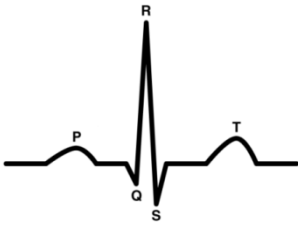
1. A normal electrocardiogram is shown below with key features labelled with the letters P, Q, R, S and T.



Complete the table below to indicate what is happening in the heart at each stage in terms of the heart muscle and the blood flow.

	PQ	**RST**
Muscle		
Blood flow		

2. Yong weighs 80 kg, breathes in 1 L/min oxygen and breaths out 700 mL/min. The level of oxygen in his venous system is 150 mL/L and 180 mL/L in the arterial system.

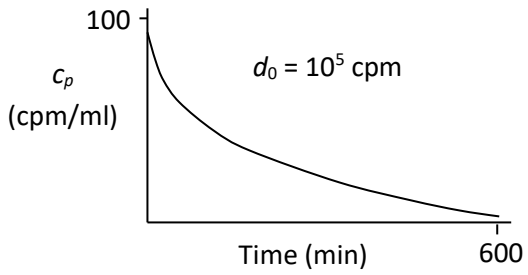
   (a) How much ATP does Yong produce per minute per kg body tissue if 20 % of the oxygen is used for respiration and only 35 % of the tissue mass contains respiring cells? [11 marks]

   (b) How many mars bars should Yong eat per day to sustain his ATP requirements? [5 marks]

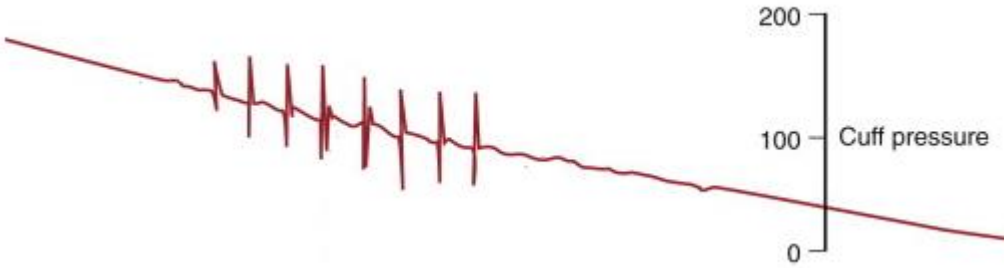
Assume that haematocrit is 45 %, that red blood cells, which can be approximated by a cylinder 8 µm in diameter and 2µm high, are composed entirely of haemoglobin which has a specific density of 1.25 and a molecular mass of 65000 Da and carries 4 oxygen molecules per molecule of haemoglobin. Assume the molecular mass of ATP is 550 Da. Assume a mars bar is 60 g and is composed entirely of glucose. Useful equation:

$$CO = \frac{V\ O_2}{[O_2]_{pv} - [O_2]_{pa}}$$

3. In the indicator dilution method for determining glomerular filtration rate, GFR, an amount, d_0, of an "ideal" indicator or tracer is injected intravenously and the concentration of the tracer in plasma, c_p(t), is measured as a function of time thereafter. The total clearance of the tracer is estimated from $K = \frac{d_o}{\int c_p(t)dt}$. Using the graph, estimate the clearance, *K*, of the tracer.



4. A patient's blood pressure trace is shown below by Korotkoff sounds and cuff pressure (mmHg) measurements:



The systolic pressure is in the approx. range of _____mmHg.

The diastolic pressure is in the approx. range of _____mmHg.

5. Put the following phases of gait in order:

Pre-swing, Terminal Stance, Loading response, Mid-standce, Initial swing, Initial contact, Terminal swing, Mid-swing