

Name:

Date:

B3 - Test 6
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.

Pathogens can enter the body and cause disease.

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

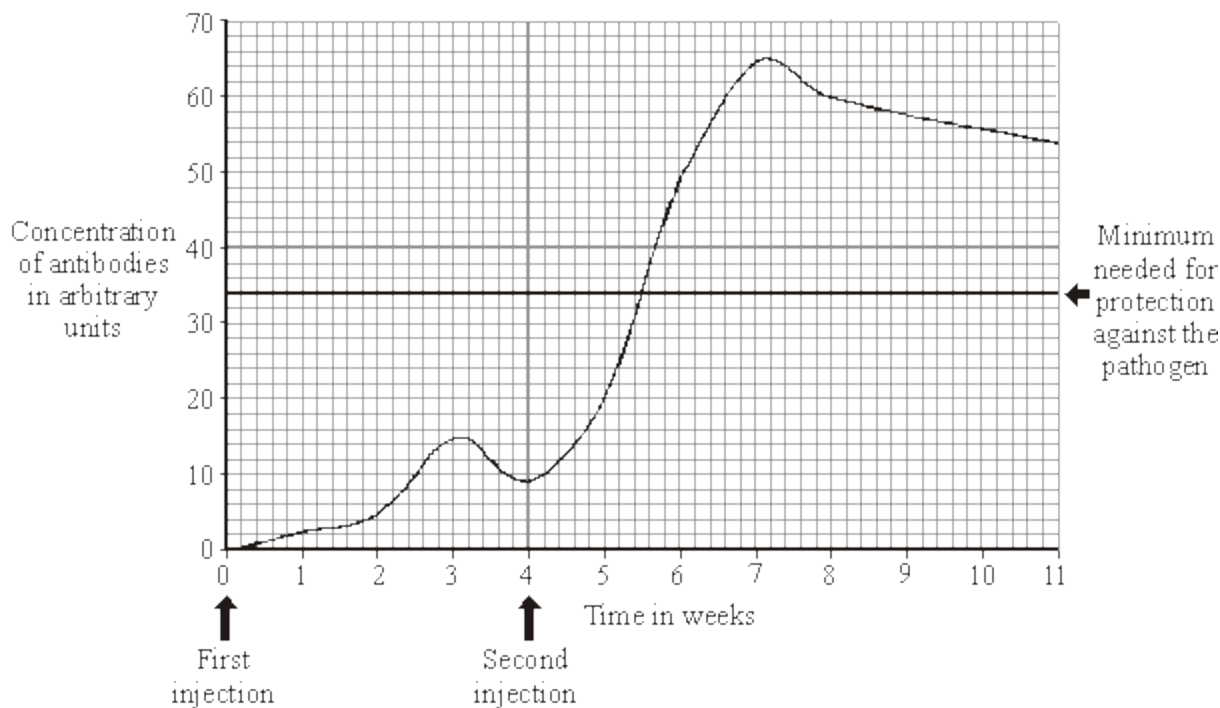
(1)

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

(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.

(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.

(1)

(Total 7 marks)

2.

Some diseases can be cured by using antibiotics or prevented by vaccination.

- (a) (i) Explain fully why antibiotics cannot be used to cure viral diseases.

(2)

- (ii) There has been a large increase in the populations of many antibiotic-resistant strains of bacteria in recent years.

Explain why.

(2)

- (b) A person can be immunised against a disease by injecting them with an inactive form of a pathogen.

Explain how this makes the person immune to the disease.

(3)

(Total 7 marks)

3.

A gardener is looking at the plants in his greenhouse.

- (a) Some of the plants have a disease.

Give **two** ways the gardener could identify the pathogen infecting the plants.

1. _____

2. _____

(2)

(b) Plants can become unhealthy if they do not have essential mineral ions.

Describe the appearance of plants with:

- **nitrate** deficiency
- **magnesium** deficiency.

Nitrate deficiency _____

Magnesium deficiency _____

(2)

- (c) Plants need other mineral ions.
- Potassium ions are needed for healthy root growth.
 - Phosphate ions are needed for healthy flowers and fruits.

The gardener makes his own garden compost.

The percentage (%) of minerals in his compost was compared with two fertilisers he could buy.

The data are shown in the table below.

	Percentage (%) mineral content			Cost in £ / kg
	Nitrate ions	Phosphate ions	Potassium ions	
Garden compost	0.5	0.3	0.8	0.00
Fertiliser S	5.0	1.3	6.6	4.99
Fertiliser T	3.0	12.0	6.0	9.99

The gardener buys Fertiliser **S**.

Explain why he chose Fertiliser **S**.

(4)
(Total 8 marks)

4.

Read the following passage.

One of the deadliest diseases in history to be making a comeback in Britain. Doctors are alarmed at the rising number of cases of tuberculosis (TB) over the past three years, after decades in which it had declined.

In the middle of the last century TB accounted for 16% of all deaths in Britain. The turning point in the fight against TB came in 1882 when Robert Koch identified the bacterium that causes the disease. In 1906 two French scientists began developing the vaccine to provide immunity against TB. The vaccine, BCG, (so-called from the initials of the two scientists) has routinely been injected into children aged 12 or 13 who are not already infected with the TB bacterium. BCG does not protect people who are already infected with TB. Recently, however, some Health Authorities have dropped their school vaccination programme.

(a) People infected with a small number of TB bacteria often do **not** develop the disease.

Explain, as fully as you can, how the body defends itself against the TB bacteria.

(3)

(b) The BCG vaccine contains a mild form of the TB bacterium. A person injected with it does **not** develop the disease.

Explain, as fully as you can, how the vaccine makes the person immune to tuberculosis.

(3)

(c) Explain why the BCG vaccine is **not** effective as a cure for people who already have tuberculosis.

(2)
(Total 8 marks)

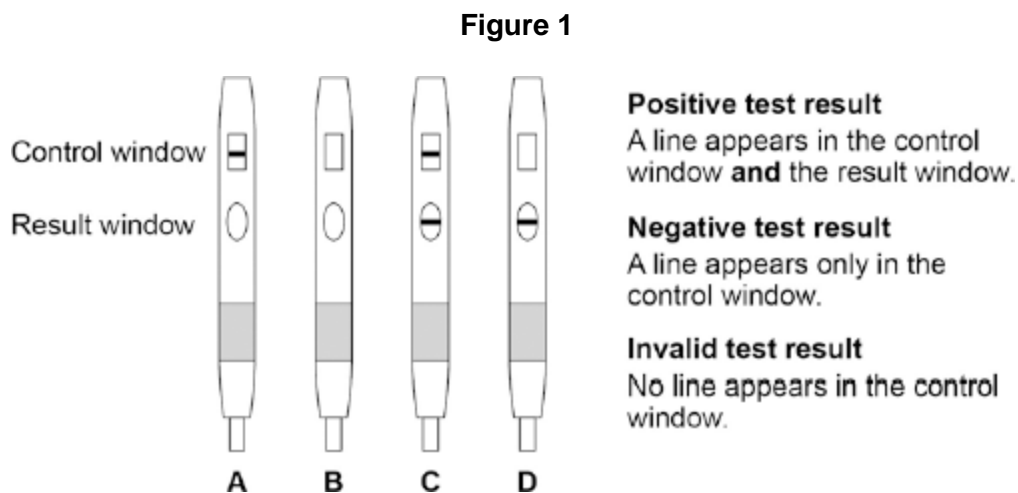
5.

Monoclonal antibodies are used to measure the levels of hormones in the blood.

Pregnant women produce the hormone HCG.

HCG is excreted in urine.

Figure 1 shows four pregnancy test strips.



(a) Which test strip shows a negative test result?

Tick **one** box.

A B C D

(1)

(b) Monoclonal antibodies are used for pregnancy testing.

Give **one other** use of monoclonal antibodies.

(1)

6.

Read the following passage.

'The immune system is the body's defence force. It protects against infections which might enter the body. The potential invaders include bacteria and viruses. The two basic defences are cells and chemicals. The best known action of defence cells is the ingesting and killing of microbes. The best known chemical defence is the antibody - a protein specially made to match with the surface of an invading microbe. Once covered with antibody, the microbe becomes easier to destroy.

5

So how do the invaders ever win? Part of the answer is that the chemical defenders take some time to become effective. When the body is infected for the first time by a particular microbe, there is a race between the multiplying microbes and the multiplying cells producing the antibody. Given time, the body usually wins; eventually enough antibodies are formed to overcome the invaders. But if the initial invasion force is large, or the immune system is weak, the battle may be lost.'

10

(a) (i) Which type of cells ingest and kill invading microbes? (lines 3 - 4)

(1)

(ii) Give **two** circumstances in which the initial invasion force might be very large (lines 11 - 12).

1. _____

2. _____

(2)

(iii) After being ingested, the microbes are digested in the cells. Briefly explain what happens to the proteins that the microbes contain.

(2)

(b) Explain how bacteria cause disease once they get into the body.

(2)

(c) Name a type of medicine that kills bacteria inside the body.

(1)

(d) People often risk first-time infection by a particular microbe while visiting other countries. People can be immunised against the disease that the microbe causes.

Explain, as fully as you can, how immunisation works.

(3)

(Total 11 marks)

7.

People may be immunised against diseases using vaccines.

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

(2)

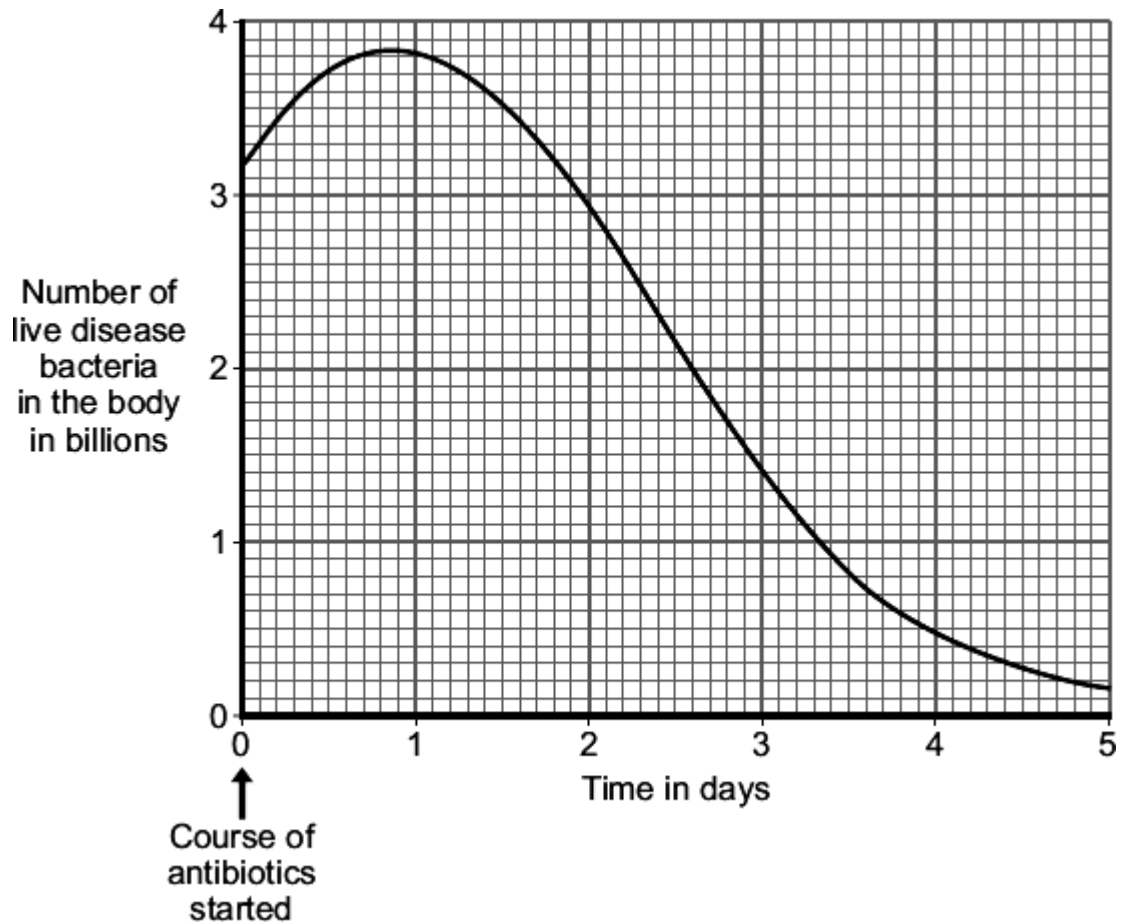
(ii) A person has been vaccinated against measles. The person comes in contact with the measles pathogen. The person does **not** catch measles.

Explain why.

(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.

(2)

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

The new strain may spread rapidly.

Explain why.

(3)

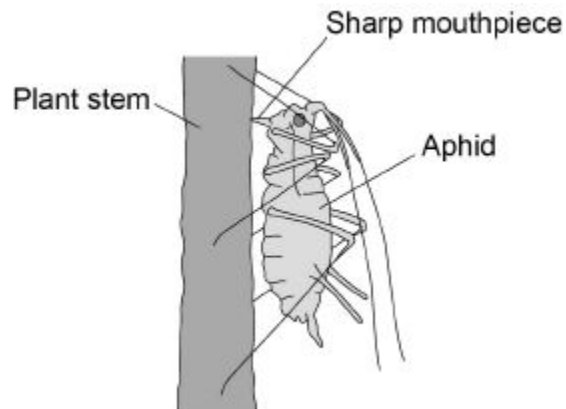
(Total 10 marks)

8.

Plants can be infected by fungi, viruses and insects.

Aphids are small insects that carry pathogens.

The diagram below shows an aphid feeding from a plant stem.



(a) An aphid feeds by inserting its sharp mouthpiece into the stem of a plant.

Give the reason why the mouthpiece of an aphid contains a high concentration of dissolved sugars after feeding.

(1)

