**1.** (a) Describe how the heart beat is maintained when a person is at rest

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(5)

(b) When a person undergoes exercise, the heart responds by beating faster. Describe how this increase in heart rate is brought about.

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(4)

(c) During vigorous exercise the limb muscles respire both aerobically and anaerobically.

Contrast aerobic respiration and anaerobic respiration in terms of the end products and the amount of energy released.

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(3)

(d) A person may suffer from muscle fatigue during a period of exercise.

Explain what causes muscle fatigue.

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(2)

(Total 14 marks)

**2.** The diagram shows a mammalian heart. Structures **A** and **B** are involved in coordinating the heart beat.



(a) Name structures **A** and **B**.

**A** ..........................................

**B** ..........................................

(2)

(b) Describe the role of structure **A** in coordinating the heart beat.

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(2)

(c) The graph shows the changes in pressure which take place in the left side of the heart.



(i) Use the graph to calculate the heart rate in beats per minute. Show your working.

Answer ..............................

(2)

(ii) The atrioventricular valve closes at 0.1 seconds.  
Explain the evidence from the graph which supports this statement.

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(1)

(d) The blood pressure in the aorta is higher than in the pulmonary artery.  
Explain what causes the blood pressure in the aorta to be higher.

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(1)

(Total 8 marks)