Name of the Student:_____
Max. Marks : 20 Marks **Time : 20 Minutes**

Q1.

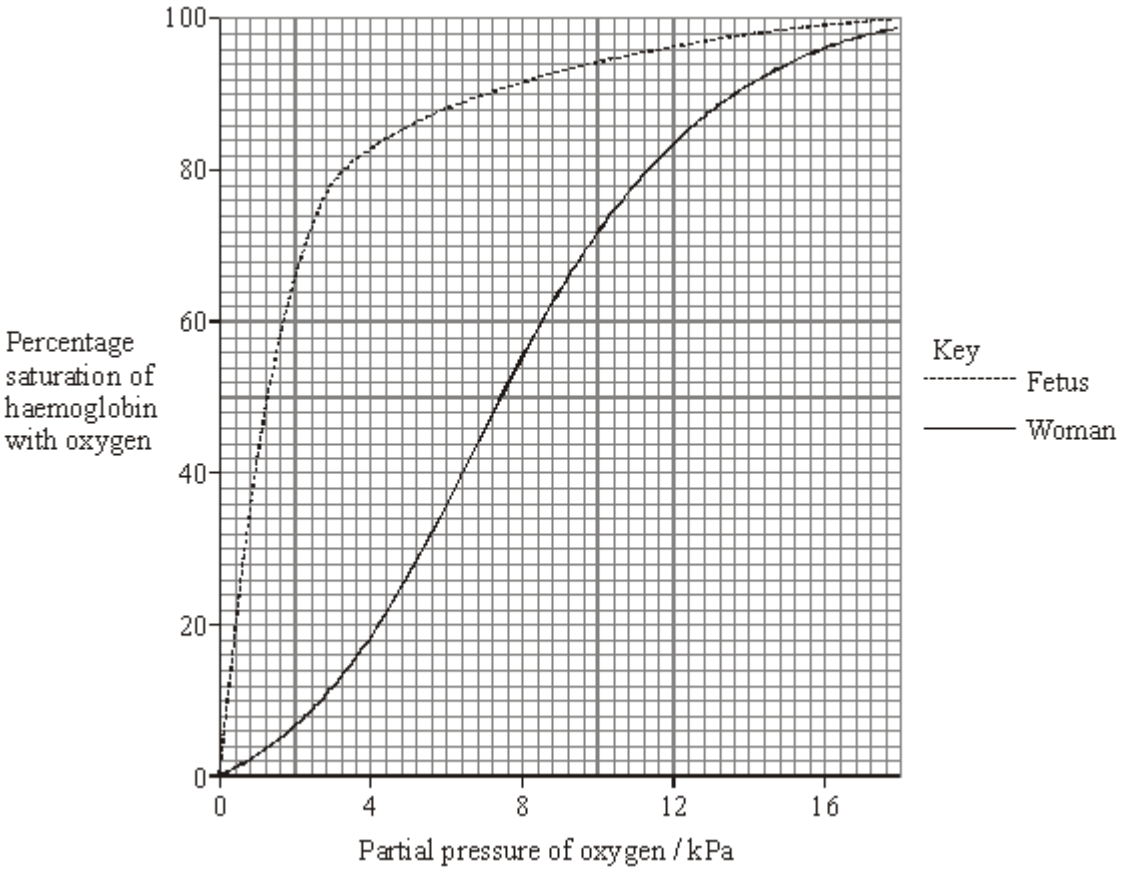
(a) Gas exchange in a fetus occurs across the placenta. Explain why it is important to maintain a supply of blood to the lungs of the fetus, even when they are not being used for gas exchange.

_____

_____

(1)

(b) The oxygen haemoglobin dissociation curves for a woman and her fetus are shown in the graph.



(i) Use the graph to find the difference between the percentage saturation of haemoglobin in the blood of the woman and the fetus when the partial pressure of oxygen in the placenta is 4 kPa.

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Answer _____

(1)

(ii) Explain how efficient gas exchange is ensured by the dissociation curve for the fetus being to the left of the dissociation curve for the woman.

_____

_____

_____

_____

(2)

(Total 4 marks)

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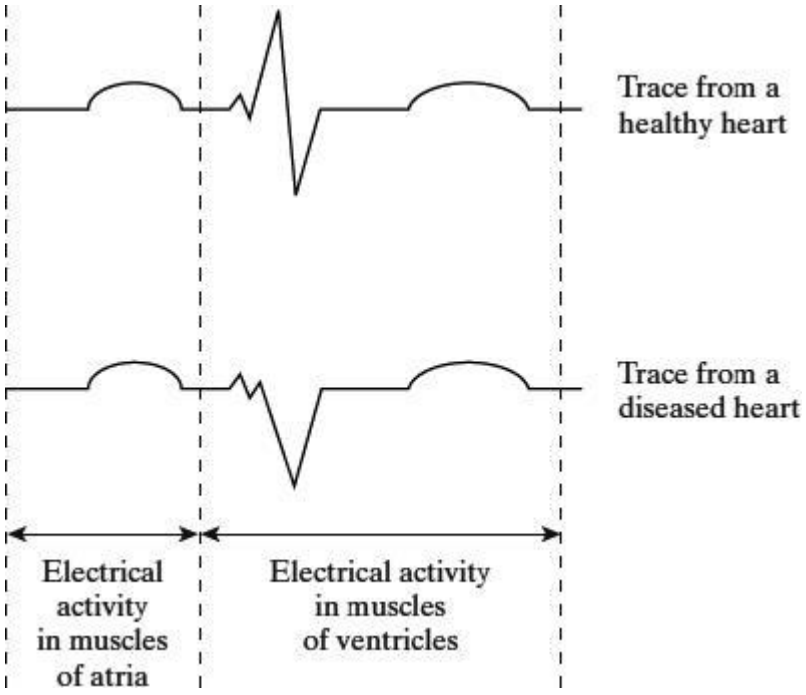
Q2.

(a) A woman takes moderate exercise. Explain what causes her heart rate to increase while she exercises.

(6)

(b) An electrocardiogram (ECG) measures the electrical changes occurring in cardiac muscle as a heart is beating. An ECG trace for a healthy person and an ECG trace for a person suffering from heart disease are shown.



(i) Describe the route taken when electrical impulses are transmitted from the sinoatrial node to the muscles of the ventricles in a healthy heart.

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_____

_____

_____

(2)

(ii) Explain how information from these ECG traces suggests that the damage caused to the diseased heart is unlikely to have affected the sinoatrial node.

_____

_____

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(2)

(Total 10 marks)

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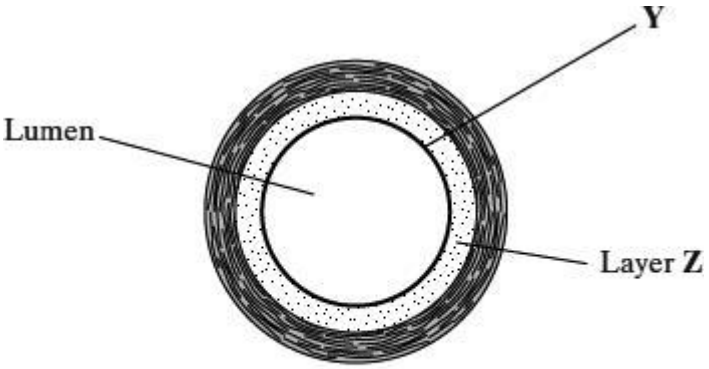
Q3.

The diagram shows a cross-section of an artery.



Magnification × 10

(a) Name the layer labelled **Y**.

_____

(1)

(b) Layer **Z** contains a high proportion of elastic tissue.

Describe the advantage of having elastic tissue in the wall of an artery.

_____

_____

_____

_____

(2)

(c) Calculate the cross-sectional area of the lumen of the artery shown in the diagram. Show your working.

The area of a circle is given by πr^2, where r is the radius of a circle ($\pi = 3.14$).

Answer _____ mm^2

(3)

(Total 6 marks)

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