Questions

Q1.

Cholesterol is often measured as part of a health check

Which **one** of the following is a correct statement about cholesterol?

(1)

☒ **A** An increase in fat intake will only increase HDL (high density lipoprotein) levels.

☒ **B** Regular aerobic activity has no effect on cholesterol levels.

☒ **C** Correct diet can improve cholesterol levels.

☒ **D** High levels of LDL (low density lipoprotein) are preferable to high levels of HDL (high density lipoprotein).

Q2.

Alcohol is a recreational drug.

Which **one** of the following is an effect of alcohol on the cardiovascular system?

(1)

☒ **A** Alcohol increases oxygen debt

☒ **B** Alcohol decreases lung volume

☒ **C** Alcohol increases blood pressure

☒ **D** Alcohol lowers blood pressure

Q3.

The equation in the box below is incomplete.

Complete the equation that is used to calculate the amount of blood ejected from the heart per minute.

(1)

..... = Heart Rate × .....

Q4.

Which **one** of the following statements correctly defines the term cardiac output?

(1)

☒ **A** Heart rate ÷ stroke volume = cardiac output
☒ **B** Cardiac output = heart rate – stroke volume
☒ **C** Cardiac output = heart rate × stroke volume

☒ **D** Stroke volume × vital capacity = cardiac output

Q5.

If an individual had high levels of low density lipoprotein (LDL 'bad' cholesterol), which of the following should he/she avoid in order to improve his/her health?

(1)

☒ **A** Foods high in unsaturated fats (e.g. sunflower oil, nuts)
☒ **B** Foods high in soluble fibre
☒ **C** Foods high in saturated fat (e.g. butter, crisps)
☒ **D** Moderate exercise

Q6.

Amy is warming up in preparation for a tennis match. During her warm-up Amy's heart rate and breathing rate increase.

What is the immediate effect of exercise on systolic blood pressure?

(1)

.....

Q7.

Explain how low density lipoprotein (LDL) increases blood pressure.

(2)

.....

.....

.....

.....

(Total for question = 2 marks)

Q8.

The following statements are effects of participation in exercise and physical activity on the cardiovascular system. State whether the effect is immediate or long term.

	Immediate or long term effect?
Increased heart rate	.....
Increased cardiac output	.....
Increased maximum cardiac output	.....

.....

(Total for Question = 3 marks)

Q9.

Blood pressure can be used to help monitor the health of an individual.

(i) A normal blood pressure reading would be 120/80. The 120 represents systolic blood pressure. Name the other blood pressure represented in this reading.

(1)

.....

(ii) Explain the immediate effect of exercise on blood pressure.

(2)

.....
.....
.....
.....
.....
.....

Q10.

Amy is warming up in preparation for a tennis match. During her warm-up Amy's heart rate and breathing rate increase.

An increase in heart rate will increase cardiac output.
How else can the heart increase cardiac output?

(1)

.....

Q11.

Diet and rest need to be considered when planning a healthy, active lifestyle.
Describe the impact of diet and rest on the cardiovascular system.
(i) Impact of **diet** on the cardiovascular system.

(3)

.....
.....
.....
.....
.....
.....

(ii) Impact of **rest** on the cardiovascular system.

(2)

.....
.....
.....
.....

Q12.

Which **one** of the following terms, **A**, **B**, **C** or **D**, is being described in the statement below?

The volume of blood leaving the heart per beat.

(1)

- ☒ **A** Maximum cardiac output
- ☒ **B** Stroke volume
- ☒ **C** Cardiac output
- ☒ **D** Heart rate

Q13.

Amy is warming up in preparation for a tennis match. During her warm-up Amy's heart rate and breathing rate increase.

Explain why it is important that Amy's heart rate **and** breathing rate increase.

(3)

.....

.....

.....

.....

.....

.....

Q14.

Complete the following statements about the effects of exercise on the cardiovascular system.

(i) A decreased resting heart rate is a ..... effect of exercise.

(1)

(ii) The heart responds to exercise by beating faster. As a result blood flow

..... to meet the higher demands being made on the body during exercise.

(1)

(iii) Rest **between** exercise sessions allows the cardiovascular system to adapt.

..... is an example of how the cardiovascular system may adapt.

(1)

Q15.

State the effect of alcohol on resting blood pressure.

(1)

.....

Examiner's Report

Q1.

The majority of the multiple choice questions (MCQs) were designed to be accessible to candidates: this series proved no different.

Q2.

The majority of the multiple choice questions (MCQs) were designed to be accessible to candidates: this series proved no different.

Q3.
No Examiner's Report available for this question

Q4.
No Examiner's Report available for this question

Q5.
No Examiner's Report available for this question

Q6.

The majority of candidates were able to identify that blood pressure would increase as an immediate effect of exercise.

Q7.

This question tested candidates' knowledge of why low-density lipoprotein (LDL) increased blood pressure. To gain both marks candidates needed to refer to LDL building up, or blocking/ clogging the arteries, therefore reducing blood flow and increasing blood pressure.

Many candidates were able to link LDL with causing a blockage in the arteries, either through the build-up of plaque or fat. It was pleasing to note the number of candidates that also identified accurately the relevant blood vessel type. Incorrect responses varied.

There was a complete range of answers, for example:

- identification that these were the 'good cholesterol'
- that they were used in redistribution of blood flow
- that pressure increased as they collected in the veins or respiratory system
- that there should be more protein in the diet

Overall, the question differentiated well between those scoring zero, one, or two, marks.

Explain how low density lipoprotein (LDL) increases blood pressure.

This is because it higher cholestrol in the body which clogs up blood vessels making it harder for the blood to fit through the blood vessel, increasing blood pressure.

(Total for Question = 2 marks)

Results Plus: Examiner Comments
This response gains both available marks.
Reference is made to cholesterol blocking the blood vessels, therefore making it harder for blood to 'fit through'.
2 marks

Explain how low density lipoprotein (LDL) increases blood pressure.

Low density lipoprotein is a bad type of cholesterol which builds up in the arteries. If too much of it builds up in someones arteries it makes blood flow harder and therefore increases blood pressure which can lead to heart attacks.

(Total for Question = 2 marks)

Results Plus: Examiner Comments
This response gives more detail than the previous response and also gains the 2 available marks for the question.
Both key points are referenced, ie that the cholesterol builds up in the arteries and that this makes blood flow more difficult.
2 marks

Q8.

(i)

Question 7 was designed to be accessible to the complete range of candidates. The majority of candidates correctly identified an increased heart rate as an immediate effect of exercise.

(ii)

This part of question 7 proved slightly more demanding than (i), some candidates incorrectly identifying an increased cardiac output as a long term training effect.

(iii)

This was well answered by the majority of candidates. However a few did incorrectly identify an increase in maximum cardiac output as an immediate effect, but overall well known by candidates.

Q9.

(ii)

This was a very accessible question, the majority of candidates achieved maximum marks. Where errors occurred they were sometimes due to candidates discussing long term effects of exercise on blood pressure, or would provide an explanation that focused on the respiratory system rather than the circulatory system. Occasionally oxygen debt was also incorrectly referenced. Most candidates however did explain that there was an increase in blood pressure due to increased blood flow. The detail provided by some was of a higher level than required by

GCSE PE, giving detail of blood vessel structure and pressure within the varying types of vessels, linking the amount of pressure to the blood vessel structure and function.

(ii) Explain the immediate effect of exercise on blood pressure.

(2)

'blood pressure is increased during exercise as more blood is needed to be pumped around the body. This means more

Results Plus: Examiner Comments
Two marks awarded. One mark for 'blood pressure is increased' and a second mark for 'as more blood is needed …'

(ii) Explain the immediate effect of exercise on blood pressure.

(2)

When an individual starts exercise their blood pressure increase, this is because the blood is needed around the body quicker. To increase the speed of the blood the heart contracts harder and faster.

Results Plus: Examiner Comments
This is an example of another good response gaining 2 marks. The candidate identifies that blood pressure increases and explains why, 'blood is needed around the body quicker'.

Q10.

The question stated that an increase in heart rate would result in an increase in cardiac output.

Candidates were asked how else cardiac output could be increased. Whilst many candidates gained credit for this question, many also did not gain credit because they simply stated stroke volume, without commenting whether it needed to increase, decrease or stay the same. Other incorrect responses were linked to blood pressure, increased oxygen delivery, and increased heart size.

Some candidates described an increase in stroke volume: this was perfectly acceptable as a response, provided it was clear that it was stroke volume and that this increased.

(b) An increase in heart rate will increase cardiac output.

How else can the heart increase cardiac output?

(1)

increase blood Pressure

Results Plus: Examiner Comments

This response was not credited because it linked to blood pressure, rather than stroke volume.
Total = 0 marks

(b) An increase in heart rate will increase cardiac output.

How else can the heart increase cardiac output?

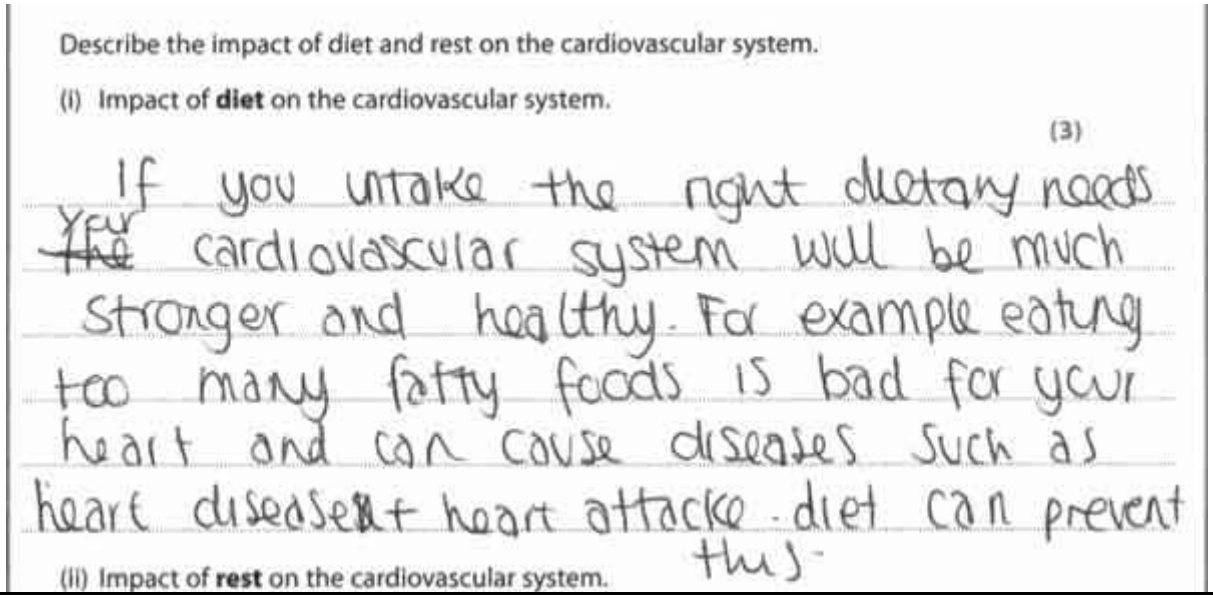
(1)

An increase in stroke volume

Results Plus: Examiner Comments
This is an example of a correct response.
Total = 1 mark

Q11.

This was a differentiated question. Candidate responses were very varied in terms of knowledge. Some responses were excellent and demonstrated a level of understanding beyond the requirements of this specification, whilst at the opposite end of the range candidates omitted the question completely or failed to link to the cardiovascular system, writing in very general terms relating to 'diet' in terms of 'dieting' and rest in relation to the training principle of rest and recovery of the body. In part (i) the expected approach was from the perspective of a 'bad' diet, and this was the approach taken by the majority of candidates, although some did successfully describe the need for minerals, especially iron, linking it to haemoglobin and oxygen transport. Popular correct answers linked poor diet to increased cholesterol and therefore increased blood pressure, or narrowing of arteries. In part (ii) candidates needed to be clear what the heart rate was dropping to, i.e. resting heart rate, and where adaptation was given as a response, it also needed to be clear that this was in relation to the heart and not a general comment in relation to muscles.



Describe the impact of diet and rest on the cardiovascular system.

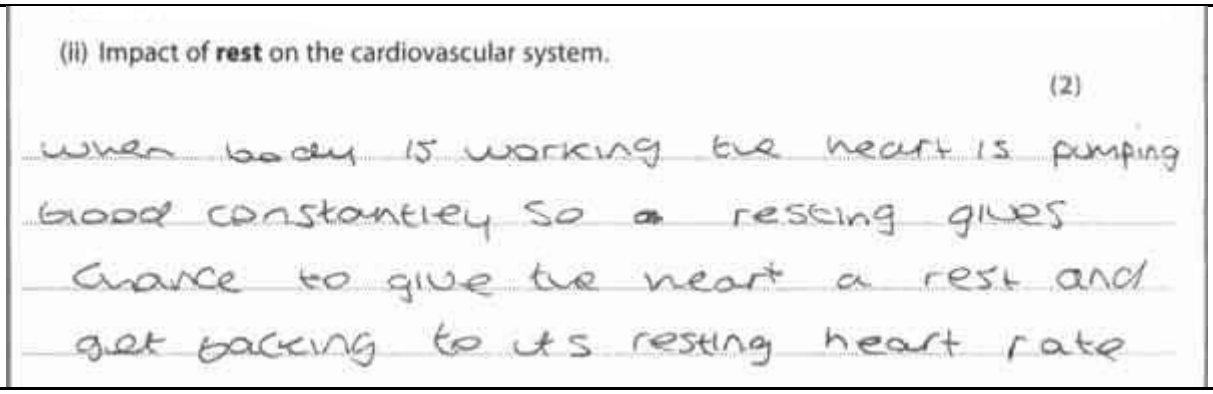
(i) Impact of **diet** on the cardiovascular system.

(3)

If you untake the right dietary needs ~~the~~ your cardiovascular system will be much stronger and healthy. For example eating too many fatty foods is bad for your heart and can cause diseases such as heart disease & heart attacks. diet can prevent this.

(ii) Impact of **rest** on the cardiovascular system.

Results Plus: Examiner Comments
In this example the candidate achieves one mark for linking a poor diet (too many fatty foods) to an increased risk of heart attack.



(ii) Impact of **rest** on the cardiovascular system.

(2)

when body is working the heart is pumping blood constantley so a resting gives chance to give the heart a rest and get backing to its resting heart rate

Results Plus: Examiner Comments
Candidate achieves one mark at end of statement where they say 'and get back to its resting heart rate'

Q12.

No Examiner's Report available for this question

Q13.

Some candidate responses appeared to ignore the question, focussing instead on the stem of it, discussing the advantages and disadvantages of completing a warm up. However, the majority of candidates achieved at least one mark for this question.

Candidates who achieved three marks generally started their response by stating that the need for increased oxygen for the muscles was due to exercise. They went on to say that the need was satisfied by the increased breathing rate, in order to draw oxygen into the body. This resulted in an increased heart rate to transport this oxygen to the muscles. Candidates who focussed on either breathing rate and/or heart rate, without first explaining their importance, were credited with one or two marks.

Most responses focussed on oxygen delivery rather than carbon dioxide removal but either was credited.

9 Amy is warming up in preparation for a tennis match. During her warm-up Amy's heart rate and breathing rate increase.

(a) Explain why it is important that Amy's heart rate **and** breathing rate increase.

(3)

Heart rate increases because there is a higher demand of oxygen (carried in the blood) to the working muscles, So the heart pumps harder to get it around faster. Her breathing rate increases due to forced breathing in exercise as there is a higher demand of oxygen to the working muscles. Also bi-products such as carbon dioxide increase and therefore have to be exhaled also.

Results Plus: Examiner Comments
This response gains all of the available marks.
The first marking point from the mark scheme is awarded part way through the response, in the section on breathing rate.
Initially, we are told there is a higher demand of oxygen to the working muscles; therefore the heart pumps harder (increased heart rate) to get it (oxygen carried in the blood) around faster (to the muscles).
We are also told that breathing rate increases (due to the higher demand for oxygen to the working muscles) to exhale bi-products, such as carbon dioxide.
Total = 3 marks

Results Plus: Examiner Tip
This question makes specific reference to the importance of an increase in heart rate and breathing rate. You must make sure that you cover both, making it clear to which you are referring in your answer.

9 Amy is warming up in preparation for a tennis match. During her warm-up Amy's heart rate and breathing rate increase.

(a) Explain why it is important that Amy's heart rate **and** breathing rate increase.

(3)

Amy needs to get a lot of oxygen to the muscles in her body so they do not get fatigued. She needs them ~~to respirate out~~ for muscular endurance. The breathing rate increases to bring more oxygen into the body. The heart rate increases to pump more oxygen around the body. As the breathing rate increases the heart rate increases and vice versa. They both increase to make sure there are more red blood cells carrying oxygen and the body to oxygenated the cells in the muscle.

Results Plus: Examiner Comments

This response also gains maximum marks.

The marks are achieved in a more logical way than the previous example. We are told the issue first, that we need to get a lot of oxygen into the muscles so that they do not become fatigued.

There is then an explanation of the role of an increased breathing rate to get more oxygen into the body, followed by the elevated heart rate to transport this oxygen in the blood to the muscles.

Total = 3 marks

Q14.

Question (a) comprised three parts. Part (a) (i) was challenging for candidates but even so, the majority identified correctly that a decreased resting heart rate was a long-term effect of exercise.

Part (a) (ii) was very well answered, most candidates identifying that there would be an increase in blood flow as a result of the heart beating more rapidly in response to exercise. Provided the word used by candidates implied an increase, their response was credited even if not grammatically correct, eg faster, quickly.

Part (a) (iii) was the most challenging with more candidates answering incorrectly than correctly. An example of a long-term training effect on the cardiovascular system was required. Whilst some candidates gave short term effects, eg increased heart rate, increased breathing rate, others identified long-term adaptations but to the respiratory or muscular systems, eg hypertrophy. Popular correct responses were cardiac hypertrophy, a drop in resting heart rate or capillarisation.

(iii) Rest **between** exercise sessions allows the cardiovascular system to adapt.

Cardiac hypertrophy is an example of how the cardiovascular system may adapt.

(1)

Results Plus: Examiner Comments
This candidate has identified an appropriate adaptation to the cardiovascular system.
1 mark

Results Plus: Examiner Tip
If a question has a word in bold text this means it is important, make sure you understand the importance of these words within the question context.
In this example **between** is important because this is the time when the body adapts to training.
To answer this question successfully the candidate needed to give an example of a long-term adaptation that happens to the cardiovascular system.

(iii) Rest **between** exercise sessions allows the cardiovascular system to adapt.

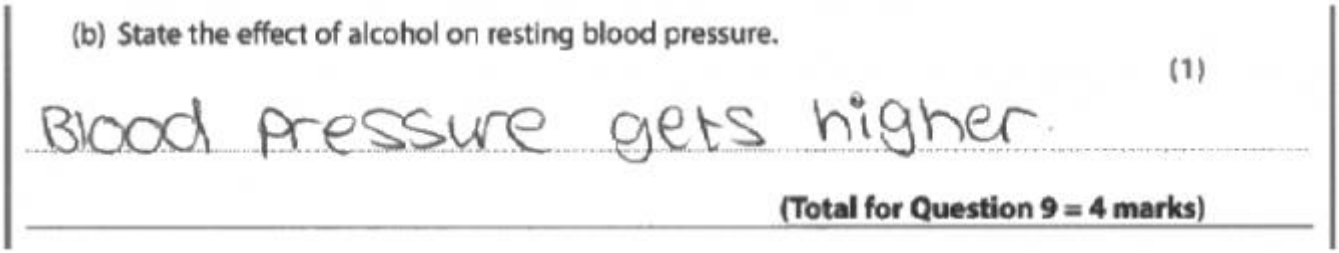
Capillarisation is an example of how the cardiovascular system may adapt.

(1)

Results Plus: Examiner Comments
Capillarisation was another popular correct response.
1 mark

Q15.

Candidates were asked to state the effect of alcohol on resting blood pressure. This question was answered well, with the majority of candidates indicating that blood pressure would be increased. However, some candidates cited alcohol as a 'relaxing tonic' therefore reducing blood pressure.


(b) State the effect of alcohol on resting blood pressure.

(1)

Blood pressure gets higher.

(Total for Question 9 = 4 marks)

Results Plus: Examiner Comments
This response gained the available mark for identifying that blood pressure increases as a result of consuming alcohol.
1 mark

Mark Scheme

Q1.

Question Number	Answer	Mark
	C correct diet can improve cholesterol levels	1

Q2.

Question Number	Answer	Mark
	C Alcohol increases blood pressure	1

Q3.

	Answer	Do not accept	Additional Guidance	Mark	Total

			Cardiac output = Heart Rate x **Stroke Volume** OR **Q** = Heart Rate x **Stroke Volume** OR **CO** = Heart Rate x **StrokeVolume** OR **Cardiac output** = Heart Rate x **SV** OR **Q** = Heart Rate x **SV** OR **CO** = Heart Rate x **SV** OR *Can accept definition of the terms* ***The amount of blood ejected from the heart per minute*** =*heart rate X* ***the amount of blood ejected from the heart per beat***	*Partial answers Any other terms*	*Accept response describing cardiac output and SV. I.e.* ***The amount of blood ejected from the heart per minute*** *=heart rate X* ***the amount of blood ejected from the heart per beat***	**1x 1**	**(1)**

Q4.

	Answer	Mark
	Q - Which of the following statements correctly defines the term cardiac output? **C** – (Cardiac output = HR × SV)	**(1)**

Q5.

	Answer	Mark
	C Foods high in saturated fat (e.g. butter, crisps)	**(1)**

Q6.

Question		Answer	Marks	Total
		Increased	1x1	(1)

Q7.

Question		Answer	Do not accept	Additional Guidance	Marks	Total
		A **linked explanation** of how LDL increases BP that makes reference to the following. • LDL attaches to walls of arteries/causes increase in plaque/fat in arteries/ blocks/ clogs (1) this restricts/blocks blood flow/reduces the size of the lumen (which causes heart to work harder) (1)	Veins Decreases size of blood vessel	Accept blood vessels/arterioles	1x2	(2)

Q8.

			Answer	Do not accept	Additional Guidance	Marks	Total
		(i)(ii)(iii)	Immediate Immediate Long term		Accept: Phonetic spelling	**3×1**	**3**

Q9.

			Answer	Do not accept	Additional Guidance	Mark	Total
			Diastolic Diastole	*Distolic* *Diatolic* *Dystolic* *Diostolic*	*Accept phonetic spellings provided contains the 'as' sound 'D**ias**tolic' 'D**yas**tolic'* Only accept **FIRST** response on line.	**1x1**	**(1)**
			An **explanation** that makes reference to the following: • Immediate increase in blood pressure as a result of exercise (1) • **due to** increased blood flow/ *increased heart rate/need for more blood to muscles* **(1)**	*Explanation to justify drop in blood pressure long term effects, e.g. lower blood pressure*	*Credit response giving explanation first provided correct, e.g. due to increased blood flow (1) pressure increases (1)*	**1x2**	**(2)**

Q10.

Question		Answer	Marks	Total
		Any one of the following: Increase/larger stroke volume Increase amount of blood pumped/ejected per beat Forcing more out each stroke Increased SV	1x1	(1)

Q11.

			Answer	Do not accept	Additional Guidance	Mark	Total
		i	A description based on the impact of **diet** that makes reference to: **IF POOR DIET:** 1. can lead to an increase in cholesterol (1) 2. This causes a narrowing of the arteries **OR** an increase in blood pressure (1) 3. increasing risk of CHD **OR** stroke (1) **----------IF**	*May answer from good or bad diet perspective but NOT a mix. I.e. points 1 – 3 OR points 4 – 6*	*Accept Point 1: fatty deposits or Triglycerides or saturated fats or bad cholesterol or LDL in place of cholesterol Point 2: Clogs/blocks arteries Point 3: Accept heart attack*	**3×1**	**3**

			GOOD DIET: 4. contains correct minerals, e.g. iron (1) 5. This increases haemoglobin (1) 6. Therefore less chance of anaemia (1)				
		ii	A description based on the impact of **rest** that makes reference to: 1. Rest required for adaptation of heart to take place **OR** need rest for cardiac hypertrophy to take place (1) 2. Rest required for heart rate to recover to <u>resting</u> level **OR** Recovery heart rate slowly returns	*Point 1 Make changes; For heart to get bigger/ stronger Point 2 For recovery; for heart to get back to normal*	Point 1: Accept examples of other relevant training adaptationsPoint 2 Must state <u>resting</u> HR	**2×1**	**2**

			to resting heart rate(1)				

Q12.

Question Number	Answer	Mark
	B Stroke volume	**1**

Q13.

Question	Answer	Marks	Total
	Linked explanation of three of the following points: • Need oxygen for muscles due to exercise/ need to get O_2 to the working muscles / remove CO_2 from muscles (1) • An increased breathing rate makes O_2 available in body/lungs/increases oxygen intake/ increases CO_2 removal (1) • But needs (increased) heart rate to transport/pump oxygen to muscles/remove CO_2 from the muscles (1)	1x3	(3)

Q14.

Question		Answer	Do not accept	Additional Guidance	Marks	Total
	(i)	long term / regular training			1x1	(1)
	(ii)	Increases Increased Increase in Larger Greater	*Increased stroke volume*	*Accept response that implies 'more' eg quickens or gets faster*	1x1	(1)
	(iii)	**One** from: Cardiac hypertrophy Increased heart size/strength of heart Capillarisation Increased maximum cardiac output Increased resting stroke volume Drop in resting heart rate Drop in resting blood pressure	*Adaptations to other body systems, e.g. muscular hypertrophy; increased alveoli* *More capillaries*	*Credit other examples of long term training effects on the CV system, including drop in LDL*	1x1	(1)

Q15.

Question		Answer	Do not accept	Additional Guidance	Marks	Total
		Increases Makes high/higher		*Accept response that implies 'more'*	1x1	(1)