PEARSON EDEXCEL GCSE BIOLOGY (HIGHER) · 1BI0

BIOLOGY



EXAM QUESTION PACK

TOPIC 8: EXCHANGE AND TRANSPORT IN ANIMALS (PACK 1)

SCORE	PERCENTAGE
/60	%

STEMUP

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Q1.

Explain why cellular respiration is essential for living organisms.

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(Total for question = 2 marks)

Q2.

Figure 10 shows the estimated blood flow through some parts of the body when a person is at rest and during exercise.

part of the body	estimated rate of blood flow in cm^3 per minute	
	at rest	during exercise
brain	750	748
heart muscle	350	1 150
digestive system	2 500	1 200
other muscles	1 200	14 500
all other organs (except lungs)	1 423	1 420

Figure 10

Explain why there is a change in the rate of blood flow through the digestive system during exercise.

(2)

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(Total for question = 2 marks)

Q3.

Explain, using Fick's law, the factors that affect the diffusion rate of molecules into and out of cells.

(6)

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(Total for question = 6 marks)

Q4.

Explain how **one** structure of a vein helps the blood return to the heart.

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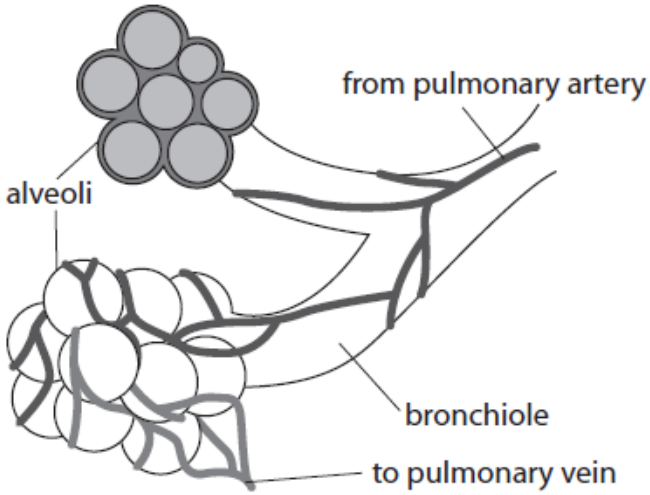
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(Total for question = 2 marks)

Q5.

Figure 10 shows alveoli from a lung.



© David Darling 2016

Figure 10

(i) Explain why these alveoli have the internal structure shown in Figure 10.

(3)

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(ii) How does oxygen move across the alveolar membrane into the capillary?

(1)

☒ **A** by osmosis

☒ **B** by active transport

☒ **C** by diffusion

☒ **D** by respiration

(Total for question = 4 marks)

Q6.

Some blood transfusions contain red blood cells.

Red blood cells are stored in a solution containing 5.0% glucose and 0.9% salt.

Explain why red blood cells cannot be stored in pure water.

(3)

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(Total for question = 3 marks)

Q7.

Figure 13 shows the heart rate of person A and person B.

Person A does not do any regular exercise.

Person B has been running regularly for one year.

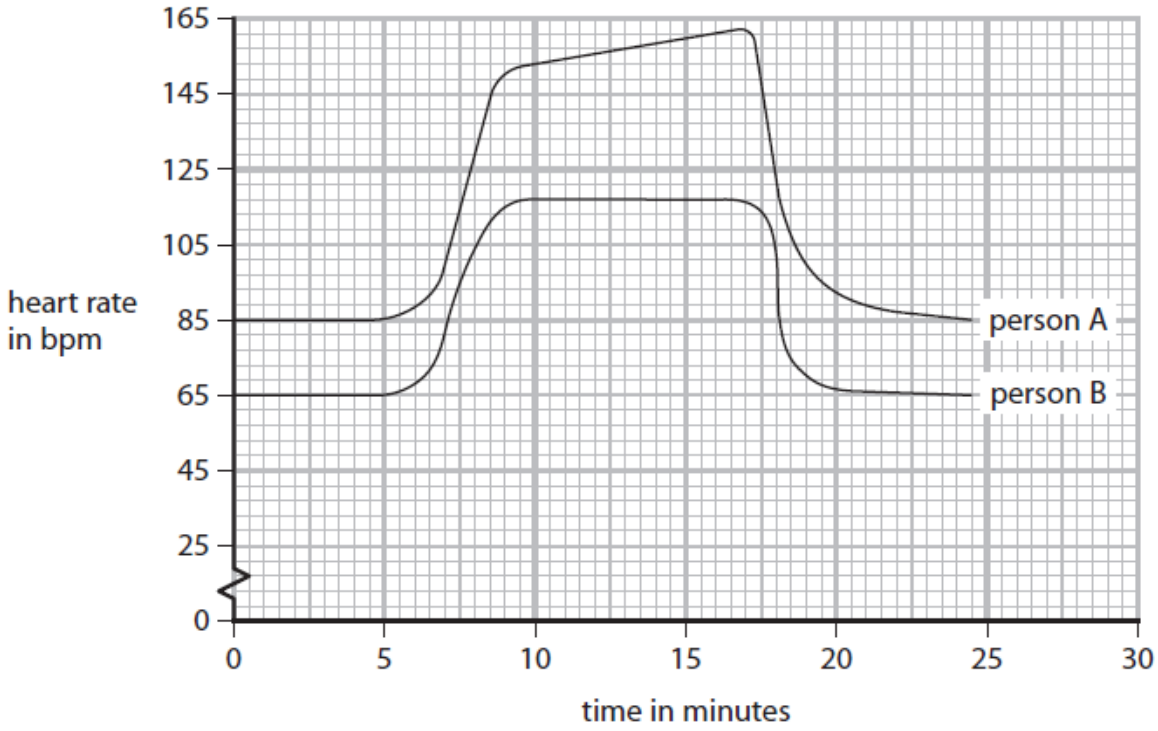


Figure 13

The cardiac output for person A during exercise was 5.5 litres per minute.

Explain why the heart rate for person A needed to be higher than the heart rate for person B during exercise.

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(Total for question = 3 marks)

Q8.

A student investigated respiration in three different organisms.

Red hydrogencarbonate indicator was placed in each of three test tubes.

Gauze was placed in each test tube to hold the organisms.

In test tube 1 the student placed four germinating peas.

In test tube 2 the student placed four dried peas.

In test tube 3 the student placed four mealworms.

Bungs were added to each of the test tubes.

The three test tubes were left for one hour.

The equipment used is shown in Figure 3.

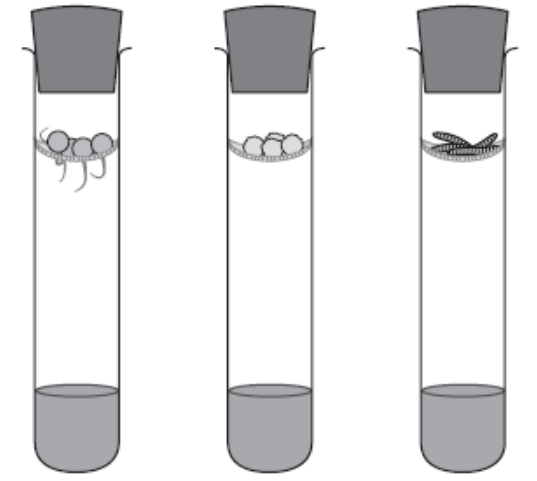


Figure 3

Hydrogencarbonate indicator changes from red to yellow when more carbon dioxide is present.

The results for this investigation are shown in Figure 4.

organisms	colour of hydrogencarbonate indicator
germinating peas	yellow
dried peas	red
mealworms	yellow

Figure 4

(i) Explain why the result for the germinating peas is different from the result for the dried peas.

(2)

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(ii) How was the carbon dioxide produced in this investigation?

(1)

☒ **A** by photosynthesis

☒ **B** when glucose is broken down in the presence of oxygen

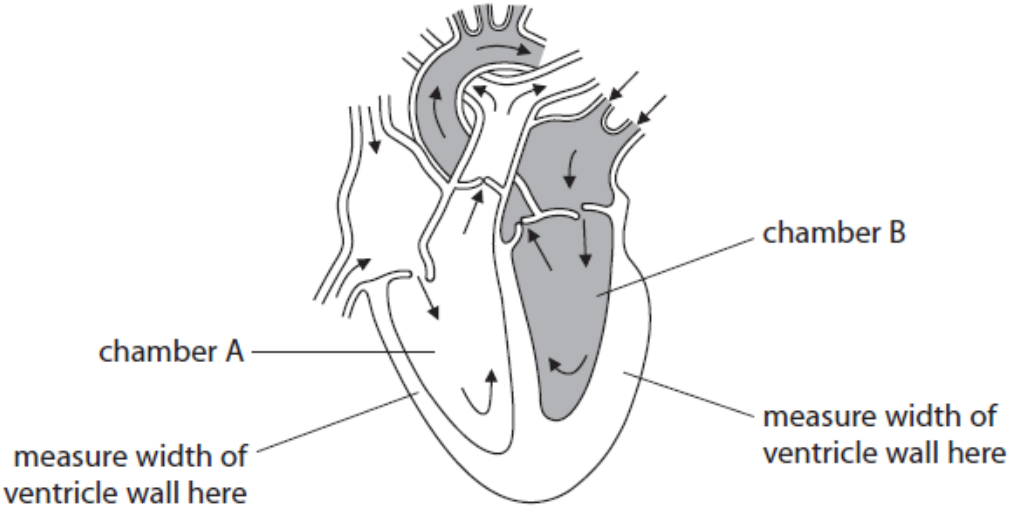
☒ **C** when glucose is broken down in the absence of oxygen

☒ **D** by the reaction between oxygen and water

(Total for question = 3 marks)

Q9.

The diagram shows the chambers of the heart.



(i) Calculate how many times thicker the wall of chamber B is compared with the wall of chamber A.

(1)

..... times thicker

(ii) Explain why the wall of chamber B is thicker than the wall of chamber A.

(2)

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Q10.

After high intensity exercise, the pH of muscles can decrease from pH 7.0 to pH 6.3.

Explain this change in pH.

(2)

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(Total for question = 2 marks)

Q11.

The percentage of blood flowing through body organs was measured at rest and during vigorous exercise.

The results are shown in Figure 14.

body organ	blood flow at rest (%)	blood flow during vigorous exercise (%)
brain	18	4
heart	5	5
kidneys	20	1
liver	25	1
skin	7	1
muscles	15	87
other	10	1

Figure 14

(i) The volume of blood in a human is 4.7 litres.

Calculate the increase in the volume of blood flow through the muscles during vigorous exercise.

(3)

..... litres

(ii) Explain why this increase in the volume of blood to the muscles is required during vigorous exercise.

(4)

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(Total for question = 7 marks)

Q12.

Figure 10 shows the estimated blood flow through some parts of the body when a person is at rest and during exercise.

part of the body	estimated rate of blood flow in cm^3 per minute	
	at rest	during exercise
brain	750	748
heart muscle	350	1 150
digestive system	2 500	1 200
other muscles	1 200	14 500
all other organs (except lungs)	1 423	1 420

Figure 10

The stroke volume is the amount of blood leaving one chamber of the heart per beat.

From which chamber of the heart does this volume of oxygenated blood flow?

(1)

☒ **A** left atrium

☒ **B** left ventricle

☒ **C** right atrium

☒ **D** right ventricle

(Total for question = 1 mark)

Q13.

Answer the question with a cross in the box you think is correct ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

(i) Which part of the blood causes blood to start clotting?

(1)

☒ **A** erythrocytes

☒ **B** lymphocytes

☒ **C** platelets

☒ **D** antibodies

(ii) Give **one** advantage of a blood clot forming.

(1)

.....

.....

(Total for question = 2 marks)

Q14.

Bloodworms in a pond indicate that the water is polluted.

(i) Which species also indicates that the water is polluted?

(1)

☒ **A** fertiliser

☒ **B** lichen

☒ **C** stonefly

☒ **D** sludgeworm

(ii) Bloodworms have a high level of haemoglobin in their blood.

Give a reason why this helps them survive in polluted water.

(1)

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(iii) Carbon dioxide diffuses from the body of the bloodworm into the water.

Give **two** factors that affect the rate of diffusion.

(2)

1 .....

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2 .....

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(Total for question = 4 marks)

Q15.

In an investigation, a person ran at different speeds.

After running the person rested.

Explain why the concentration of lactic acid in the blood changes whilst resting.

(3)

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Q16.

Red blood cells are carried in veins and arteries.

Figure 4 shows the equipment used to measure the elasticity of an artery.

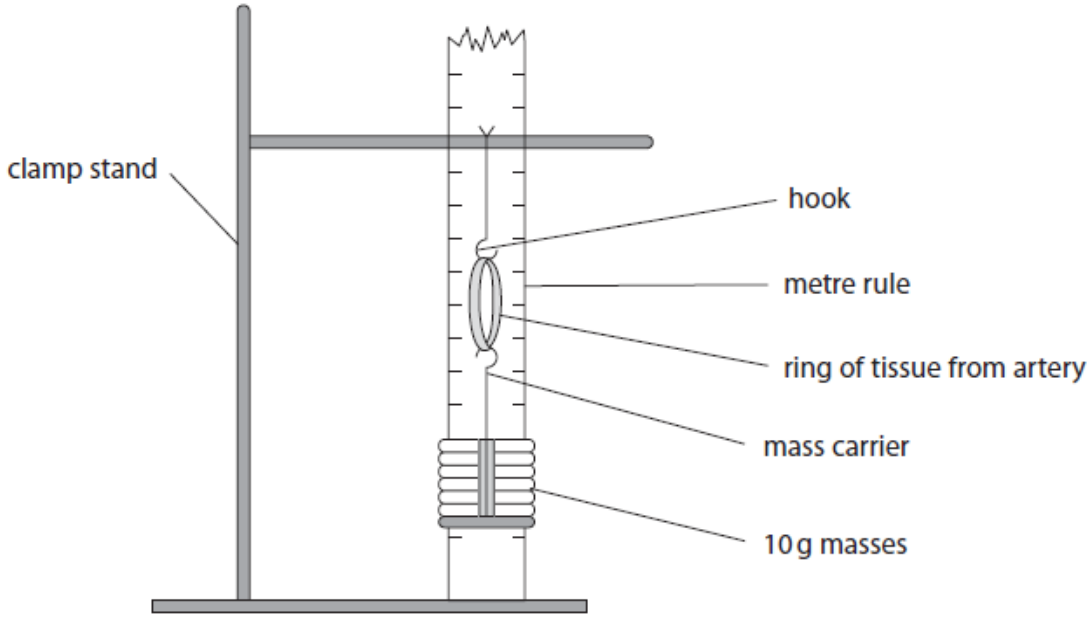


Figure 4

(i) Describe a method you could use to see how much the ring of tissue from an artery could stretch before it no longer returned to its original size.

(3)

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(ii) Give **one** safety precaution you need to take when handling animal tissue such as blood vessels.

(1)

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.....

(Total for question = 4 marks)

Q17.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

A group of the same type of cells, such as red blood cells, is known as

(1)

☒ **A** an organ

☒ **B** an organ system

☒ **C** an organism

☒ **D** a tissue

(ii) In humans, each mature red blood cell does not have a nucleus.

Suggest why not having a nucleus in a red blood cell is an advantage.

(2)

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Q18.

(i) Complete the word equation for aerobic respiration.

(1)

oxygen + glucose ⟶ ..... + ...

(ii) Explain why oxygen uptake increases as an athlete runs at faster speeds.

(2)

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(iii) When athletes train hard they can respire anaerobically.

Which of the following statements about anaerobic respiration are true?

1. Lactic acid and carbon dioxide are produced.

2. Lactic acid can build up causing cramp.

Put a cross (☒) in the box next to your answer.

(1)

☒ **A** statement 1 only

☒ **B** statement 2 only

☒ **C** both statement 1 and 2

☒ **D** neither statement 1 nor 2.

Q19.

The heart rate and stroke volume of an athlete training at a high intensity were measured and their cardiac output was calculated.

The table shows the measurements before, after 2 weeks and after 4 weeks of training.

	heart rate / beats per minute	stroke volume / dm^3	cardiac output / dm^3 per minute
Before training	142	0.08	11.4
After 2 weeks training	164	0.10	16.4
After 4 weeks training		0.12	24.0

(i) Calculate the heart rate after 4 weeks of training.

(2)

..... beats per minute

(ii) Explain how the higher cardiac output after 4 weeks of training increased the rate of aerobic respiration.

(2)

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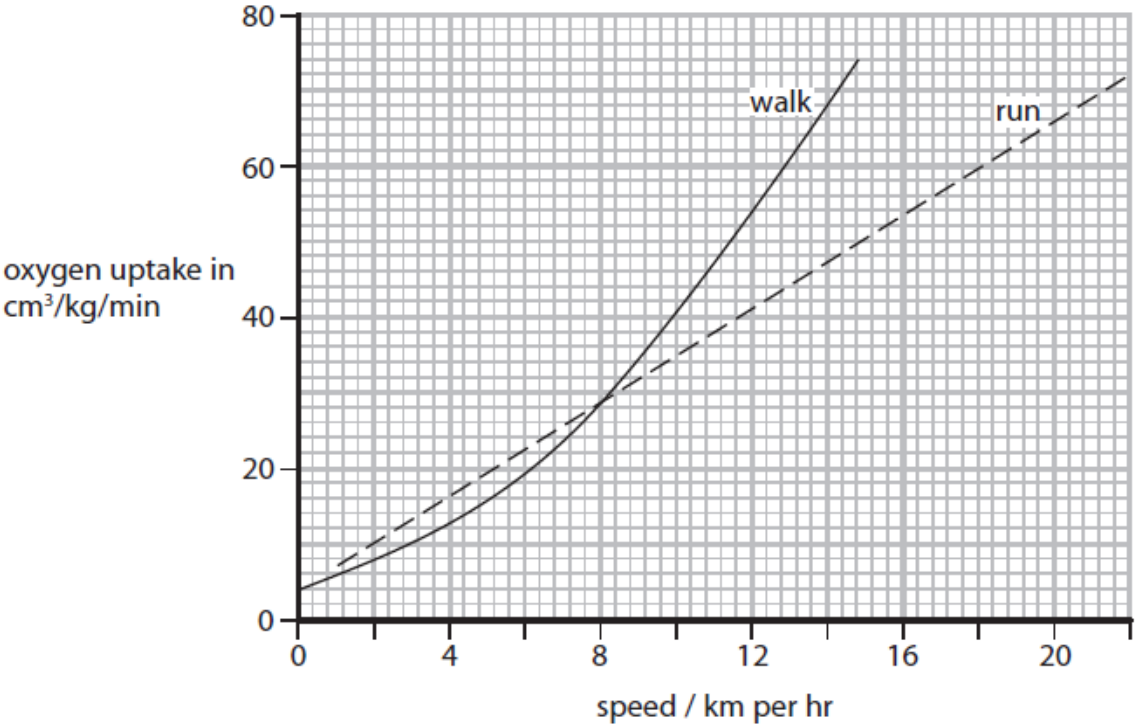
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Q20.

The graph shows the oxygen uptake for an athlete when walking and running.



Compare the oxygen uptake when the athlete is walking and running at speeds from 6 to 10 km per hour.

(3)

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Q21.

Figure 4 shows a peak flow meter.

A peak flow meter is used to measure the rate at which air is blown out of the lungs.



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Figure 4

To use a peak flow meter a person takes a deep breath and exhales the air as hard and as fast as possible into the peak flow meter.

People with asthma can have a reduced peak flow.

A student investigated the peak flow of five people with asthma and five people without asthma.

All the people were male and the same age.

Give **two** other factors the student should control when selecting the people for this investigation.

(2)

1 .....

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2 .....

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(Total for question = 2 marks)

Q22.

A student investigated respiration in three different organisms.

Red hydrogencarbonate indicator was placed in each of three test tubes.

Gauze was placed in each test tube to hold the organisms.

In test tube 1 the student placed four germinating peas.

In test tube 2 the student placed four dried peas.

In test tube 3 the student placed four mealworms.

Bungs were added to each of the test tubes.

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The equipment used is shown in Figure 3.

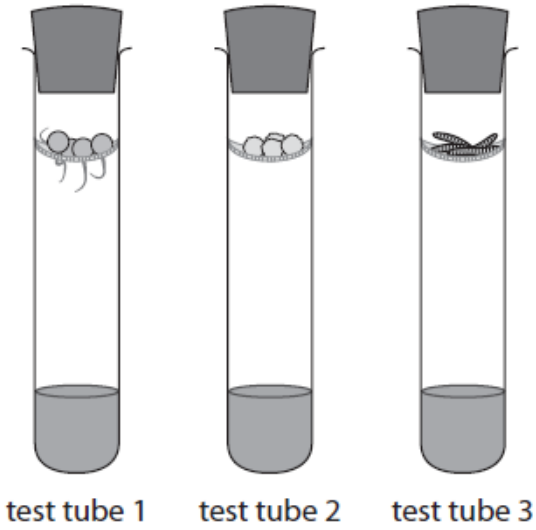


Figure 3

(i) State **two** ways this method could be improved to make the results for these three organisms more comparable.

(2)

1 .....

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2 .....

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(ii) Describe a suitable control for this investigation.

(2)

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(Total for question = 4 marks)

Q23.

Figure 4 shows a cross-section of an artery and a vein.



(Source: © The University of Kansas Medical Center)

Figure 4

(i) Explain **one** difference between the artery wall and the vein wall shown in Figure 4.

(2)

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(ii) Name **one** structure that is found in veins but not found in arteries.

(1)

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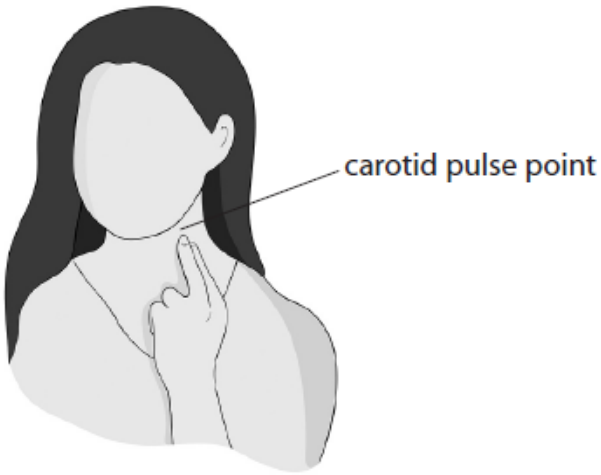
(Total for question = 3 marks)

Q24.

The effect of different types of exercise on the heart rate of an athlete was investigated.

The athlete counted the number of beats in 10 seconds at the carotid artery pulse point, as shown in Figure 12.

This measurement was used to calculate the heart rate.



(Source: © dityazemli/Shutterstock)

Figure 12

The athlete exercised for 20 minutes.

The heart rate was recorded every 5 minutes during each type of exercise.

(i) State how the heart rate was calculated using this method.

(1)

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(ii) Give **two** ways of improving the method used to obtain the data needed to calculate the heart rate.

(2)

1 .....

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2 .....

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Figure 13 shows the results of this investigation.

type of exercise	heart rate in bpm				
	0 minutes	5 minutes	10 minutes	15 minutes	20 minutes
running	90	156	168	180	180
walking	90	96	90	96	90

Figure 13

(iii) Comment on the difference in the heart rates during these types of exercise.

(3)

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(Total for question = 6 marks)