

Q1. An ECG trace is to be obtained for a healthy patient. Describe the procedure involved to ensure that a good trace is obtained. Your answer should include reference to:

- connections to the body
- how unwanted signals are avoided
- some properties of the amplifier used.

The quality of your written communication will be assessed in your answer.

(Total 6 marks)

Q2. (a) Sketch a graph of the ECG trace for a healthy heart. Label each axis with appropriate units and scales.



(4)

(b) When obtaining such a trace, electrodes are attached to the patient. State and explain **two** precautions which should be taken when attaching the electrodes to ensure reception of the best signal.

precaution 1:

.....
.....

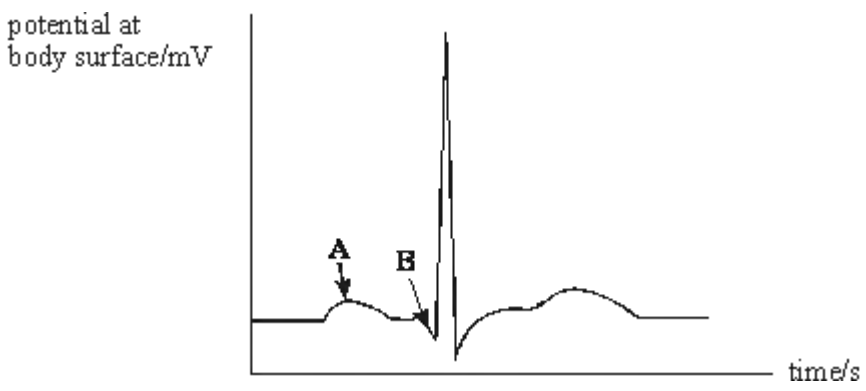
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precaution 2:

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(2)
(Total 6 marks)

Q3. Electrodes are placed on the surface of a body to record an ECG trace for a healthy person.
The trace obtained for one heartbeat is shown.



- (a) (i) Label approximate scales on each axis.
- (ii) State what electrical event happens at points **A** and **B** and the physical change that results.

Position **A**:
electrical event

.....
 physical change

.....

Position **B**:
 electrical event

physical change

.....

(6)

(b) State, giving a reason, **one** precaution you would take when attaching the electrodes to the surface of the skin to ensure a good signal is obtained.

.....

(2)

(c) The amplifier used must have a high gain. State **two** other properties of the amplifier.

property 1

property 2

.....

(2)

(Total 10 marks)

Q4.Electrodes are attached to the chest of a healthy person and a normal ECG waveform is obtained.

(a) State **two** ways of ensuring good electrical contact between the electrodes and the person.

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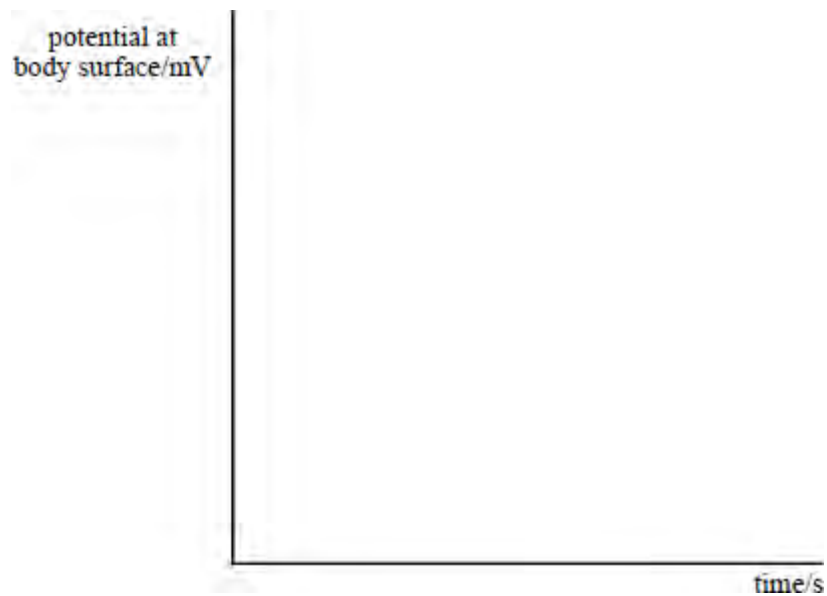
(2)

- (b) State **two** properties of the amplifier needed to amplify the signal from the electrodes.

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(2)

- (c) Sketch, on the axes below, the waveform that you would expect to obtain. Label the axes with appropriate scales.

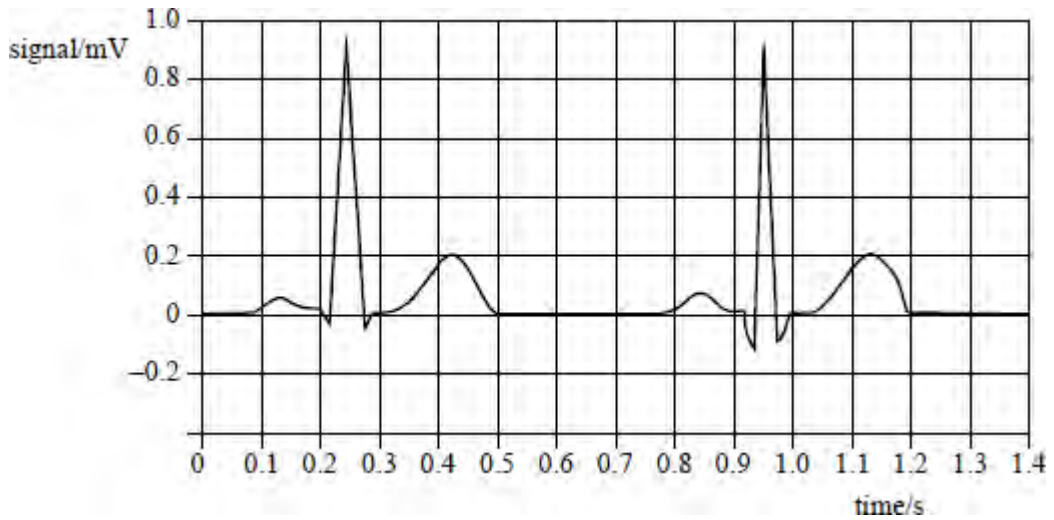


Mark on the waveform where the following occur:

- (i) atrial depolarisation
- (ii) ventricular depolarisation
- (iii) ventricular repolarisation.

(5)
(Total 9 marks)

Q5.



The graph above shows a normal electrocardiogram (ECG) signal obtained at the surface of the skin of a patient.

(a) What is the amplitude of the main pulse in the signal?

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(1)

(b) Find the period of the heart beat and from it calculate the pulse rate per minute.

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

(2)

(c) What changes would you expect to see in the electrocardiogram if the patient began to take exercise?

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

(2)

(d) On the graph, label with a P the points where atrial contraction occurs and with a Q

the points where ventricular contraction starts.

(2)
(Total 7 marks)