

Name of the Student: _____**Max. Marks : 28 Marks****Time : 28 Minutes****Q1.**

Bacteria and viruses can reproduce quickly inside the body and make us feel ill. These organisms may cause symptoms such as a high body temperature.

(a) How do bacteria and viruses make us feel ill?

(1)

Two common medicines are paracetamol and ibuprofen. These medicines help to reduce high body temperature.

Data was collected to find out whether paracetamol, ibuprofen or a combination of these two medicines was the best to reduce high body temperature in children.

Children who were ill with high body temperatures were identified at doctors' surgeries.

These children were put into three treatment groups:

Group 1: given paracetamol only

Group 2: given ibuprofen only

Group 3: given a combination of paracetamol and ibuprofen

The children in each group were matched for age and gender.

There were 50 children in each group.

The table below shows how often the medicines were given to the children in each group. The doses were as directed by the manufacturers.

	Time in hours						
	0	2	4	6	8	10	12
Group 1: Paracetamol only	P		P		P		P
Group 2: Ibuprofen only	I			I			I
Group 3: Paracetamol and ibuprofen	P&I		P	I	P		P&I

Key: P = paracetamol only
 I = ibuprofen only

P&I = paracetamol and ibuprofen

- (b) This investigation would have been improved if a fourth group of children had been included.

- (i) The children in each group were matched for age and gender.

Suggest **one** other factor the children should have been matched for to make this investigation valid.

(1)

- (ii) What would the children in the fourth group have been given?

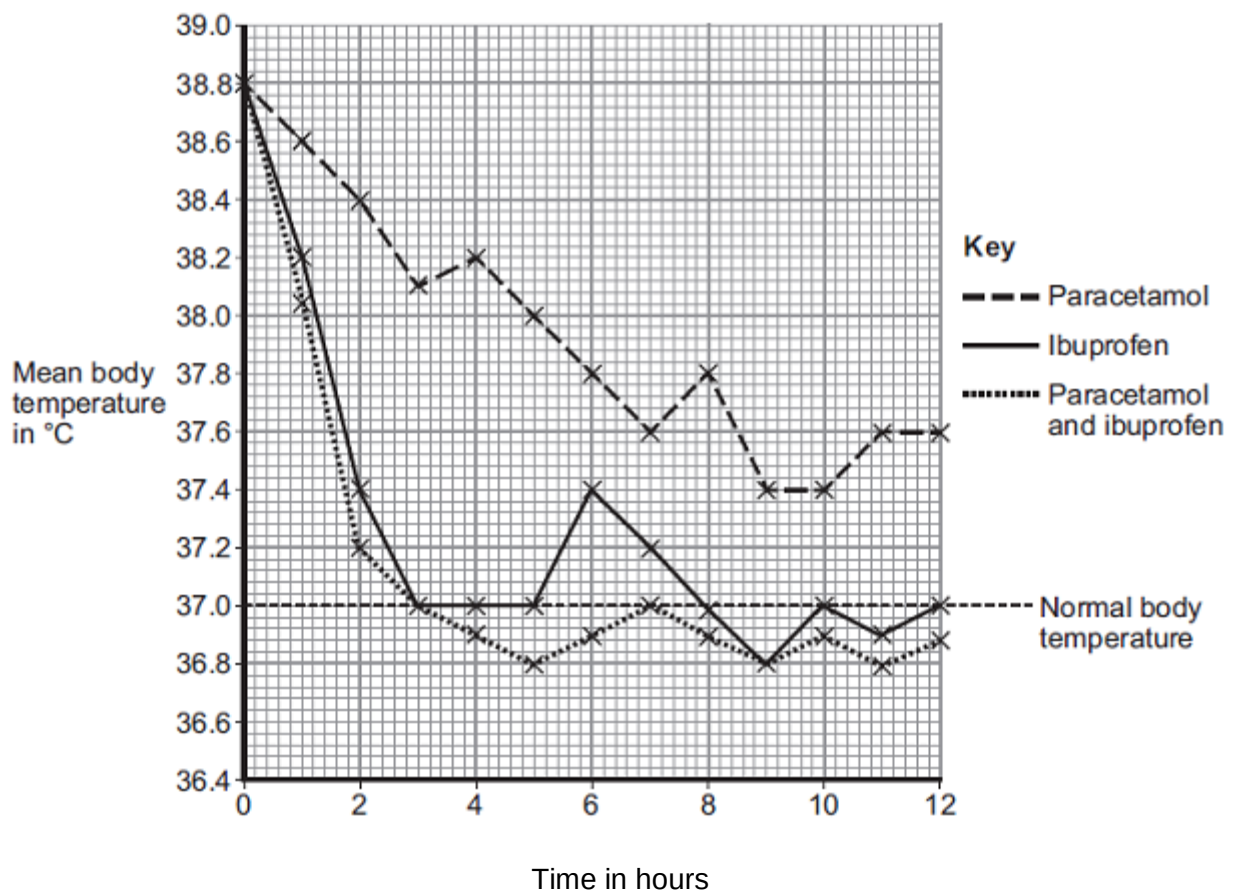
(1)

- (iii) Suggest why this would have improved the investigation.

(1)

- (c) The children's body temperatures were measured before any medicine was given and every hour after treatment started.

The mean body temperatures for each of the three groups are shown in the figure below.



- (i) What was the difference in mean body temperature after 4 hours between the group

taking paracetamol only and the group taking ibuprofen only?

_____ °C

(1)

- (ii) How many more hours did the mean body temperature stay normal or below normal, when taking both paracetamol and ibuprofen compared to taking ibuprofen only?

_____ hours

(1)

- (d) Doctors and nurses usually advise parents to give ibuprofen to children with a high body temperature.

Complete the sentences to suggest reasons why giving only ibuprofen might be better than giving only paracetamol or a combination of paracetamol and ibuprofen. You should use information from the table and the figure.

- (i) Giving ibuprofen might be better than giving paracetamol because _____

(2)

- (ii) Giving only ibuprofen might be better than giving a combination of paracetamol and ibuprofen because _____

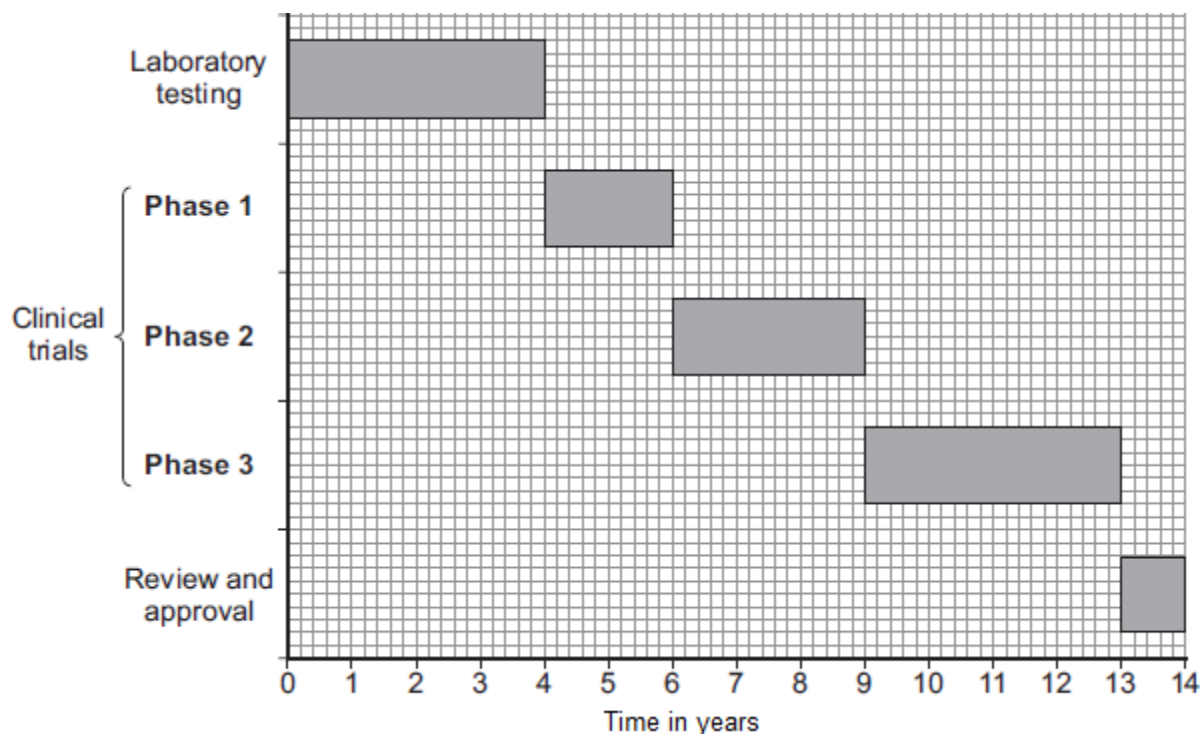
(2)

(Total 10 marks)

Q2.

New drugs have to be tested before they can be sold.

The graph shows how much time the different stages of testing took for a new drug.



- (a) (i) How much more time did the clinical trials take than the laboratory testing?

_____ years

(1)

- (ii) Apart from the time taken, what other difference is there between laboratory testing and clinical trials?

(1)

- (b) (i) During **Phase 1** clinical trials, the drug is tested on healthy volunteers using low doses.

Suggest why **only** healthy volunteers and **only** low doses are used at this stage of drug testing.

(2)

(ii) In **Phase 2** and **Phase 3** clinical trials, a double blind trial is usually done.

Explain what a double blind trial is and why a double blind trial is good practice.

(3)

(Total 7 marks)

Q3.

MRSA is a strain of bacterium that developed due to a mutation.

MRSA is difficult to treat so has led to high numbers of infections in hospital patients.

Explain why.

(Total 4 marks)

Q4.

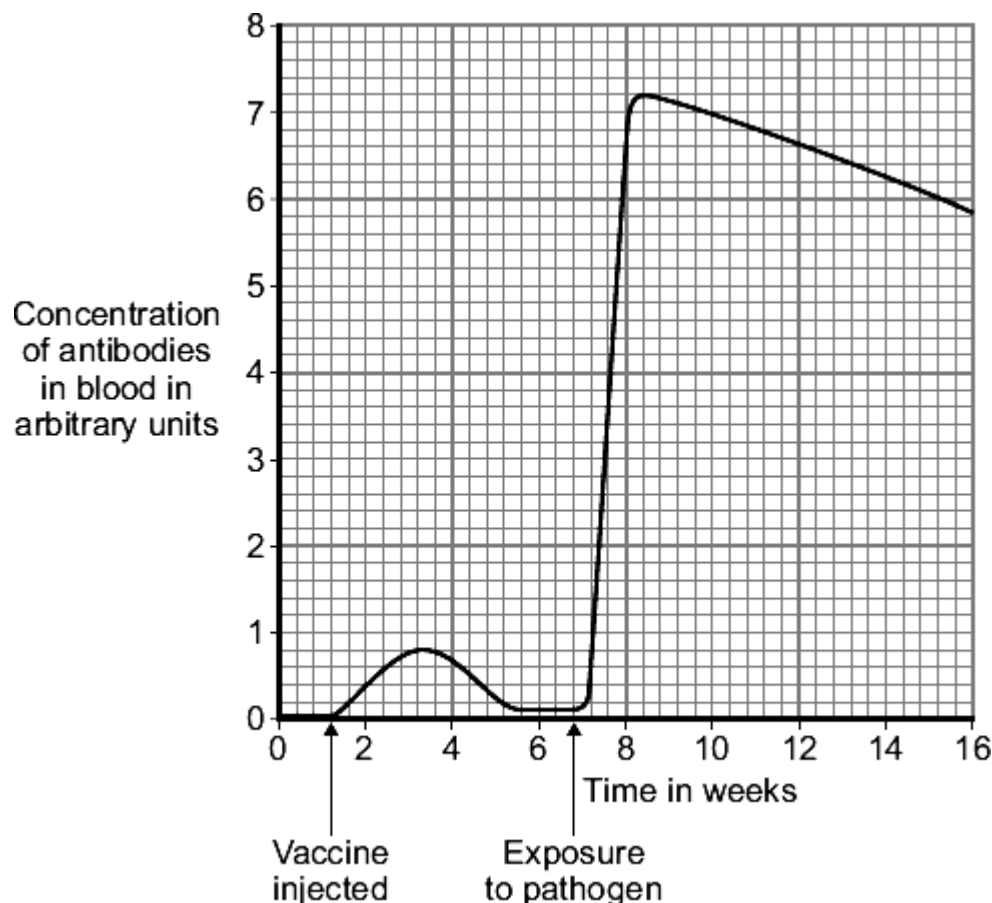
People can be immunised against a pathogen by injecting them with a vaccine.

- (a) What does a vaccine contain?

(1)

- (b) A person was injected with a vaccine. A few weeks later the person was exposed to the pathogen they had been immunised against.

The graph shows how the concentration of antibodies in the blood changed after injection of the vaccine and after exposure to the pathogen.



- (i) Describe in detail the differences between antibody production after the injection of the vaccine **and** after the person was exposed to the pathogen.

(3)

- (ii) Suggest an explanation for the differences you have described in part (b)(i).

(3)

(Total 7 marks)