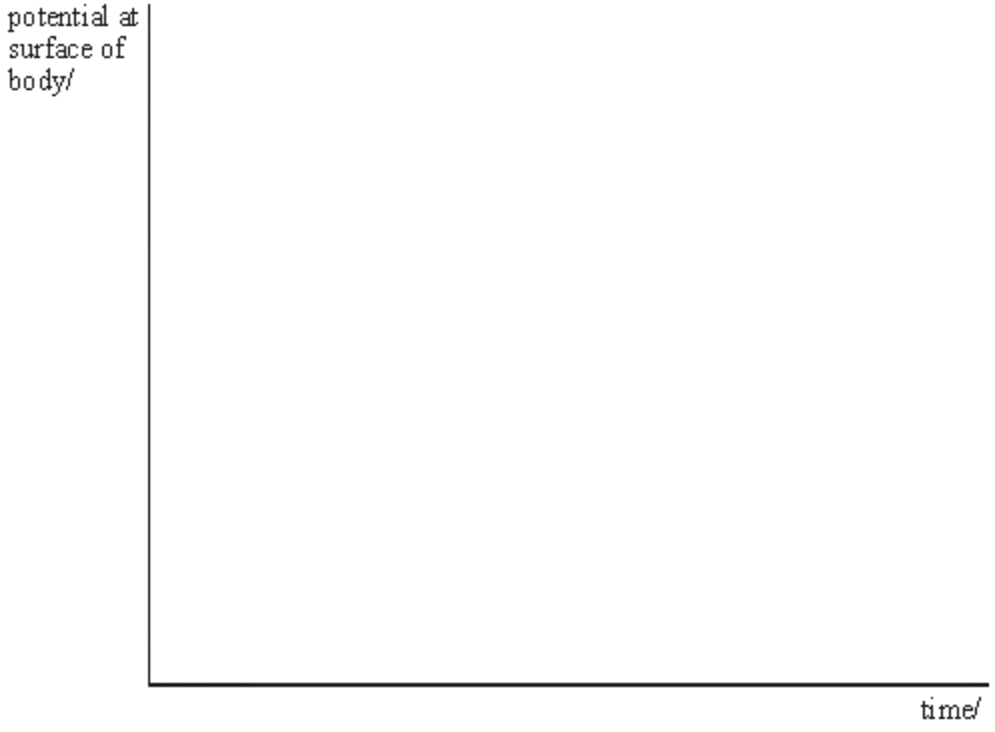
Q1. An ECG trace is to be obtained for a healthy patient. Describe the procedure involved to ensure that a good trace is obtained. Your answer should include reference to:

- 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:

.....

.....

.....

.....

precaution 2:

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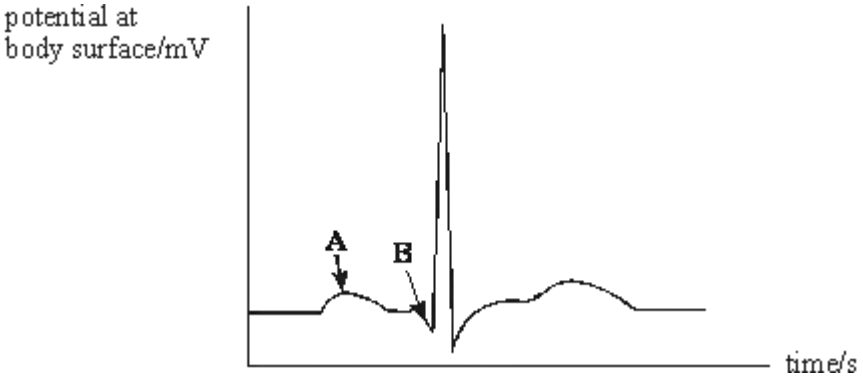
(2)
(Total 6 marks)

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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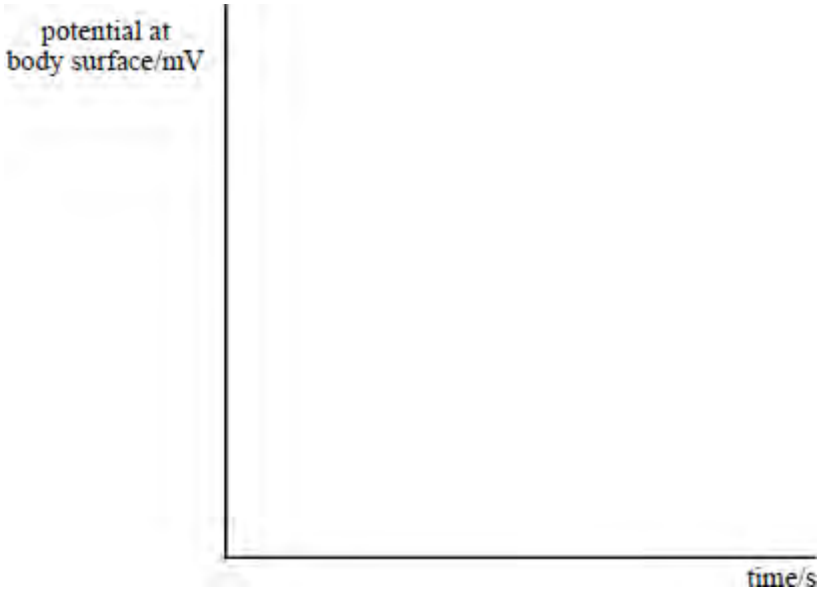
(2)

(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:

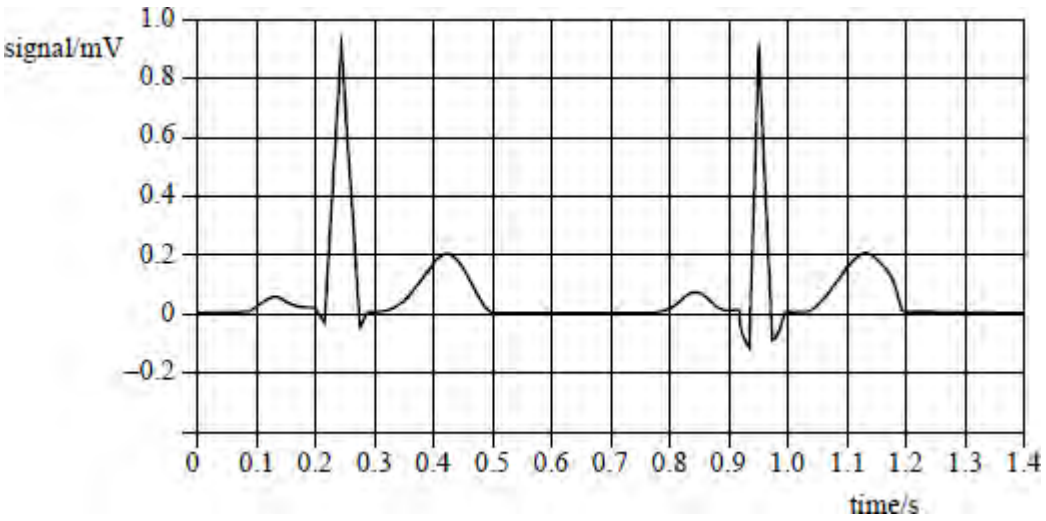
(i) atrial depolarisation

(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.

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(2)

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

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(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)