

Name of the Student: _____

Max. Marks : 21 Marks

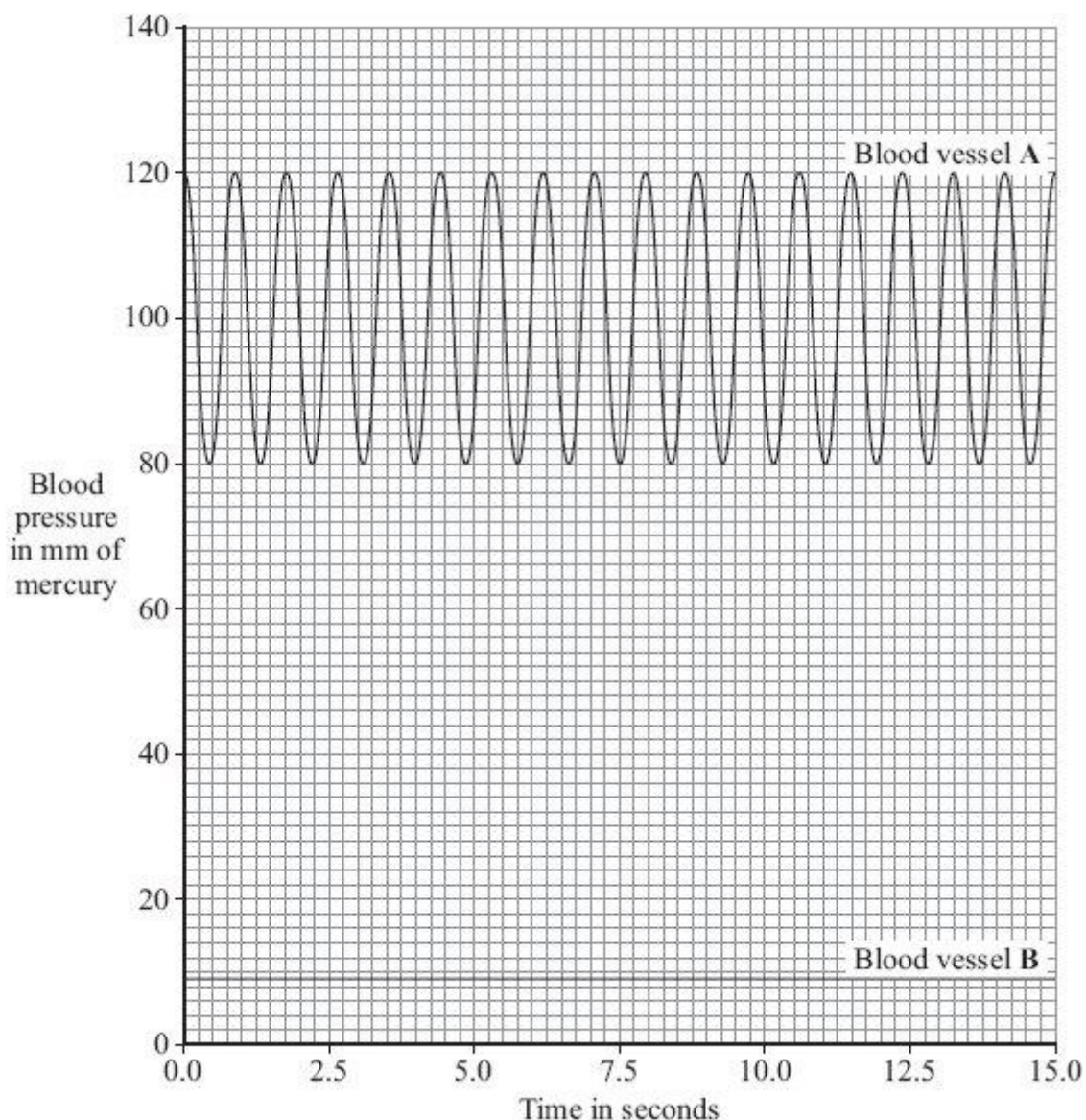
Time : 21 Minutes

Q1.

The heart pumps blood around the body. This causes blood to leave the heart at high pressure.

The graph shows blood pressure measurements for a person at rest.

The blood pressure was measured in an artery and in a vein.



(a) Which blood vessel, **A** or **B**, is the artery?

Blood vessel _____

Give **two** reasons for your answer.

Reason 1 _____

Reason 2 _____

(2)

(b) Use information from the graph to answer these questions.

(i) How many times did the heart beat in 15 seconds? _____

(1)

(ii) Use your answer from part (b)(i) to calculate the person's heart rate per minute.

Heart rate = _____ beats per minute

(1)

(c) During exercise, the heart rate increases. This supplies useful substances to the muscles and removes waste materials from the muscles at a faster rate.

(i) Name **two** useful substances that must be supplied to the muscles at a faster rate during exercise.

1. _____

2. _____

(2)

(ii) Name **one** waste substance that must be removed from the muscles at a faster rate during exercise.

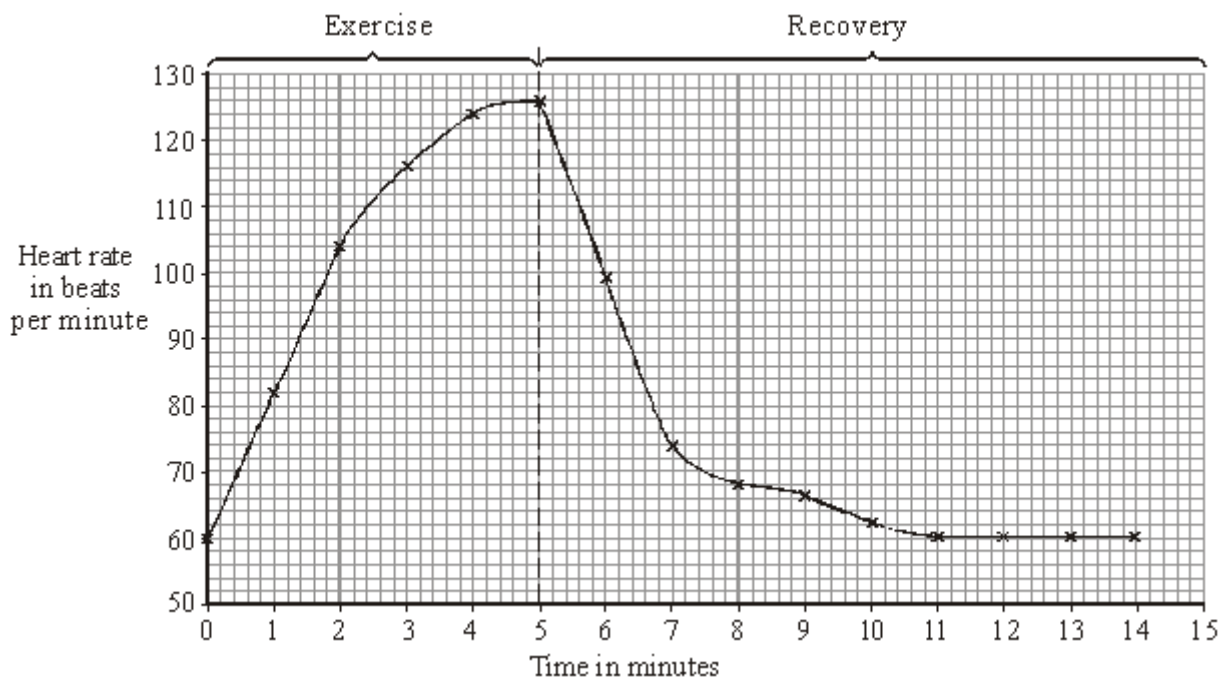
(1)

(Total 7 marks)

Q2.

A student pedalled an exercise cycle at constant speed for 5 minutes. The student's heart rate was recorded at one-minute intervals during the exercise and also during recovery.

The results are shown in the graph.



- (a) Describe, in as much detail as you can, the changes in heart rate between 0 and 14 minutes.

(3)

- (b) How do arteries supplying the leg muscles alter the rate of blood flow through them during exercise?

(1)

- (c) Explain how an increase in heart rate helped the student during exercise.

(4)
(Total 8 marks)

Q3.

A popular diet book claims that a low-carbohydrate diet results in quicker weight loss and a more healthy body than a low-fat diet.

Scientists carried out an investigation to see if this claim is true.

- They used 120 overweight volunteers divided into two equal groups.
- **Group 1** was given a diet containing less than 20 g of carbohydrate per day.
- **Group 2** was given a low-fat diet. This contained less than 30% of energy from fat and less than 300 mg of cholesterol per day.
- Both groups were given the same exercise programmes and a weekly information meeting.
- Both groups were allowed only 2000 kilocalories per day.

The results after 24 weeks are shown in the table.

	Group 1 Low-carbohydrate diet	Group 2 Low-fat diet
Proportion of volunteers who completed the trial	76%	57%
Mean change in body mass	-12.9%	-6.7%
Mean change in body fat mass	-9.4 kg	-4.8 kg
Mean change in blood HDL concentration	+55 mg per litre	-16 mg per litre
Mean change in blood LDL concentration	+16 mg per litre	-74 mg per litre

(a) What was the independent variable in this investigation?

(1)

(b) Give **one** variable that the scientists tried to control in this investigation.

(1)

(c) Give **two** ways in which the method used by the scientists could have led to unreliable data.

1. _____

2. _____

(2)

(d) Does the data support the claim in the book?

Draw a ring around your answer. **Yes / No**

Give **two** reasons for your answer.

1. _____

2. _____

(2)

(Total 6 marks)