

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. GNORE 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 ;	Answers must be comparative for credit – i.e. 1 mark for each correct row on the table. IGNORE references to surface area, length 1. ACCEPT thinner wall NOT reference to cell wall IGNORE capillaries are one cell thick if not in clear context of 1. or 6. 3. and 4. NOT more or less 5. IGNORE porous , permeable 6. ACCEPT artery lumen wider than the capillary, artery lumen narrower in relation to diameter of vessel	(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)	1.(Use subjects with) {same / similar / eq } {levels of activity / exercise / eq } ; 2.{same / similar / eq }{volume / mass / energy content } of breakfast ; 3.{same / similar / eq }{volume / mass / energy content } of other {meals / drinks} during the day ; 4. same duration of trial / eq ; 5. control of other health factors e.g. smoking , fitness, stress. 6. same starting {mass / BMI} / eq ; 7. ame type of breakfast (for each participant throughout the Investigation) / eq ; 8. (body) mass measured at same time of day / eq ;	IGNORE gender, age, office workers ACCEPT control of variable for same / similar 2. IGNORE amount, quantity 5. IGNORE pregnancy	(2)

Question Number	Answer	Additional Guidance	Mark
4 (c)	<p>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 } ;</p> <p>2. Reference to suitable calculated difference to illustrate point 1 ;</p> <p>3. idea that {metabolic rate / eq} may be lower for those who skip breakfast ;</p> <p>4. appropriate comment on balance between intake and energy use ;</p>	<p>IGNORE units</p> <p>1. ACCEPT 3rd highest BMI</p> <p>2. .g. 1.5 above cooked cereal, 0.5 above fruit and veg, 0.5 above breads, 0.85 above ready-to-eat cereal</p> <p>3. ACCEPT converse</p> <p>4. ACCEPT may eat more during the day (due to more hunger) / eq</p>	(2)

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