

Q1.

Write an essay on the topic below.

The importance of ions in metabolic processes

Q2.

The table below shows information about two types of medicine.

Name of medicine	Mass of medicine in one tablet / mg	Maximum dose of medicine an adult is allowed	Mass of sodium in one tablet / g
Aspirin	300	0.6 g every 4 hours	0.15
Paracetamol	500	1.0 g every 6 hours	0.43

- (a) A journalist studied the data in the above table. She made the following suggestion.

'If an adult takes the maximum number of tablets allowed for **either** of the medicines, then the person would have more than the RDA of sodium.'

The RDA (recommended daily allowance) of sodium for an adult human is 2.4 g per day.

Is the journalist's statement true for **both** of the medicines in the above table?

Use suitable calculations to support your answer.

Show your working.

(2)

Doctors investigated the link between high sodium concentrations in medicines and hypertension (high blood pressure).

They analysed medical records of patients. 1 292 337 of these patients had taken medicines containing high sodium concentrations. Each of these patients was paired with a patient from a control group.

- (b) Give **two** factors that should have been the same for each pair of patients and **one** factor that should have been different.

Same factor 1 _____

Same factor 2 _____

Different factor _____

(2)

- (c) Doctors found:

- 4.73% of the patients who had taken medicines containing high sodium concentrations suffered from hypertension
- there were 7.18 times fewer control patients with hypertension.

Calculate how many of the control patients had hypertension.

Show your working.

Answer _____ patients

(2)

- (d) A high concentration of sodium in the blood can affect blood volume and cause hypertension.

Use your knowledge of water potential to suggest how high sodium concentrations in the medicines taken could affect blood volume.

(3)

(Total 9 marks)

Q3.

(a) Describe the roles of iron ions, sodium ions, and phosphate ions in cells.

(5)