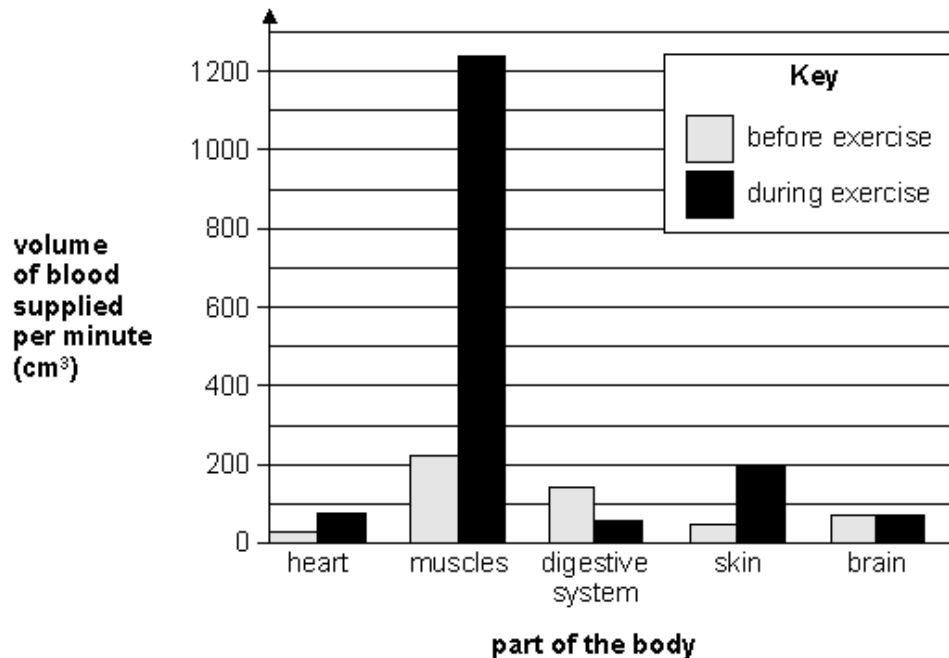


## SET 3 - Aiming for level 7-9 at GCSE

**Q1.** When people exercise, the volume of blood per minute needed to supply different parts of the body changes.

This is shown in the bar chart below.



- (a) Explain why muscles need **more** blood during exercise. Give **three** reasons.

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.....

3 marks

- (b) Look at the bar chart.  
Suggest why you should not go for a long run just after eating a meal.

.....

.....

1 mark

- (c) Why is it important that the blood supply to the brain stays constant?

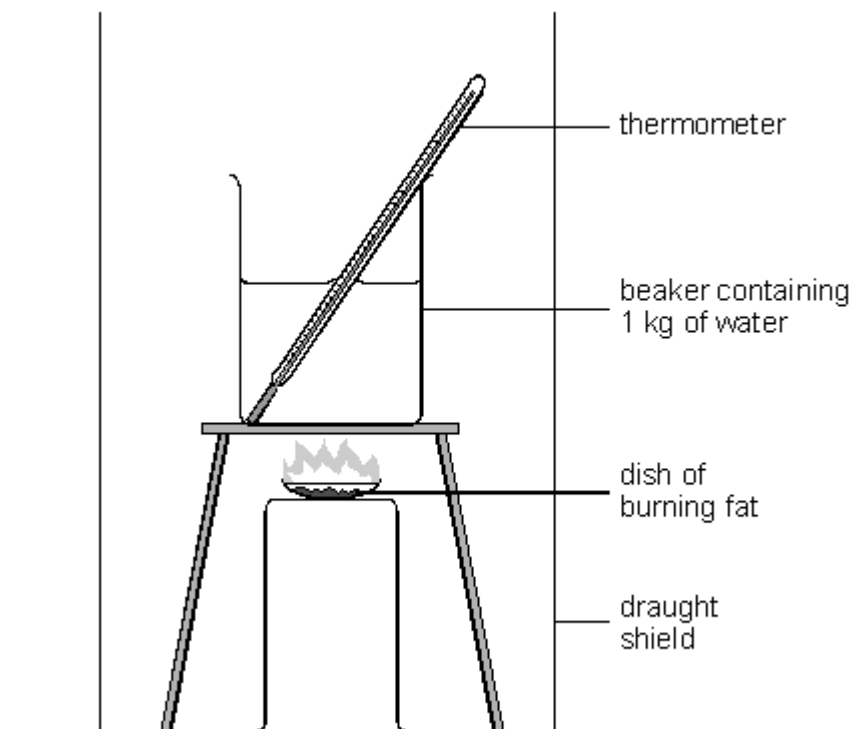
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1 mark  
maximum 5 marks

**Q2.**

- (a) Mammals use fat as a long-term store of energy.
- (i) The diagram shows some simple apparatus for investigating the amount of energy released by burning fat.



4.2 kJ of energy will raise the temperature of 1 kg of water by 1°C.  
1 g of fat contains 38.5 kJ of energy.

Calculate the rise in temperature of 1 kg of water if 0.5 g of fat is burned.  
Show your working.

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2 marks

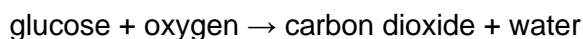
- (ii) Fat is stored in layers beneath the skin. This fat is part of the body's energy reserve. Give another function of the layers of fat.

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.....

1 mark

- (b) Mammals use glucose as a fuel in respiration in their cells. The word equation for respiration is:



Mammals with a high rate of respiration need to have a high heart rate.  
Explain why.

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2 marks  
Maximum 5 marks

### Q3.

The table gives the numbers of protons, neutrons and electrons in some atoms and ions of elements. The letters used in the table are **not** the chemical symbols of the elements.

atom or ion	protons	neutrons	electrons
J	16	16	16
L	10	10	10
M	11	12	11
Q	12	14	10
R	17	20	17
X	9	10	10
Z	17	18	17

Use this information to answer the following questions.  
Each letter can be used once, more than once or not at all.

- (a) Give the letters of:
- (i) **two** atoms of the same element; ..... and .....
  - (ii) a positive ion; .....
  - (iii) a negative ion; .....
  - (iv) an atom or ion which has a mass number of 20; .....
  - (v) an atom of a very reactive metal; .....

5 marks

- (b) How many electrons does an atom with an atomic number of 12 have?

.....

1 mark

- (c) (i) **X** is an ion. In which group of the periodic table is the element from which **X** is formed?

.....

1 mark

- (ii) From the table above, give the letter of another atom which reacts in a similar way to the element from which ion **X** is formed.

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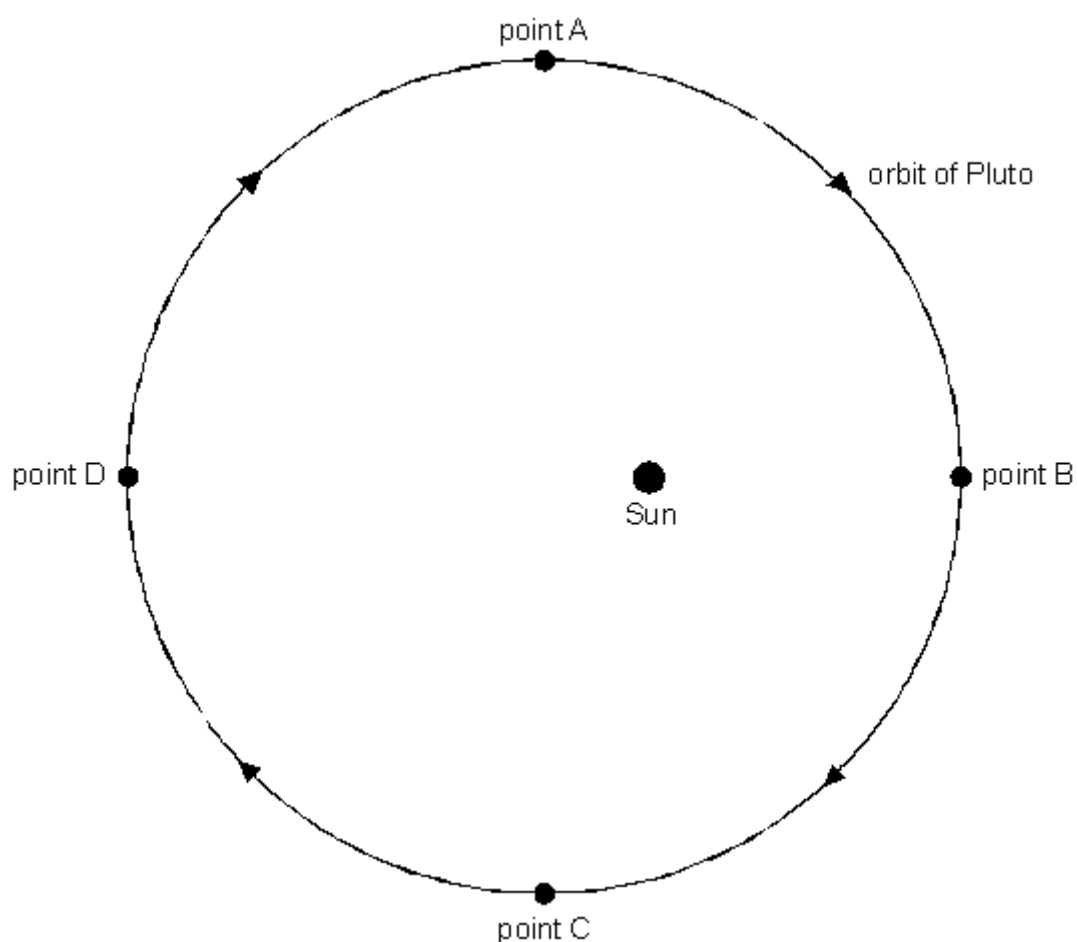
1 mark

Maximum 8 marks

#### Q4.

In our Solar System, Pluto is usually the furthest planet from the Sun.

The shape of its orbit is not quite a circle. The diagram shows the shape of Pluto's orbit and the position of the Sun.



- (a) Describe how the gravitational force of the Sun, acting on Pluto, alters as Pluto moves round its orbit through points A, B, C and D.  
Give reasons for your answers.

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3 marks

- (b) At which point, A, B, C or D, will Pluto have:

- (i) the most potential energy? Explain your answer.

..... because .....

.....

1 mark

- (ii) the most kinetic energy? Explain your answer.

..... because .....

.....

1 mark

Maximum 5 marks

