

Question Number	Answer	Additional Guidance	Mark
1(a)	<ol style="list-style-type: none"> 1. idea that initiates electrical activity over atria ; 2. causes atria to contract / eq ; 3. {forcing / eq} the (oxygenated) blood into the left ventricle / eq ; 4. electrical activity from SAN {received by AVN / travels through {bundle of His / Purkyne fibres / eq}} ; 5. causing left ventricle to contract (forcing blood into aorta) / eq ; 	<ol style="list-style-type: none"> 1. ACCEPT initiates impulse / initiates depolarisation 2. ACCEPT systole for contract 4. ACCEPT Purkinje for Purkyne 5. ACCEPT systole for contract NOT left and right 	(4)

Question Number	Answer	Additional Guidance	Mark
*1(b)	<p>(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. increase in <i>respiration</i> rate in <i>muscle</i> cells ; 2. more {CO₂/carbonic acid/eq} in blood ; 3. more {lactate / lactic acid} in blood / eq ; 4. idea that <i>chemoreceptors</i> in <i>medulla</i> stimulated ; 5. ref to <i>cardiovascular</i> control centre in <i>medulla</i> ; 6. ref to <i>autonomic nervous system</i> / <i>sympathetic nerve</i> ; 7. more <i>impulses</i> from { <i>medulla</i> / <i>cardiovascular</i> control centre} to SAN OR along neurones to SAN ; 8. More { <i>noradrenaline</i> / <i>norepinephrine</i>} released onto SAN ; 9. SAN (excitation) rate increased / eq ; 10.(causing an) increased {heart rate / eq} / eq ; 11.Comment on other mechanism e.g. presence of adrenaline, stretch receptor role ; 	<p>QWC emphasis is on spelling</p> <ol style="list-style-type: none"> 2 OR 3 ACCEPT reduced blood pH 4. ACCEPT in <i>aorta</i>, <i>carotid</i> 6. ACCEPT <i>accelerator</i> nerve 10. ACCEPT beats per min for heart rate 	(6)

Question Number	Answer	Additional Guidance	Mark
1(c) (i)	Correct answer with units gains 2 marks 1 beat = 0.81 sec / 60 ÷ 74 / eq ; 8.1 seconds ;	ACCEPT 8.11 seconds	(2)

Question Number	Answer	Mark
1(c) (ii)	mV / millivolts / eq ;	(1)

Question Number	Answer	Additional Guidance	Mark
2(a)	<ol style="list-style-type: none"> 1. RBC will {carry/supply oxygen} ; 2. idea that low number of mitochondria present in fast twitch ; 3. so additional oxygen may have limited additional effect / eq ; 4. poor {blood supply / capillary network} in fast twitch muscle so little additional {oxygen / RBC / eq} received / eq ; 5. (in fast twitch) respiration is (primarily) anaerobic / eq ; 6. short {time duration of race/distance travelled} means minimal additional blood supplied to muscles in timeframe ; 	<p>ACCEPT converse for slow twitch muscle</p> <p>4. ACCEPT low numbers of RBC in fast twitch so extra will have minimal additional effect</p> <p>6. ACCEPT no need for oxygen because of short {time duration of race/distance travelled}</p>	(3)

Question Number	Answer	Additional Guidance	Mark
2(b)	<ol style="list-style-type: none"> 1. idea of not being fair ; 2. idea of being a poor role model for youngsters ; 3. health risk to athletes / eq ; 4. cost to {NHS / medical services / eq} of health implications / eq ; 	<p>3. ACCEPT raised blood clotting risk, harmful side effects</p>	(2)

Question Number	Answer	Additional Guidance	Mark
3 (a)	1. cardiac / myogenic ; 2. atrioventricular ; 3. left atrium ; 4. pulmonary artery ; 5. semilunar ;	1. IGNORE smooth 2. ACCEPT bicuspid, tricuspid, mitral IGNORE cuspid, AV 3. OT atrium alone ACCEPT left auricle, left atria	(5)

Question Number	Answer	Additional Guidance	Mark														
3 (b)	<table border="1"> <thead> <tr> <th>Arteries</th> <th>Capillaries</th> </tr> </thead> <tbody> <tr> <td>1. thick wall / multiple cell layers</td> <td>1. { thin / thinner / one cell thick } wall / eq ;</td> </tr> <tr> <td>2. (lots of) collagen</td> <td>2. { little / no } collagen / eq ;</td> </tr> <tr> <td>3. (lots of) muscle</td> <td>3. no muscle / eq ;</td> </tr> <tr> <td>4. (lots of) elastic tissue</td> <td>4. o elastic tissue / eq ;</td> </tr> <tr> <td>5. no pores</td> <td>5. pores present / eq ;</td> </tr> <tr> <td>6. narrow lumen</td> <td>6. narrow(er) lumen / lumen one cell wide / eq ;</td> </tr> </tbody> </table>	Arteries	Capillaries	1. thick wall / multiple cell layers	1. { thin / thinner / one cell thick } wall / eq ;	2. (lots of) collagen	2. { little / no } collagen / eq ;	3. (lots of) muscle	3. no muscle / eq ;	4. (lots of) elastic tissue	4. o elastic tissue / eq ;	5. no pores	5. pores present / eq ;	6. narrow lumen	6. narrow(er) lumen / lumen one cell wide / eq ;	<p>Answers must be comparative for credit – i.e. 1 mark for each correct row on the table.</p> <p>IGNORE references to surface area, length</p> <p>1. ACCEPT thinner wall NOT reference to cell wall IGNORE capillaries are one cell thick if not in clear context of 1. or 6.</p> <p>3. and 4. NOT more or less</p> <p>5. IGNORE porous , permeable</p> <p>6. ACCEPT artery lumen wider than the capillary, artery lumen narrower in relation to diameter of vessel</p>	(2)
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3 (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
3 (c) (ii)	(internal) bleeding / haemorrhage / stomach ulcers / eq ;	ACCEPT rashes, nausea, vomiting, hair loss, diarrhoea, irritation to stomach lining	(1)

Question Number	Answer	Mark
4(a) (i)	D ready-to-eat cereal have a higher BMI than those people who ate cooked cereal;	(1)

Question Number	Answer	Mark
4(a) (ii)	A every group sampled in the investigation indicates that they were overweight;	(1)

Question Number	Answer	Mark
4(a) (iii)	B kgm^{-2} ;	(1)

Question Number	Answer	Mark
4(a) (iv)	A a larger sample size ;	(1)

Question Number	Answer	Additional Guidance	Mark
4(b)	<p>1.(Use subjects with) {same / similar / eq } {levels of activity / exercise / eq } ;</p> <p>2.{same / similar / eq }{volume / mass / energy content } of breakfast ;</p> <p>3.{same / similar / eq }{volume / mass / energy content } of other {meals / drinks} during the day ;</p> <p>4. same duration of trial / eq ;</p> <p>5. control of other health factors e.g. smoking , fitness, stress.</p> <p>6. same starting {mass / BMI} / eq ;</p> <p>7. ame type of breakfast (for each participant throughout the Investigation) / eq ;</p> <p>8. (body) mass measured at same time of day / eq ;</p>	<p>IGNORE gender, age, office workers ACCEPT control of variable for same / similar</p> <p>2. IGNORE amount, quantity</p> <p>5. IGNORE pregnancy</p>	(2)

Question Number	Answer	Additional Guidance	Mark
4 (c)	1. those subjects who ate no breakfast had a higher mean BMI than those who ate { fruit and vegetables / ready-to-eat cereal / cooked cereal / breads / most breakfasts } ; 2. Reference to suitable calculated difference to illustrate point 1 ; 3. idea that { metabolic rate / eq } may be lower for those who skip breakfast ; 4. appropriate comment on balance between intake and energy use ;	IGNORE units 1. ACCEPT 3 rd highest BMI 2. .g. 1.5 above cooked cereal, 0.5 above fruit and veg, 0.5 above breads, 0.85 above ready-to-eat cereal 3. ACCEPT converse 4. ACCEPT may eat more during the day (due to more hunger) / eq	(2)

Question Number	Answer	Additional Guidance	Mark
4 (d)	1. People who eat cooked cereals have the lowest BMI of all groups / eq ; 2. credit correct manipulation of figures ; 3. idea that lower BMI helps to reduce blood pressure ; 4. idea that dietary fibre can't be digested ; 5. idea that dietary fibre helps { lower absorption of cholesterol / increase excretion of cholesterol / eq } ; 6. { lower cholesterol / eq } reduces risk of { atherosclerosis / eq } ;	IGNORE HDL/LDL references 2. e.g. 0.4 above healthy weight 6. ACCEPT converse	(3)