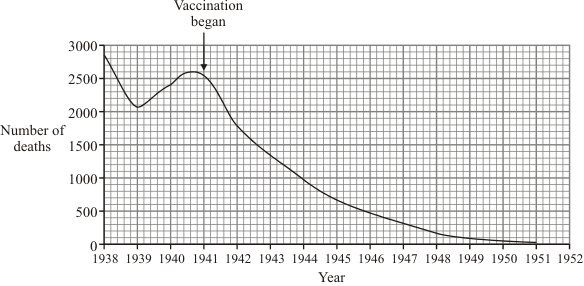
B1 Revision Pack 6

**Q1.**          Diphtheria is a disease of the human breathing system. The graph shows the number of deaths from diphtheria in the United Kingdom between 1938 and 1951. Vaccination against diphtheria was begun in 1941.



(a)     What evidence in the graph suggests that vaccination protects people from diphtheria?

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**(1)**

(b)     Complete the passage by choosing the correct words from the box.

|  |
| --- |
| **antibodies                    bacteria                    platelets**  **red blood cells                    white blood cells** |

          During vaccination, harmless ................................................ are injected into the body.

          This causes ........................................... to make ............................................ which help

          to protect the body against diphtheria.

**(3)**

**(Total 4 marks)**

**Q2.**          Pathogens can enter the body and cause disease.

(a)     (i)      Name **one** type of medicine which kills bacteria in the body.

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**(1)**

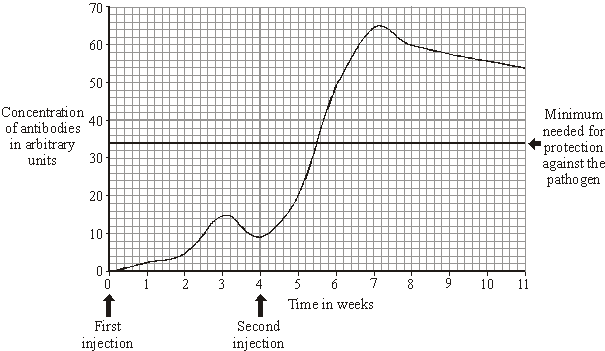
(ii)     Name **one** type of medicine which helps to relieve the symptoms of infectious disease.

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**(1)**

(b)     Vaccination protects us from pathogens.

          The graph shows the concentration of antibodies in the blood of a person after two injections of vaccine given four weeks apart.



(i)      How long after the first injection did it take for the concentration of antibodies to reach the minimum level for protection against the pathogen?

..................................... weeks

**(1)**

(ii)     Describe what happened to the concentration of antibodies in the blood from week 0 to week 7.

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**(3)**

(iii)     Would you expect the concentration of antibodies to stay above the level needed for protection against the pathogen over the next ten years?

Draw a ring around your answer.        **Yes / No**

Give a reason for your answer.

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**(1)**

**(Total 7 marks)**

**Q3.**White blood cells protect the body against pathogens such as bacteria and viruses.

(a)     (i)      Pathogens make us feel ill.

Give **one** reason why.

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**(1)**

(ii)     White blood cells produce antibodies. This is one way white blood cells protect us against pathogens.

Give **two** other ways that white blood cells protect us against pathogens.

1.............................................................................................................

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2.............................................................................................................

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**(2)**

(b)     Vaccination can protect us from the diseases pathogens cause.

(i)      One type of virus causes measles.

A doctor vaccinates a child against measles.

What does the doctor inject into the child to make the child immune to measles?

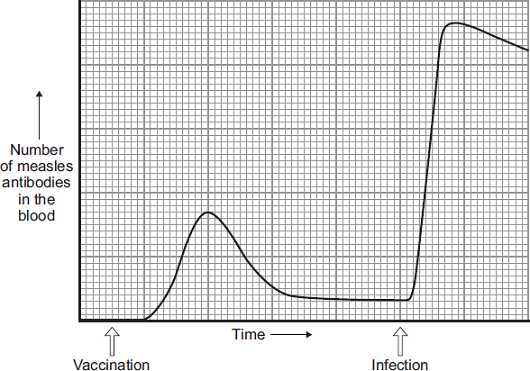
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(ii)     A few weeks after the vaccination, the child becomes infected with measles viruses from another person.

The graph shows the number of measles antibodies in the child’s blood from before the vaccination until after the infection.



More measles antibodies are produced after the infection than after the vaccination.

Describe other differences in antibody production after infection compared with after vaccination.

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(iii)    Vaccination against the measles virus will **not** protect the child against the rubella virus.

Why?

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**(1)**

(c)     What is the advantage of vaccinating a large proportion of the population against measles?

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**(1)**

**(Total 10 marks)**

**Q4.**         People may be immunised against diseases using vaccines.

(a)     (i)      Which part of the vaccine stimulates the body’s defence system?

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...............................................................................................................**(2)**

(ii)      A person has been vaccinated against measles. The person ccmes in contact with the measles pathogen. The person does **not** catch measles.

Explain why.

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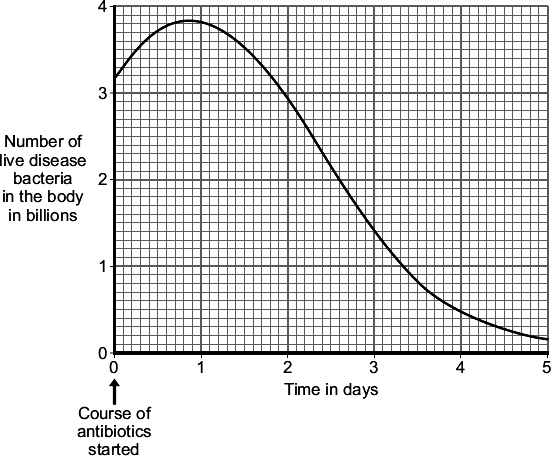
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...............................................................................................................**(3)**

(b)      A man catches a disease. The man has **not** been immunised against this disease. A doctor gives the man a course of antibiotics.

The graph shows how the number of live disease bacteria in the body changes when the man is taking the antibiotics.



(i)      Four days after starting the course of antibiotics the man feels well again.  
It is important that the man does **not** stop taking the antibiotics.

Explain why. Use information from the graph.

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(ii)      Occasionally a new, resistant strain of a pathogen appears.

The new strain may spread rapidly. Explain why.

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**(3)**

**(Total 10 marks)**

**Q5.**In 2014 there was an outbreak of Ebola virus disease (EVD) in Africa.

At the time of the outbreak there were:

•        no drugs to treat the disease

•        no vaccines to prevent infection.

(a)     By March 2015 there were an estimated 9 850 deaths worldwide from EVD.

The number of deaths is an estimate.

Suggest why it is an estimate rather than an exact number.

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........................................................................................................................(1)

(b)     Why were antibiotics **not** used to treat EVD?

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(c)     After the outbreak began, drug companies started to develop drugs and vaccines for EVD.

A drug has to be thoroughly tested and trialled before it is licensed for use.

Testing, trialling and licensing new drugs usually takes several years.

Draw **one** line from each word about drug testing to the definition of the word.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Word about drug testing** |  | **Definition** |

|  |  |  |  |
| --- | --- | --- | --- |
|  | Dose |  | Side effects making the person ill |
|  |  |  |  |
|  | Efficacy |  | The concentration of the drug to be used and how often the drug should be given |
|  |  |  |  |
|  | Toxicity |  | Whether the drug works to treat the illness |

**(2)**

(d)     The results of drug testing and drug trials are studied in detail by other scientists.

Only then can the results be published by the drug company.

Suggest **one** reason why the results are studied by other scientists.

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........................................................................................................................(1)

(e)     The number of deaths from EVD continued to increase.

The World Health Organization (WHO) decided it was ethical to use unlicensed drugs.

The WHO said unlicensed drugs could only be given to people who gave their permission.

Also, any results had to be shared with other researchers and drug companies.

Some vaccines had shown positive results in animal testing, but the vaccines had not been tested and trialled in humans.

The supplies of the vaccine were low.

At first the vaccines were only used for health workers.

How would the use of a vaccine **reduce the spread** of EVD?

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(f)     Evaluate the use of unlicensed drugs and vaccines during the EVD outbreak.

Give a conclusion.

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**(6)**

**(Total 13 marks)**

**Q6.**          Scientists at a drug company developed a new pain-killing drug, drug **X**.

(a)     Painkillers do **not** cure infectious diseases.

Why?

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**(1)**

(b)     The scientists compared drug **X** with two other pain-killing drugs, drug **A** and drug **B**.  
In their investigation the scientists:    •  chose 600 volunteers. The volunteers were all in pain    •  gave 200 of the volunteers a standard dose of drug **A**    •  gave 200 of the volunteers a standard dose of drug **B**    •  gave 200 of the volunteers a standard dose of drug **X**.

Over the next seven hours the volunteers recorded how much pain they felt.

To get valid results the three groups of volunteers should be matched for as many factors as possible.

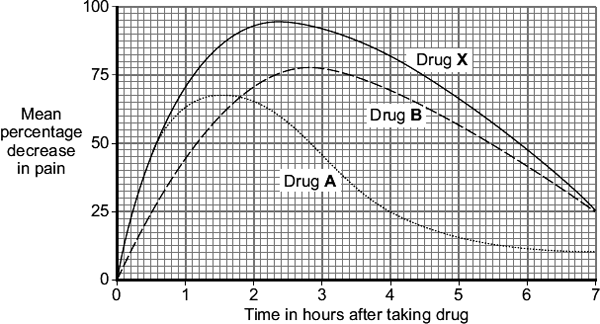
Suggest **two** of the factors that should be matched.

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**(2)**

(c)     The graph shows the results of the investigation.



(i)      How much pain did the volunteers still feel, four hours after taking drug **A**?

                                              ............................................................ percent

**(1)**

(ii)     Give **one** advantage of taking drug **A** and **not** drug **B**.

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........................................................................................................................(1)

(iii)    Give **two** advantages of taking drug **B** and **not** drug **A**.

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(d)     Drug **X** is much more expensive than both drug **A** and drug **B**.

A pharmacist advised a customer that it would be just as good to take drug **A** and drug **B** together instead of drug **X**.

Do you agree with the pharmacist’s advice? Give reasons for your answer.

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**(3)**

**(Total 10 marks)**

**Q7.**Drugs must be trialled before the drugs can be used on patients.

(a)     (i)      Before the clinical trials, drugs are tested in the laboratory.  
The laboratory trials are **not** trials on people.

What is the drug tested on in these laboratory trials?

........................................................................................................................(1)

(ii)     Drugs must be trialled before the drugs can be used on patients.

Give **three** reasons why.

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(b)     Read the information about cholesterol and ways of treating high cholesterol levels.

Diet and inherited factors affect the level of cholesterol in a person's blood.  
Too much cholesterol may cause deposits of fat to build up in blood vessels and reduce the flow of blood. This may cause the person to have a heart attack.  
Some drugs can lower the amount of cholesterol in the blood.

The body needs cholesterol. Cells use cholesterol to make new cell membranes and some hormones. The liver makes cholesterol for the body.

Some drugs can help people with high cholesterol levels.

**Statins** block the enzyme in the liver that is used to produce cholesterol.  
People will normally have to take statins for the rest of their lives. Statins can lead to muscle damage and kidney problems. Using some statins for a long time has caused high numbers of deaths.

**Cholesterol blockers** reduce the absorption of cholesterol from the intestine into the blood.  
Cholesterol blockers can sometimes cause problems if the person is using other drugs.

Evaluate the use of the two types of drug for a person with high cholesterol levels.

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**(6)**

**(Total 10 marks)**

**Q8.**Pathogens cause infectious diseases in animals and plants.

(a)     Draw **one** line from each disease to the type of pathogen that causes the disease.

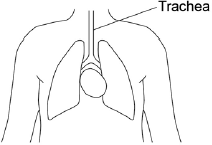
|  |  |  |  |
| --- | --- | --- | --- |
|  | **Disease** |  | **Type of pathogen** |
|  |  |  | Bacterium |
|  | Gonorrhoea |  |  |
|  |  |  | Fungus |
|  | Malaria |  |  |
|  |  |  | Protist |
|  | Measles |  |  |
|  |  |  | Virus |

**(3)**

(b)     Some parts of the human body have adaptations to reduce the entry of live pathogens.

Look at **Figure 1**.

**Figure 1**

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Explain how the trachea is adapted to reduce the entry of live pathogens.

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**(4)**

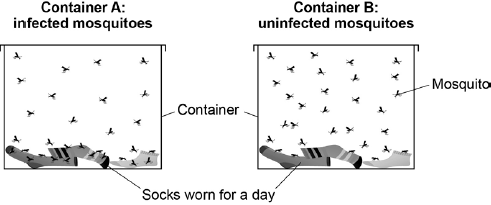
(c)     Malaria is a serious disease that can be fatal.

Malaria is spread to humans by infected mosquitoes.

Scientists investigated the behaviour of mosquitoes to understand how the spread of malaria could be controlled.

**Figure 2** shows the equipment the scientists used.

**Figure 2**

****

This is the method used.

1.       30 mosquitoes **infected with malaria** were placed in Container **A**.

2.       30 **uninfected** mosquitoes were placed in Container **B**.

3.       The total number of times the mosquitoes landed on the socks was recorded.

Name the dependent variable and suggest **one** control variable in this investigation.

Dependent variable ........................................................................................

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Control variable ..............................................................................................

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**(2)**

(d)     Infected mosquitoes landed on the socks three times more often than uninfected mosquitoes.

Explain how this information can be used to reduce the spread of malaria.

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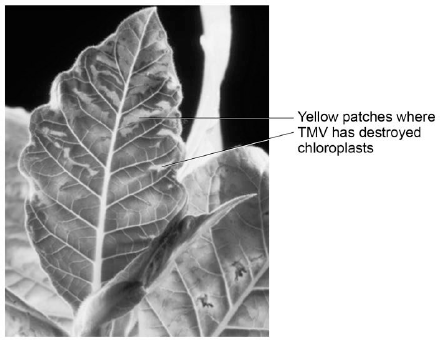
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**(2)**

(e)     Tobacco mosaic virus (TMV) affects many species of plant.

**Figure 3** shows a leaf infected with TMV.

**Figure 3**

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© Nigel Cattlin/Getty Images

TMV destroys chloroplasts in the leaf.

Explain how this could affect the growth of the plant.

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**(3)**

**(Total 14 marks)**