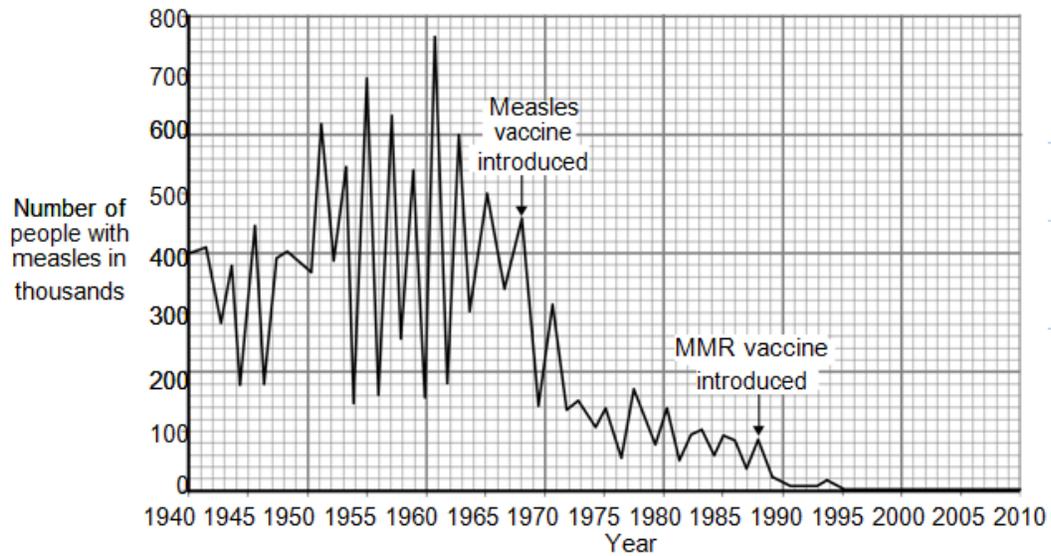

(2 marks)

Q:2 The graph shows the number of people with measles in the UK between 1940 and 2010.



(a) Compare how effective introducing the measles vaccine was with introducing the MMR vaccine.

Use data from the graph.

(3 marks)

(b) The MMR vaccine was introduced in 1988.

Other than measles, which two diseases does the MMR vaccine protect against?

1 _____ 2 _____

(2 marks)

(c) To immunise someone against measles, a small quantity of the inactive measles pathogen is injected into the body.

Describe what happens in the body after immunisation to stop a person catching measles in the future.

(3 marks)

Q:3 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 mark)

(a) (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 marks)

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

(b) (i) One type of virus causes measles.

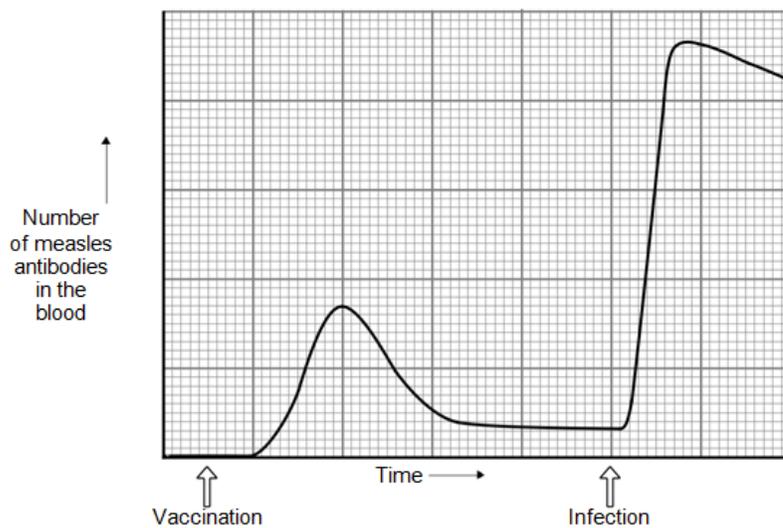
A doctor vaccinates a child against measles.

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

(2 marks)

(b) (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 marks)

(b) (iii) Vaccination against the measles virus will not protect the child against the rubella virus. Why?

(1 mark)

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

(1 mark)

Q:4 Use words from the box to complete the sentences about curing disease.

antibiotics	antibodies	antitoxins	painkillers	statins
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The substances made by white blood cells to kill pathogens are called _____

The substances made by white blood cells to counteract poisons produced by pathogens are called _____

Medicines which kill bacteria are called _____

(3 marks)

(b) The MMR vaccine protects people against three diseases.

Write down the names of two of these diseases.

1 _____

2 _____

(2 marks)

(c) All vaccinations involve some risk.

The table shows the risk of developing harmful effects:

☐ from the disease if a child is not given the MMR vaccine

☐ if a child is given the MMR vaccine.

Harmful effect	Risk of developing the harmful effect from the disease if not given the MMR vaccine	Risk of developing the harmful effect if given the MMR vaccine
Convulsions	1 in 200	1 in 1000
Meningitis	1 in 3000	Less than 1 in 1 000 000
Brain damage	1 in 8000	0

A mother is considering if she should have her child vaccinated with the MMR vaccine.

Use information from the table to persuade the mother that she should have her child vaccinated.

(2 marks)

Q:5 Controlling infections in hospitals has become much more difficult in recent years.

(a) Explain why MRSA is causing problems in many hospitals.

(2 marks)

(b) The pioneer in methods of treating infections in hospitals was Ignaz Semmelweiss. He observed that women whose babies were delivered by doctors in hospital had a death rate of 18% from infections caught in the hospital. Women whose babies were delivered by midwives in the hospital had a death rate of 2%. He observed that doctors often came straight from examining dead bodies to the delivery ward.

(i) In a controlled experiment, Semmelweiss made doctors wash their hands in chloride of lime solution before delivering the babies. The death rate fell to about 2% – down to the same level as the death rate in mothers whose babies were delivered by midwives.

Explain why the death rate fell.

(1 mark)

(ii) Explain how Semmelweiss's results could be used to reduce the spread of MRSA in a modern hospital.

(2 marks)

Q:6 Some diseases can be tackled by using antibiotics and vaccination.

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

(2 marks)

(ii) A recent study found that babies in 90 % of hospitals are infected with the MRSA bacterium.

Explain how the MRSA bacterium has developed resistance to antibiotics.

(2 marks)

(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 marks)

Q:7 Pathogens can enter the body and cause disease.

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

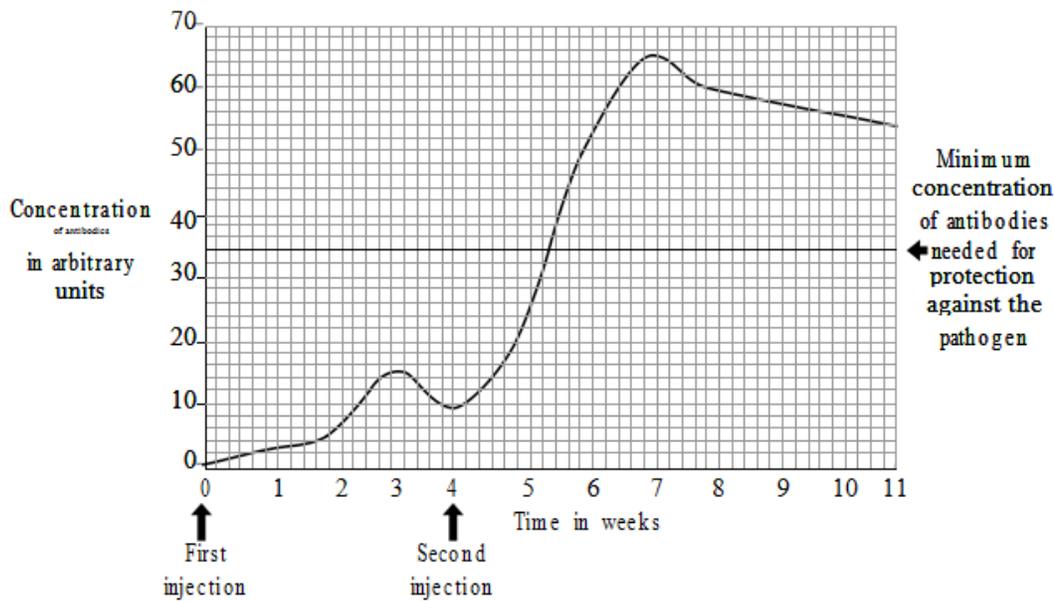
(1 mark)

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

(1 mark)

(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.



(b)(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 mark)

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

(3 marks)

(b)(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 mark)

TOTAL MARKS=51