

Name:

Date:

B3 - Test 5
INFECTION
Advanced

GCSE

BIOLOGY

AQA - Triple Science

Mark

Grade

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

Instructions

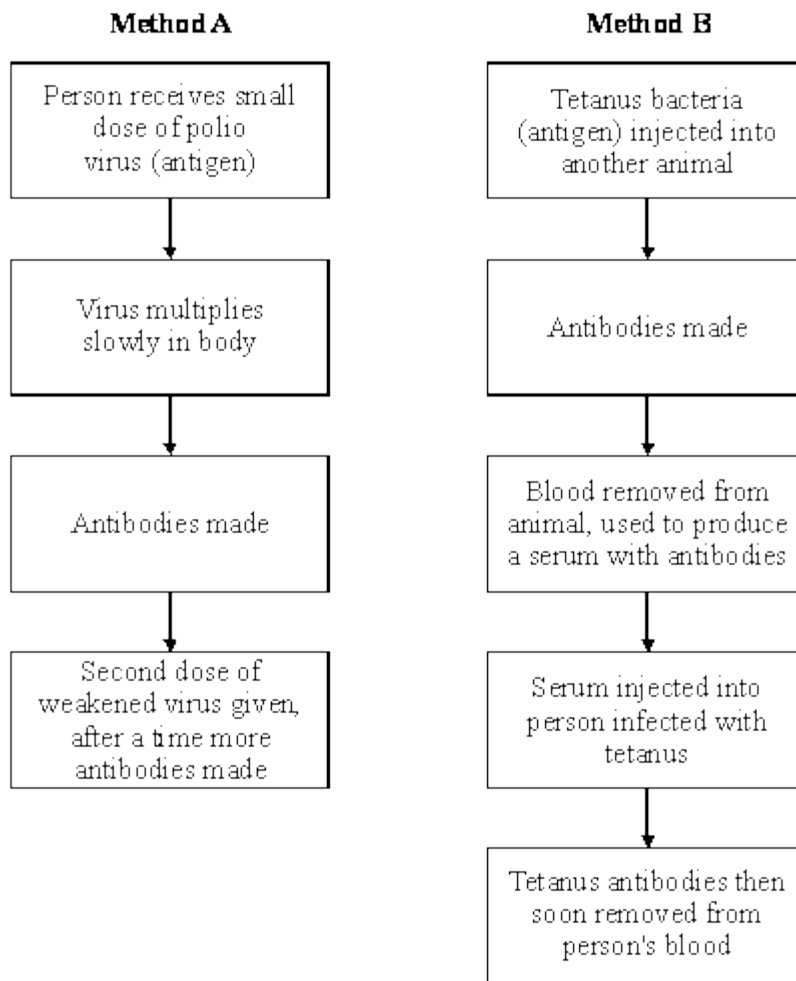
- Answer all questions
- Answer questions in the space provided
- All working must be shown

Information

- The marks for the questions are shown in brackets

1.

The diagram shows two methods which are used to give humans protection against disease. **Method A** shows active immunity and **Method B** shows passive immunity. **Method A** can be used against polio. **Method B** is often used against tetanus.



(a) What is the name of the substances produced by the body which destroy harmful viruses and bacteria?

(1)

(b) Why does **Method A** give long lasting protection against polio?

(1)

(c) Why does **Method B** not give long lasting protection against tetanus?

(1)

- (d) In immunisation against polio a second dose of the weakened virus is given (this is known as a booster). Suggest why this booster is necessary.

(1)

- (e) **Method A** would **not** be helpful for a person who had just been infected with tetanus bacteria. Explain the reason for this.

(2)

- (f) Why is **Method B** very good for dealing quickly with an infection of tetanus?

(1)

(Total 7 marks)

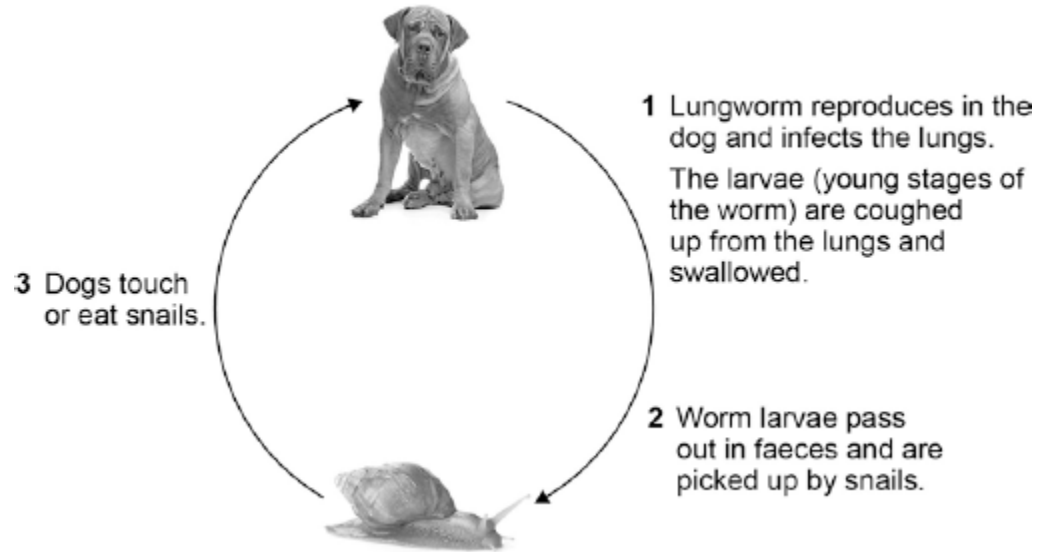
2.

Lungworm is an infection.

Lungworm can kill dogs.

It is caused by a small worm.

The diagram below shows the lifecycle of the lungworm.



Dog © Eriklam/iStock/Thinkstock, snail © Karandaev/iStock/Thinkstock

(a) What type of organism is represented by the snail in the lifecycle of the lungworm?

Tick **one** box.

Fungus

Parasite

Protist

Vector

(1)

(b) Suggest how the spread of the lungworm disease can be prevented.

(3)

(c) Malaria is a disease spread by mosquitoes.

Describe **two** ways to control the spread of malaria.

1. _____

2. _____

(2)

(Total 6 marks)

3.

(a) Explain, as fully as you can, how the body's white blood cells respond to infections.

(4)

- (b) Describe, in as much detail you can, how **one** method of immunisation protects us from a named disease.

Name of disease _____

How immunisation protects us from this disease.

(3)

(Total 7 marks)

4.

A virus called RSV causes severe respiratory disease.

- (a) Suggest **two** precautions that a person with RSV could take to reduce the spread of the virus to other people.

1. _____

2. _____

(2)

(b) One treatment for RSV uses monoclonal antibodies which can be injected into the patient.

Scientists can produce monoclonal antibodies using mice.

The first step is to inject the virus into a mouse.

Describe the remaining steps in the procedure to produce monoclonal antibodies.

(3)

(c) Describe how injecting a monoclonal antibody for RSV helps to treat a patient suffering with the disease.

(2)

A trial was carried out to assess the effectiveness of using monoclonal antibodies to treat patients with RSV.

Some patients were given a placebo.

(d) Why were some patients given a placebo?

(1)

A number of patients had to be admitted to hospital as they became so ill with RSV.

The results are shown in the table below.

Treatment received by patient	% of patients within each group admitted to hospital with RSV
Group A : Monoclonal antibody for RSV	4.8
Group B : Placebo	10.4

The trial involved 1 500 patients.

- Half of the patients (group **A**) were given the monoclonal antibodies.
- Half of the patients (group **B**) were given the placebo.

(e) Calculate the total number of patients admitted to hospital with RSV during the trial.

Total number of patients admitted to hospital = _____

(2)

(f) Evaluate how well the data in the table above supports the conclusion:

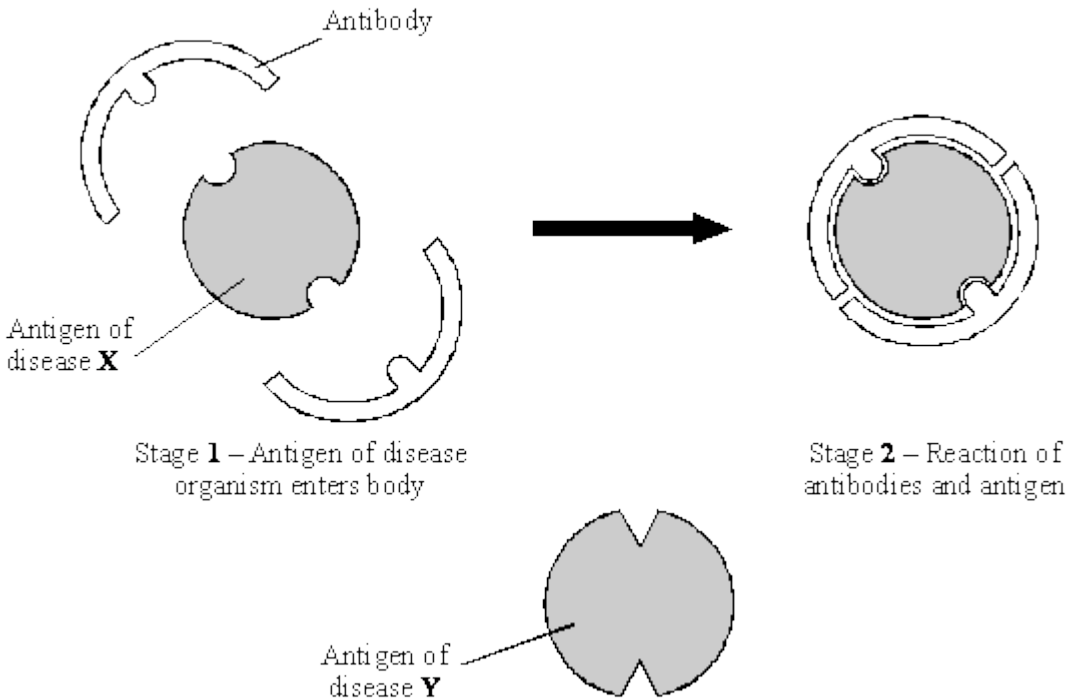
‘monoclonal antibodies are more effective at treating RSV than a placebo’.

(2)

(Total 12 marks)

5.

(a) Antibodies help to defend the body against disease. The diagram represents the reaction of antibody and antigen for disease X.

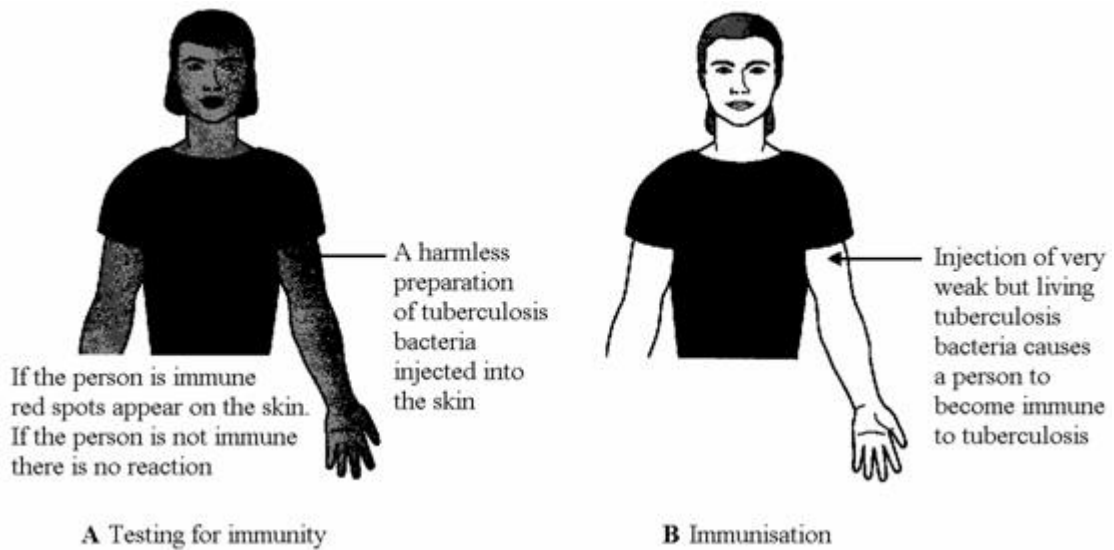


Using the diagram to help you, suggest why the body's defence against disease X would not be effective against disease Y.

(2)

- (b) Tuberculosis is a disease which is caused by a bacterium. The body is able to produce antibodies to destroy the bacteria which cause the disease. Some people are naturally immune. A person can be tested to find if they are immune.

Use information in the diagrams to help you answer the questions.



- (i) Suggest the possible cause of the reaction when a person who is already immune is tested, as shown in diagram **A**.

(2)

- (ii) Explain why the injection of tuberculosis bacteria (diagram **B**) causes immunity but does not cause the disease.

(3)

(Total 7 marks)

6.

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.

(3)

- (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.

(6)

(Total 10 marks)

7.

Pathogenic bacteria and viruses may make us feel ill if they enter our bodies.

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

Bacteria _____

Viruses _____

(2)

(b) Most drugs that kill bacteria cannot be used to treat viral infections.

Explain why.

(2)

(c) Antibiotic-resistant strains of bacteria are causing problems in most hospitals.

Explain, as fully as you can, why there has been a large increase in the number of antibiotic-resistant strains of bacteria.

(4)

(Total 8 marks)

8.

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

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

Give **one** reason why.

(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. _____

2. _____

(2)

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

(i) One type of virus causes measles.

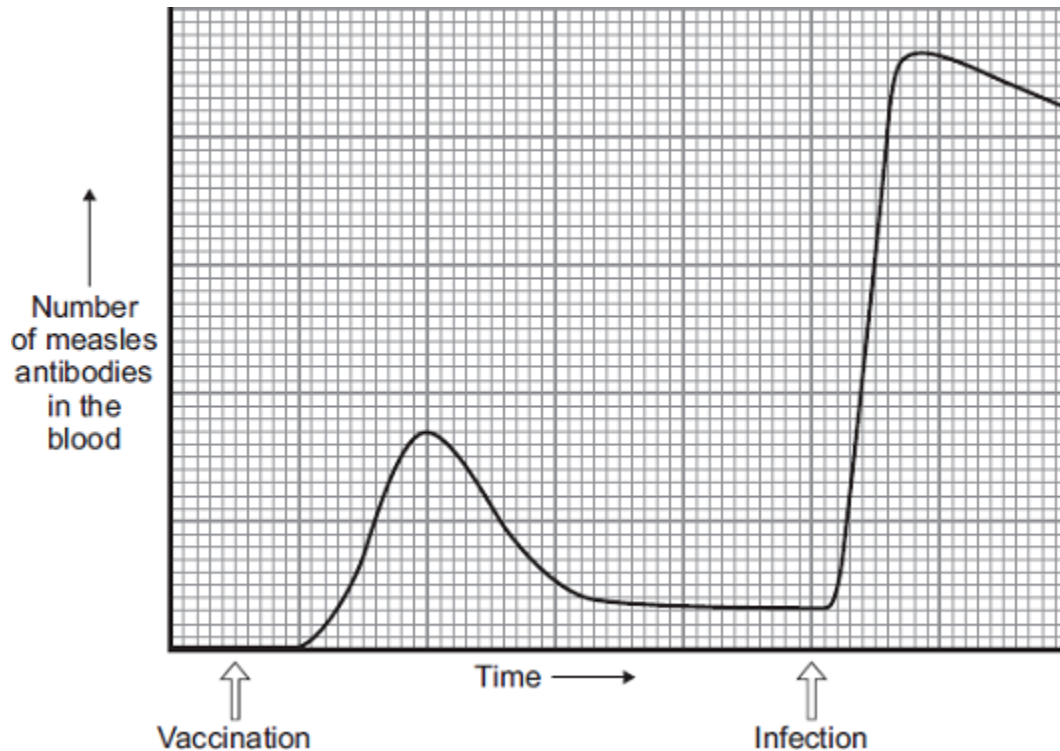
A doctor vaccinates a child against measles.

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

(2)

- (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.

(3)

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

Why?

(1)

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

(1)

(Total 10 marks)