosclerosis, fatty plaques, atheroma	(2)

Question Number	Answer	Additional guidance	Mark
(b)(i)	1. idea that statins seen as more effective / more aware of the benefits / eq ; 2. may be prescribed (more frequently) as a preventative measure to reduce risk of further CVD / eq ; 3. specific reference to cheaper / off-patent statins available / eq ; 4. perception of lower risks / more awareness of the risks / eq ;		(2)

Question Number	Answer	Additional guidance	Mark
(b)(ii)	1. use of both increased over three years / eq ; 2. greater increase in use of antihypertensives than in platelet inhibitory drugs / eq ; 3. the use of platelet inhibitory drugs is (always) greater than antihypertensives / eq ; 4. comparative manipulation of data ;		(3)

Question Number	Answer	Additional guidance	Mark
(c)(i)	1. prevents platelets becoming {activated / sticky} / eq ; 2. prevent the formation of a {blood clot / thrombus / embolism / eq} / eq ; 3. specific example e.g. stroke ;	1. ACCEPT effectiveness of platelets reduced / idea that clotting factors {not synthesised / inhibited / eq} 2. IGNORE 'thin the blood' ACCEPT prevents blood clotting 3. IGNORE CVD ACCEPT idea that (risk of) blood vessels becoming blocked is reduced	(2)

Question Number	Answer	Additional guidance	Mark
(c)(ii)	1. reduce blood pressure / eq ; 2. reduces heart rate / eq ; 3. prevent muscles in vessel walls contracting / eq ; 4. by acting on (sympathetic) nervous system / eq ;		**(2)**

Q4.

Question Number	Answer	Additional Guidance	Mark
	A – high blood pressure		**(1)**

Q5.

Question Number	Answer	Additional Guidance	Mark
	An explanation which includes reference to the following: • antihypertensive drugs lower blood pressure (1) • lower blood pressure reduces risk of damage to endothelium of the artery (1) • reduced risk of inflammatory response (1) • reduced risk of { atheroma / plaque } formation (1)	Accept converse argument for marking points 2, 3 and 4 Ignore epithelium Allow description of an inflammatory response	**(4)**

Q6.

Question Number	Answer	Additional Guidance	Mark
(a)	1. cardiac / myogenic ;	1. IGNORE smooth	
	2. atrioventricular ;	2. ACCEPT bicuspid, tricuspid, mitral IGNORE cuspid, AV	
	3. left atrium ;	3. NOT atrium alone ACCEPT left auricle, left atria	
	4. pulmonary artery ;		
	5. semilunar ;		(5)

Question Number	Answer		Additional Guidance	Mark
(b)			Answers must be comparative for credit – i.e. 1 mark for each correct row on the table. IGNORE references to surface area, length	
	Arteries	**Capillaries**		
	1. thick wall / multiple cell layers	1. {thin / thinner / one cell thick} wall / eq ;	1. ACCEPT thinner wall NOT reference to cell wall IGNORE capillaries are one cell thick if not in clear context of 1. or 6.	
	2. (lots of) collagen	2. {little / no } collagen / eq ;		
	3. (lots of) muscle	3. no muscle / eq ;	3. and 4. NOT more or less	
	4. (lots of) elastic tissue	4. no elastic tissue / eq ;		
	5. no pores	5. pores present / eq ;	5. IGNORE porous , permeable	
	6. narrow lumen	6. narrow(er) lumen / lumen one cell wide / eq ;	6. ACCEPT artery lumen wider than the capillary, artery lumen narrower in relation to diameter of vessel	(2)

Question Number	Answer	Additional Guidance	Mark
(c) (i)	1. prevent the formation of a {blood clot / thrombus / embolism / eq} / eq ; 2. idea that it reduces 'stickiness' of platelets ; 3. idea that clotting factors {not synthesised / inhibited / eq} ; 4. idea that (risk of) blood vessels becoming blocked is reduced OR idea that blood can flow normally in arteries ;	1. IGNORE 'thin the blood' ACCEPT prevents blood clotting 2. ACCEPT effectiveness of platelets reduced 3. ACCEPT named clotting factor e.g. fibrinogen, thromboplastin, prothrombin,	**(2)**

Question Number	Answer	Additional Guidance	Mark
(c) (ii)	(internal) bleeding / haemorrhage / stomach ulcers / eq ;	ACCEPT rashes, nausea, vomiting, hair loss, diarrhoea, irritation to stomach lining	**(1)**