AQA GCSE Biology | 8461

SPECIFICATION POINT 4.3.1.7

Vaccination

Past-paper questions

Tier	**Foundation**
Question groups	**33**
Available paper years	**2007–2025**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.3.1.7 Vaccination

Question 01

4 (a) Use words from the box to complete the sentences about curing disease.

antibiotics	**antibodies**	**antitoxins**	**painkillers**	**statins**

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 getting the harmful effect from the disease (if not vaccinated)	Risk of getting the harmful effect from 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

4.3.1.7 Vaccination

Question 01 · continued

BLANK

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)

(d) The vaccine used to protect us from the Hepatitis B virus is produced by genetic engineering.

Yeast cells are used to produce the vaccine.

Use words from the box to complete the sentence.

chromosomes	**drugs**	**enzymes**	**genes**	**hormones**

To produce the vaccine ..... are used to cut out .....

from the Hepatitis B virus which are then inserted into the yeast cells.

(2 marks)

9

4.3.1.7 Vaccination

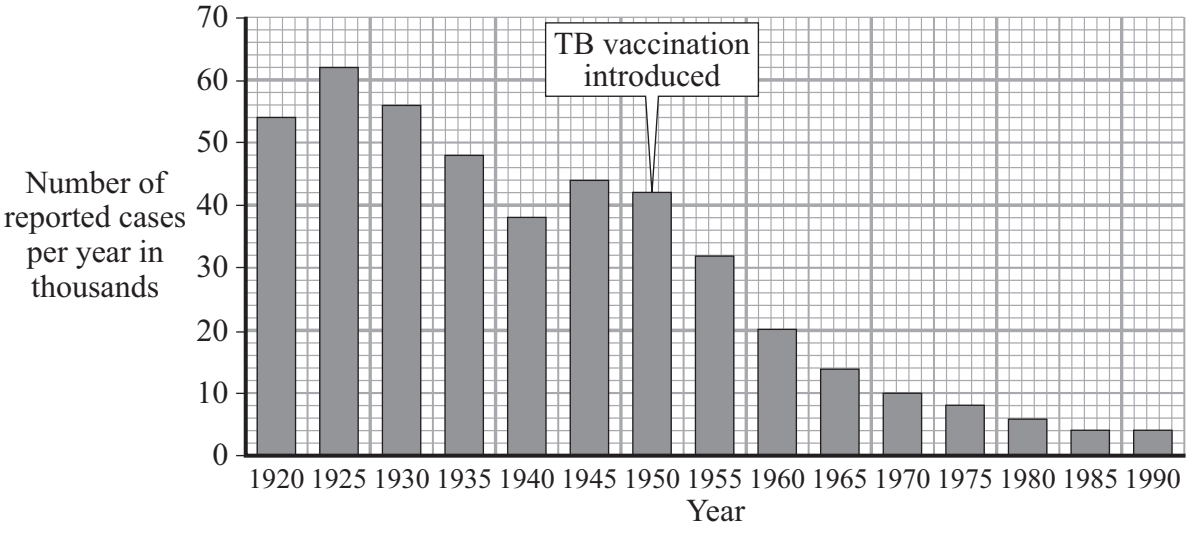
Question 02

March 2007 | BLY1A | Original Q8 | Legacy

QUESTION EIGHT

Tuberculosis (TB) is a disease caused by a bacterium.

The bar chart shows the number of reported cases of TB from 1920 to 1990.



8A What was the maximum number of reported cases of TB in a year during the period from 1920 to 1990?

1 60

2 62

3 44 000

4 62 000

8B The number of cases of TB decreased after the introduction of vaccination.

Vaccination may not have been the only reason for this decrease.

What evidence from the graph suggests that there may have been other reasons?

1 The number of cases decreased between 1925 and 1940.

2 The number of cases decreased between 1950 and 1990.

3 The number of cases decreased very rapidly between 1950 and 1960.

4 The number of cases increased between 1940 and 1950.

4.3.1.7 Vaccination

Question 02 · continued

8C The TB vaccination causes . . .

1 red blood cells to produce antibodies.

2 white blood cells to produce antibodies.

3 white blood cells to produce toxins.

4 white blood cells to stop producing antitoxins.

8D TB is spread by breathing in infected droplets which have been coughed out by infected people.

Which of the following is **least** likely to reduce the spread of TB?

1 isolating people with the disease

2 vaccinating all adults

3 vaccinating all children

4 vaccinating people who have the disease

4.3.1.7 Vaccination

Question 03

June 2007 | BLY1A | Original Q5 | Legacy

QUESTION FIVE

The table shows the vaccines given to children in the UK.

Age when vaccine is given	Vaccine(s) given	How vaccine is given
Two months	diphtheria, tetanus, pertussis, polio and hepatitis type b	one injection
Three months	pneumococcal infection	one injection
	diphtheria, tetanus, pertussis, polio and hepatitis type b	one injection
	meningitis C	one injection
Four months	diphtheria, tetanus, pertussis, polio and hepatitis type b	one injection
	meningitis C	one injection
	pneumococcal infection	one injection
12 months	hepatitis type b and meningitis C	one injection
13 months	measles, mumps and rubella (MMR)	one injection
3 years and 4 months to 5 years	pneumococcal infection	one injection
	diphtheria, tetanus, pertussis and polio	one injection
	measles, mumps, and rubella (MMR)	one injection
13 to 18 years	diphtheria, tetanus and polio	one injection

Match vaccines, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A hepatitis type b

B MMR

C pneumococcal infection

D tetanus

	How vaccine is used
1	given only to children over 12 months old
2	given five times
3	never mixed with other vaccines before being given
4	not given as a booster dose to schoolchildren

4.3.1.7 Vaccination

Question 04

June 2007 | BLY1A | Original Q8 | Legacy

QUESTION EIGHT

Most infectious diseases can be prevented by vaccination.

8A What does a vaccine contain?

1 antibiotics

2 a mixture of toxins and antitoxins

3 dead or weakened microbes

4 white blood cells

8B Following a vaccination, the white cells produce . . .

1 antibiotics.

2 antibodies.

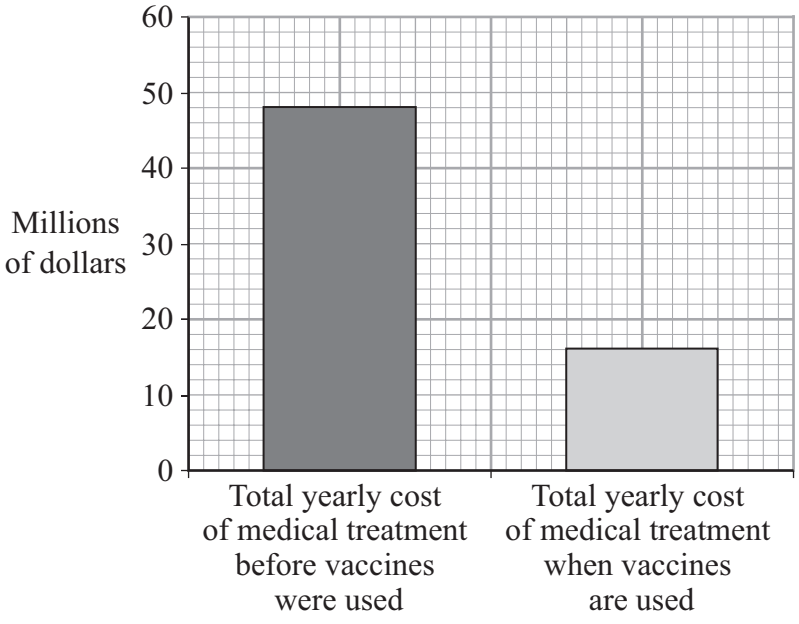
3 statins.

4 toxins.

4.3.1.7 Vaccination

Question 04 · continued

The bar chart compares the total yearly cost of medical treatment for a disease in a country before vaccines were used and the total yearly cost when vaccines are used.



8C How much money is saved by the use of vaccines?

1 14 million dollars

2 16 million dollars

3 32 million dollars

4 48 million dollars

8D What is the most likely reason for the difference in cost?

1 Vaccines cure diseases.

2 Vaccines do not cost much to buy.

3 People who have been vaccinated never become ill.

4 People who have been vaccinated need less treatment in hospital.

4.3.1.7 Vaccination

Question 05

June 2007 | BLY1F | Original Q2 | Legacy

2 (a) We control many conditions inside our bodies.

Name **three** conditions which are controlled inside our bodies.

1 .....

2 .....

3 .....

(3 marks)

(b) Hormones are used to control fertility in women.

Use words from the box to complete the sentences.

antibiotic	**contraceptive drug**	**fertility drug**	**vaccine**

A woman can prevent pregnancy by taking a ..... .

A woman can be helped to become pregnant by taking a ..... .

(2 marks)

(c) Some drugs are addictive.

(i) Name **one** addictive drug.

.....

(1 mark)

(ii) Explain why it is very difficult to give up using an addictive drug.

.....

.....

.....

.....

(2 marks)

8

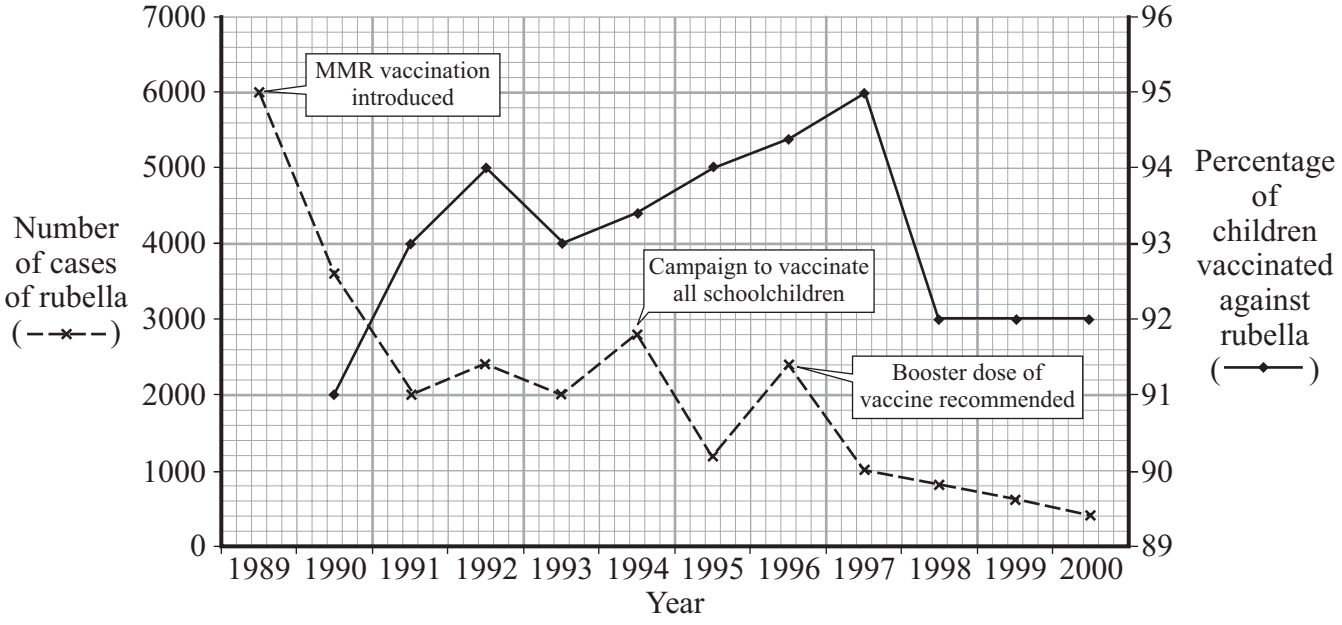
4.3.1.7 Vaccination

Question 06

November 2007 | BLY1A | Original Q4 | Legacy

QUESTION FOUR

The graph shows the effect of the MMR vaccination on the number of cases of rubella in Scotland between 1989 and 2000.



Match figures, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A 94

B 95

C 1400

D 6000

1	the number of cases of rubella in the year in which the MMR vaccination was introduced
2	the percentage of children vaccinated against rubella in 1995
3	the highest percentage of children vaccinated against rubella
4	the fall in the number of cases of rubella in the 12 months following the recommendation of a booster dose

4.3.1.7 Vaccination

Question 07

January 2008 | BLY1F | Original Q6 | Legacy

6 Polio is a disease caused by a virus. In the UK, children are given polio vaccine to protect them against the disease.

(a) In the sentences below, draw a ring around the correct words in each box.

(i) It is difficult to kill the polio virus inside the body

because the virus

is not affected by drugs
lives inside cells
produces antitoxins

.

(1 mark)

(ii) The vaccine contains an

active
infective
inactive

form of the polio virus.

(1 mark)

(iii) The vaccine stimulates the white blood cells to

produce

antibiotics
antibodies
drugs

which destroy the virus.

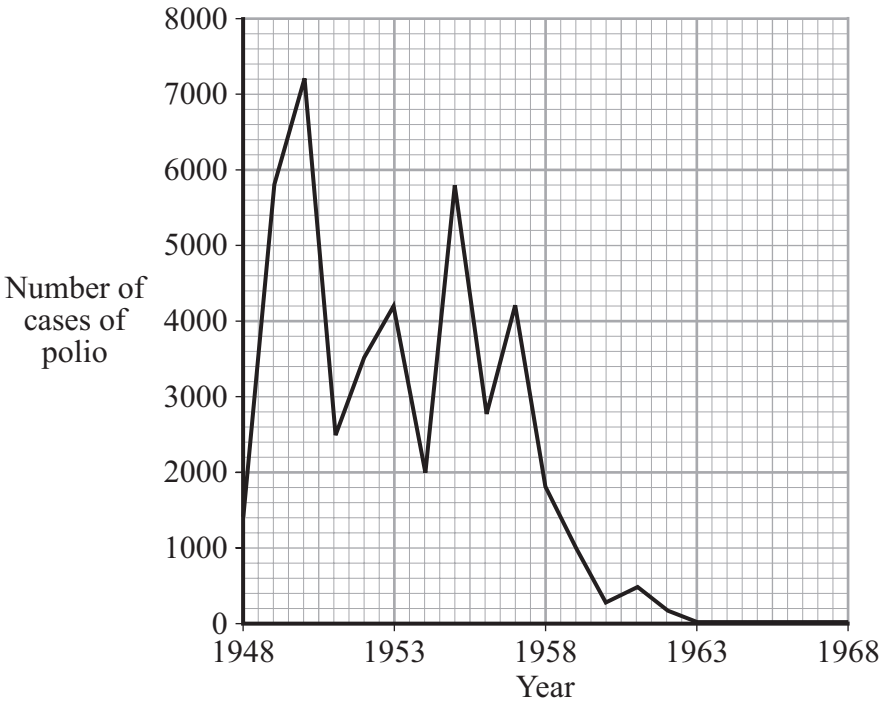
(1 mark)

4.3.1.7 Vaccination

Question 07 · continued

BLANK

(b) The graph shows the number of cases of polio in the UK between 1948 and 1968.



(i) In which year was the number of cases of polio highest?

.....

(1 mark)

(ii) Polio vaccination was first used in the UK in 1955.

How many years did it take for the number of cases of polio to fall to zero?

.....

(1 mark)

(iii) There have been no cases of polio in the UK for many years. But children are still vaccinated against the disease.

Suggest **one** reason for this.

.....

.....

(1 mark)

6

4.3.1.7 Vaccination

Question 08

June 2008 | BLY1AP | Original Q6 | Legacy

QUESTION SIX

Our bodies defend themselves naturally against infections. We also use other methods to protect ourselves against infections and to relieve the symptoms of disease.

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A antibiotics

B painkillers

C antibodies

D vaccines

1	given to people to provide immunity
2	medicines that kill bacteria
3	produced by white blood cells
4	relieve symptoms of disease

4.3.1.7 Vaccination

Question 09

June 2008 | BLY1F | Original Q5 | Legacy

5 Pathogens can enter the body and cause disease.

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

.....

(1 mark)

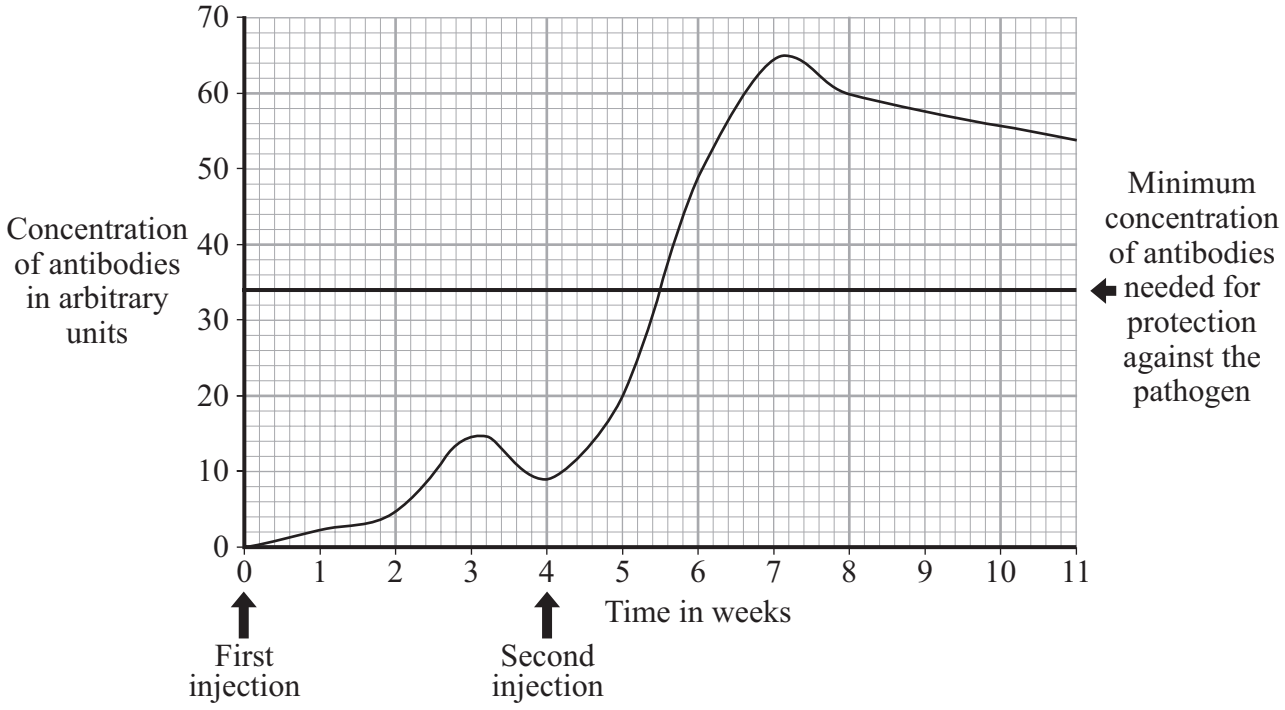
5 (a) (ii) Name **one** type of medicine which helps to relieve the symptoms of infectious disease.

.....

(1 mark)

5 (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.



5 (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)

4.3.1.7 Vaccination

Question 09 · continued

for mark

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

.....

.....

.....

.....

.....

.....

.....

(3 marks)

5 (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)

7

4.3.1.7 Vaccination

Question 10

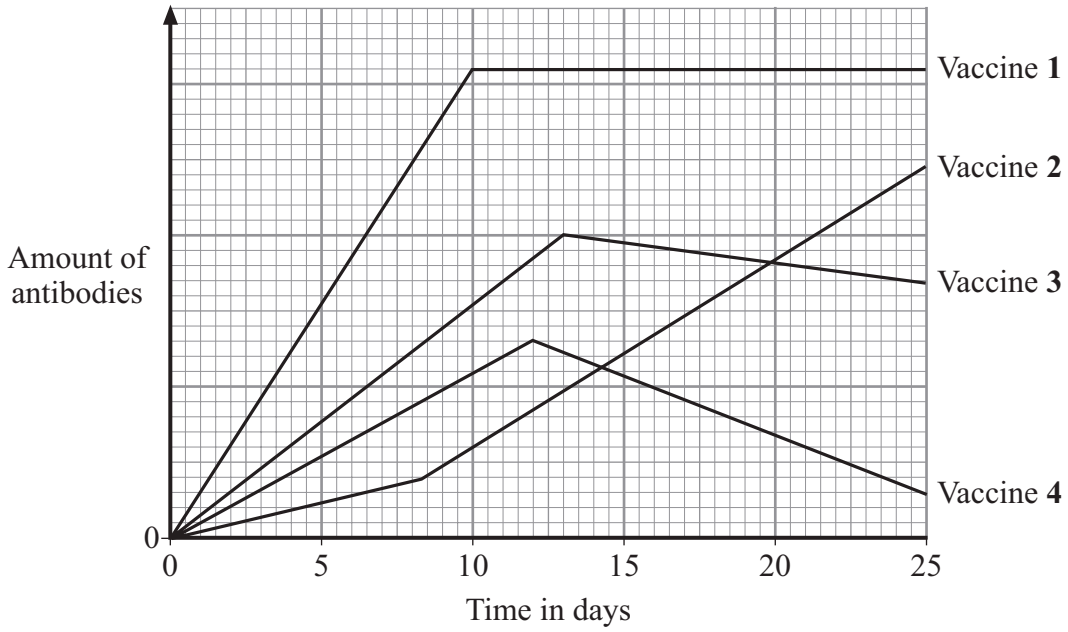
November 2008 | BLY1AP | Original Q4 | Legacy

QUESTION FOUR

The graph shows the amount of antibodies produced over 25 days in response to injecting four different vaccines, **1**, **2**, **3** and **4**.

Match statements, **A**, **B**, **C** and **D**, with the vaccines **1–4**.

A	The amount of antibodies falls to almost zero by 25 days.
B	The amount of antibodies levels off after 10 days.
C	The amount of antibodies reaches a peak at 13 days and then falls slowly.
D	The amount of antibodies rises throughout the 25 days.



4.3.1.7 Vaccination

Question 11

January 2009 | BLY1F | Original Q7 | Legacy

7 The MMR vaccine is used to protect children against measles, mumps and rubella.

7 (a) Complete the sentences about vaccination.

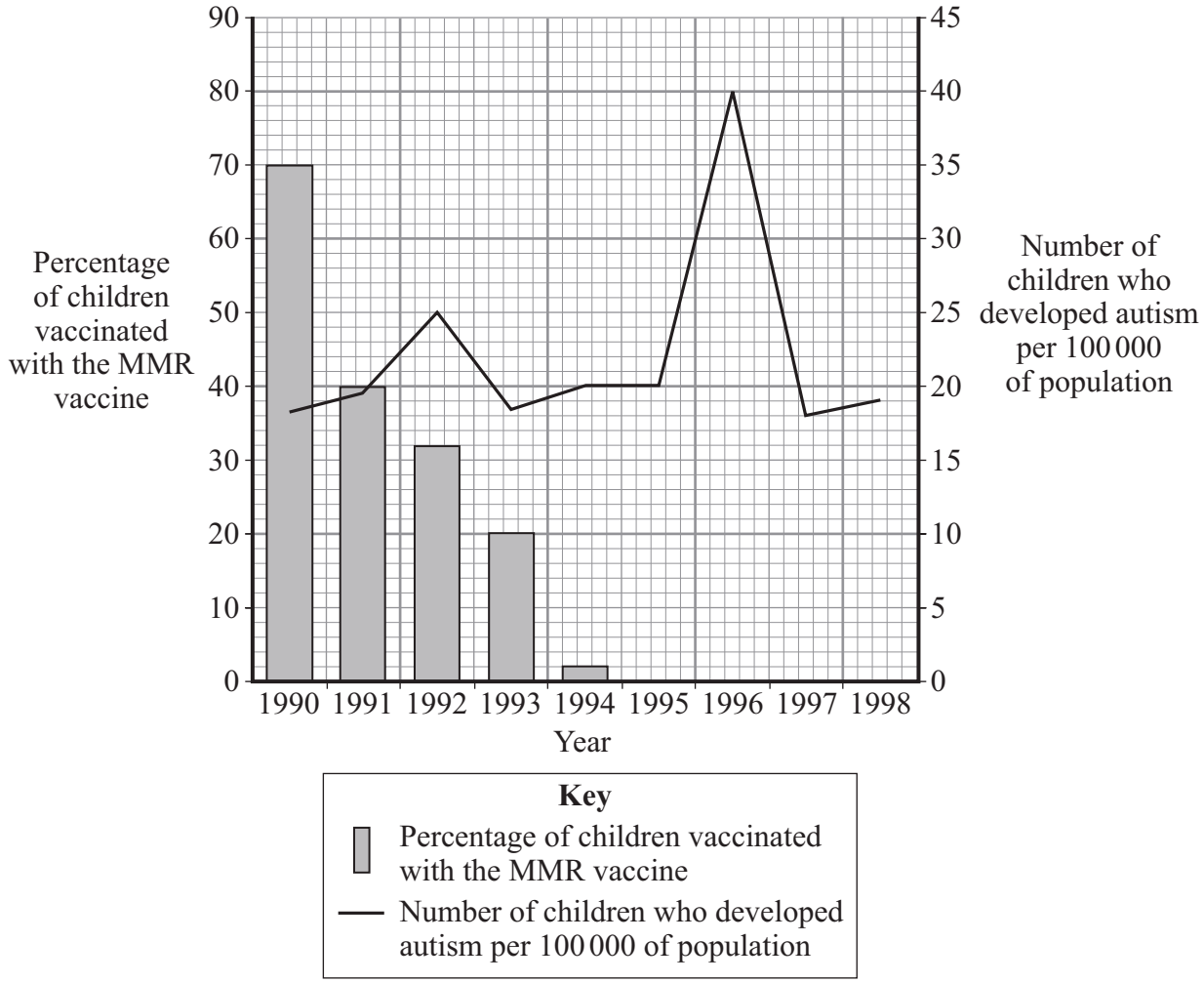
Vaccines stimulate white blood cells to produce ..... .

This makes children ..... to the pathogen.

(2 marks)

7 (b) In the 1990s, many people thought that the MMR vaccine caused autism in some children. As a result, the Japanese government stopped using the MMR vaccine.

The graph gives information about the percentage of children in Japan vaccinated with the MMR vaccine and the number of children who developed autism during the 1990s.



4.3.1.7 Vaccination

Question 11 · continued

for mark

7 (b) (i) Describe how the percentage of children vaccinated with the MMR vaccine changed between 1990 and 1995.

.....

.....

.....

.....

.....

(2 marks)

7 (b) (ii) Does the data in the graph support a link between MMR vaccination and autism?

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

Explain the reason for your answer.

.....

.....

.....

.....

.....

(2 marks)

6

4.3.1.7 Vaccination

Question 12

March 2009 | BLY1AP | Original Q7 | Legacy

QUESTION SEVEN

Vaccination protects us against some diseases.

7A It is important that a high proportion of children are vaccinated against measles . . .

1 to reduce the chance of a measles epidemic.

2 so that fewer people will suffer side effects from vaccination.

3 so that there is less chance of a resistant strain of measles developing.

4 so that fewer people will produce measles antibodies.

The table is taken from an information leaflet for parents of young children. It shows a recommended vaccination programme for children.

When the vaccination is given	What the vaccine protects children against	How the vaccine is given
At 2 months old **and** at 3 months old **and** at 4 months old	polio	by mouth
	diphtheria tetanus whooping cough	by one injection
Between 12 and 15 months old **and** at 4 to 5 years old	measles mumps rubella	by one injection
	polio	by mouth
	diphtheria tetanus	by one injection
At 10–14 years old	tuberculosis	by one injection

Use **only** the information in the table to answer questions **7B** and **7C**.

7B Which vaccine is given by mouth?

1 polio

2 tetanus

3 tuberculosis

4 whooping cough

4.3.1.7 Vaccination

Question 12 · continued March 2009 | BLY1AP | Original Q7 | Legacy

7C Against how many diseases altogether has a 14 year-old child been vaccinated?

1 4

2 7

3 8

4 14

7D It is necessary to give the same vaccination against polio more than once because . . .

1 white blood cells only live for a few weeks.

2 the polio virus mutates frequently.

3 one vaccination does **not** result in a sufficient number of antibodies.

4 the older you are, the more likely you are to get polio.

Turn over for the next question

4.3.1.7 Vaccination

Question 13

June 2009 | BLY1AP | Original Q9 | Legacy

QUESTION NINE

Vaccination helps to protect us from disease.

Vaccination may cause a reaction, such as a rash, in the person who is vaccinated.

The table shows the reported number of reactions to vaccination in the UK in one year.

Vaccine	Type of vaccination	Total number of reactions reported	Number of severe reactions
Measles	Single	414	61
Mumps	Single	54	19
Rubella	Single	685	100
MMR	Triple	20 974	2586

9A Which vaccine caused the highest proportion of severe reactions, when compared with the number of reactions reported?

1 measles

2 mumps

3 rubella

4 MMR

9B To calculate the percentage of people who had reactions to the vaccines, you would also need to know . . .

1 the number of vaccinations of each type given.

2 the age of each person vaccinated.

3 whether those people given one of the single vaccinations had previously been given one of the other single vaccinations.

4 the total population of the UK.

4.3.1.7 Vaccination

Question 13 · continued June 2009 | BLY1AP | Original Q9 | Legacy

The table shows the percentage of children vaccinated against some diseases in the UK.

Year	Percentage of children vaccinated			
	Polio	Whooping cough	Flu	Measles, mumps, rubella (MMR)
1996–1997	96	94	95	92
1997–1998	96	94	95	91
1998–1999	95	94	95	88
1999–2000	95	94	94	88
2000–2001	94	94	94	87
2001–2002	94	93	93	84
2002–2003	93	93	93	82
2003–2004	94	93	93	80
2004–2005	93	93	93	81
2005–2006	94	94	94	84

9C For which disease was the percentage of children vaccinated most stable between 1996 and 2006?

1 polio

2 whooping cough

3 flu

4 measles, mumps and rubella

9D It is important that the percentage of people in the population who have been vaccinated is high.

This is because . . .

1 it reduces the chance of epidemics.

2 fewer people may suffer side effects from the vaccine.

3 there is less chance that resistant strains of pathogen will develop.

4 antibodies will be produced quickly if the live pathogen is caught.

END OF TEST

4.3.1.7 Vaccination

Question 14

November 2009 | BLY1AP | Original Q7 | Legacy

QUESTION SEVEN

Most pandemics are caused by viruses.

7A Viral diseases . . .

1 are usually fatal.

2 cannot be treated by using antibiotics.

3 can be treated by using thalidomide.

4 never produce symptoms.

Read the passage about a bird-flu vaccine trial.

> The medical staff in a town in another country are being investigated about a vaccine trial that they carried out on 350 poor, homeless people last year. Investigators say that the trial involved an untested vaccine for the bird-flu virus.
>
> The investigators claim that the homeless people were paid 2 Euros to be tested with what they thought was a normal flu vaccine. It was actually a bird-flu vaccine.
>
> The director of a homeless centre in the town said that 21 people from his centre had died last year. The average number of deaths at the homeless centre is 8 in a year.

7B How many more deaths than the average were there in the homeless centre in the year of the trial?

1 8

2 13

3 21

4 29

4.3.1.7 Vaccination

Question 14 · continued

7C The medical staff probably chose this group of people for the vaccine trial because they were . . .

1 poor.

2 homeless.

3 suffering from flu.

4 immune to normal flu.

7D New strains of pathogens may cause pandemics because . . .

1 it is impossible to produce a vaccine for them.

2 unhygienic practices in hospitals are increasing.

3 people are not aware of how dangerous they are.

4 most people are not immune to them.

Turn over for the next question

4.3.1.7 Vaccination

Question 15

January 2010 | BLY1F | Original Q3 | Legacy

3 Vaccines protect us against diseases.

3 (a) Against which **three** diseases does the MMR vaccine protect us?

Tick (✓) **three** boxes.

Malaria	☐
Measles	☐
Meningitis	☐
Mumps	☐
Rabies	☐
Rubella	☐

(3 marks)

3 (b) Draw a ring around the correct word to complete the sentence.

Vaccines cause white blood cells to produce

antibodies.

cholesterol.

penicillin.

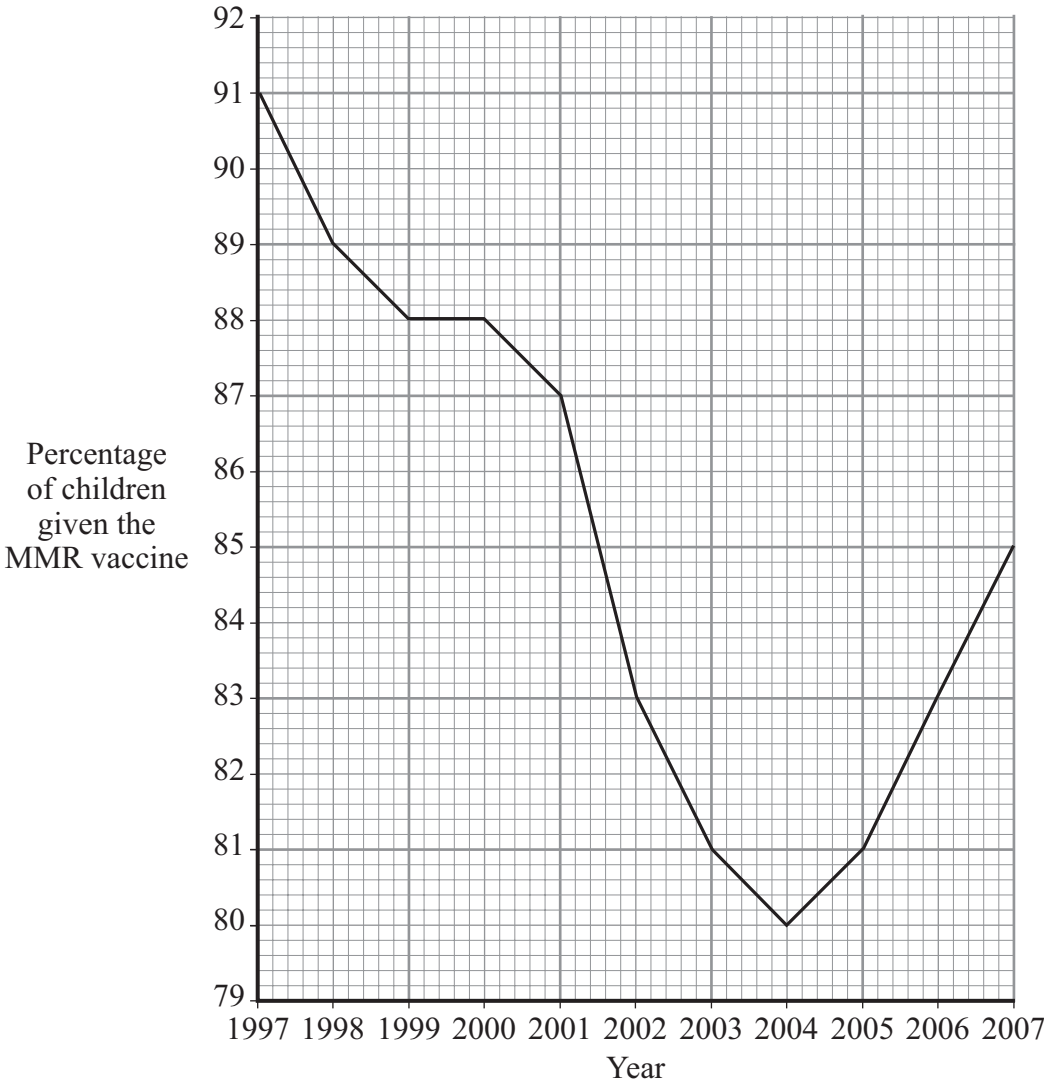
(1 mark)

4.3.1.7 Vaccination

Question 15 · continued

for mark

The graph shows the percentage of children given the MMR vaccine in the UK between 1997 and 2007.



3 (c) (i) Describe the pattern shown by the data on the graph.

.....

.....

.....

.....

(2 marks)

3 (c) (ii) Suggest **one** explanation for the change in the percentage of children given the MMR vaccine between 1997 and 2004.

.....

.....

(1 mark)

7

4.3.1.7 Vaccination

Question 16

March 2010 | BLY1AP | Original Q8 | Legacy

QUESTION EIGHT

Measles is a dangerous viral disease which kills about one person in every 1000 people infected. It gives long-term complications for many others. Worldwide, almost 350 000 people, mainly of school age, are killed by measles every year.

After a UK health scare, some parents refused to have their children vaccinated.

In England and Wales:

- in 2006 there were 756 cases of measles
- in 2007 there were 971 cases of measles
- in 2008 there were more than 1300 cases of measles.

8A Approximately how many people are **infected** by measles across the world each year?

1 971

2 350 000

3 350 000 000

4 It is impossible to tell from the data.

8B The rise in the number of people suffering from measles in the UK in recent years . . .

1 can be described as a pandemic.

2 is due to measles viruses mutating.

3 is due to antibiotic resistance.

4 can be described as an epidemic.

4.3.1.7 Vaccination

Question 16 · continued March 2010 | BLY1AP | Original Q8 | Legacy

8C White blood cells can protect us from pathogens.

Which row in the table shows the way(s) in which this protection can occur?

	Ingesting pathogens	Producing antitoxins	Producing antibodies
1	✓	✓	✗
2	✓	✗	✓
3	✗	✓	✓
4	✓	✓	✓

8D School-age children are more likely to catch measles than adults.

This is because . . .

1 large numbers of children are often close together.

2 children have a poorly developed immune system.

3 the virus multiplies in the soil in playing fields.

4 new vaccines are less effective than older ones in protecting against measles.

4.3.1.7 Vaccination

Question 17

June 2010 | BLY1AP | Original Q8 | Legacy

QUESTION EIGHT

Our bodies defend themselves against attack by pathogens.

8A Our white cells produce antibodies which destroy . . .

1 all types of bacteria and all types of viruses.

2 all types of bacteria but no viruses.

3 all types of viruses but no bacteria.

4 some types of bacteria and some types of viruses.

8B Our white cells also produce antitoxins which . . .

1 counteract poisons produced by pathogens.

2 destroy both bacteria and viruses.

3 destroy bacteria but not viruses.

4 ingest pathogens.

8C Antibiotics destroy . . .

1 all types of bacteria and all types of viruses.

2 some types of bacteria and some types of viruses.

3 some types of bacteria but no viruses.

4 some types of viruses but no bacteria.

8D Vaccines . . .

1 can be made from dead pathogens.

2 can give protection against bacteria but not viruses.

3 can give protection against viruses but not bacteria.

4 destroy pathogens.

4.3.1.7 Vaccination

Question 18

November 2010 | BLY1AP | Original Q2 | Legacy

QUESTION TWO

We use substances to prevent diseases and to cure diseases.

Match substances, **A**, **B**, **C** and **D**, with the statements **1–4** in the table.

A painkiller

B penicillin

C thalidomide

D vaccine

	Information
1	used to cure an infection caused by bacteria
2	used to prevent disease
3	used to help in the treatment of leprosy
4	used to treat symptoms, eg headache

4.3.1.7 Vaccination

Question 19

November 2010 | BLY1AP | Original Q9 | Legacy

QUESTION NINE

A virus causes influenza (flu).

Older people are much more likely to die from flu than younger people. The government offers flu vaccination to people aged over 65.

9A Flu vaccine contains . . .

1 antibodies.

2 antitoxins.

3 weakened virus.

4 white blood cells.

9B After the vaccination, people are immune to flu because their bodies . . .

1 destroy the flu virus in the vaccine.

2 produce antibodies against the flu virus.

3 produce antibiotics against the flu virus.

4 produce white blood cells to ingest the flu virus.

9C Every year, scientists develop a vaccine for several strains of the flu virus. They choose the strains that they think are most likely to be around in winter. Some older people get vaccinated but later die from flu.

The most likely reason for these deaths among older people is that . . .

1 they had not taken antibiotics.

2 they had suffered with flu last winter.

3 they were allergic to the vaccine.

4 there are many different strains of flu virus.

4.3.1.7 Vaccination

Question 19 · continued

9D People in a doctor's surgery made the comments below.

Which of these comments would be a valid reason for someone **not** to have the flu vaccination?

1 'I don't like injections.'

2 'I have a bad reaction to vaccines.'

3 'I never get flu anyway.'

4 'I've heard that my children might get flu from me if I have the vaccination.'

END OF TEST

4.3.1.7 Vaccination

Question 20

March 2011 | BLY1AP | Original Q9 | Legacy

QUESTION NINE

Read the newspaper article published in 2009.

Swine Flu: How Serious a Threat?

The World Health Organisation says that a new strain of virus, the swine flu virus, has killed 150 people in Mexico. This shows that the virus can pass from human to human. One expert says that he expects the outbreak to develop into a pandemic.

9A A pandemic is an outbreak of a disease . . .

1 confined to a town.

2 confined to a region.

3 that will **not** spread.

4 that will spread all over the world.

9B The swine flu virus makes us ill because the virus . . .

1 produces antibodies.

2 produces toxins.

3 reproduces rapidly.

4 slows down our reactions.

9C The swine flu virus made many people ill because . . .

1 people were **not** immune to the swine flu virus.

2 painkillers do **not** work on viral diseases.

3 scientists had **not** produced a new antibiotic.

4 new strains of a virus are always more powerful than existing strains.

4.3.1.7 Vaccination

Question 20 · continued

9D Scientists have developed a swine flu vaccine.

This vaccine works because it . . .

1 destroys the virus.

2 produces antitoxins.

3 engulfs the virus.

4 stimulates the production of antibodies.

END OF TEST

4.3.1.7 Vaccination

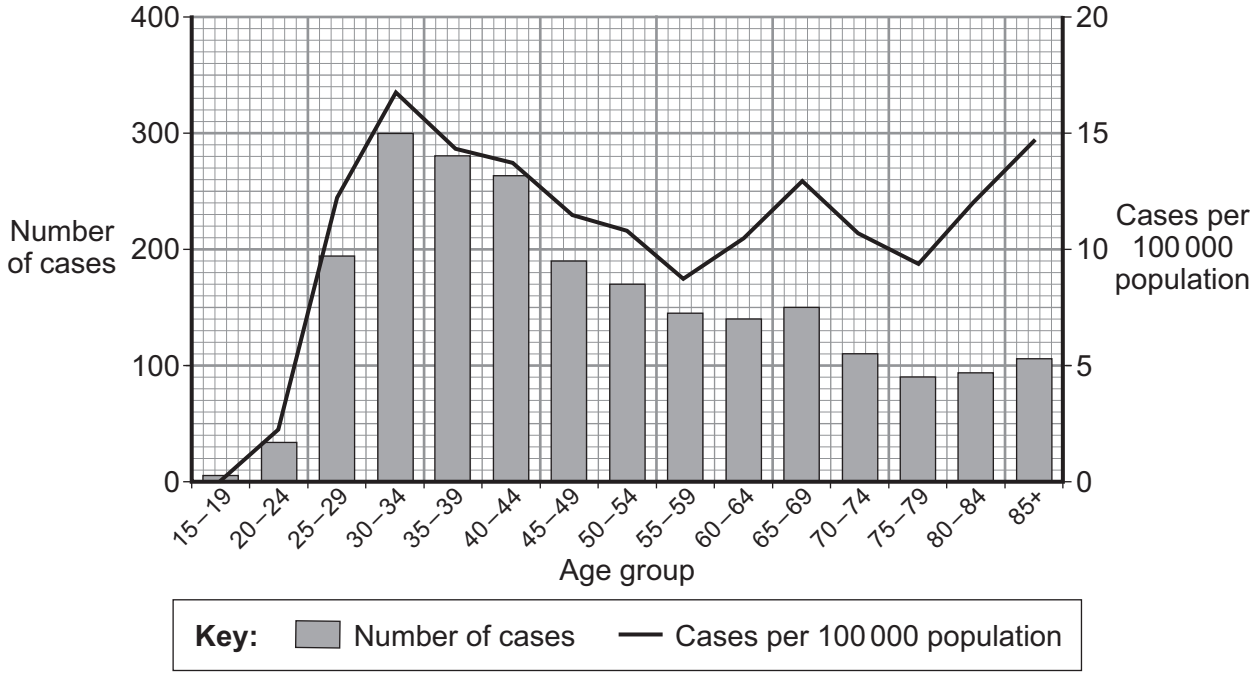
Question 21

June 2011 | BLY1AP | Original Q9 | Legacy

QUESTION NINE

A virus causes cervical cancer. Sexual intercourse transmits the virus.

The graph shows the number of cases of cervical cancer diagnosed in England in 2005.



9A Which age group had the highest number of cases of cervical cancer?

1 15–19

2 30–34

3 40–44

4 85+

9B A city has 500 000 inhabitants.

How many women aged 65–69 would have been diagnosed with cervical cancer in 2005?

1 13

2 65

3 150

4 260

4.3.1.7 Vaccination

Question 21 · continued

9C The government has started a programme of vaccination against the cervical cancer virus. The programme starts with the vaccination of 14-year-old girls.

From the information in the graph, what is the reason for starting with this age group?

The girls in this age group . . .

1 are used to being vaccinated.

2 get booster doses of other vaccines at school.

3 have mainly not yet started their menstrual cycles.

4 have mainly not yet been infected with the virus.

9D Many parents do not agree with girls of 14 being vaccinated against the cervical cancer virus.

An ethical reason for this would be that the parents . . .

1 think vaccination might encourage the girl to have underage sex.

2 do not know how the vaccine works.

3 are afraid of side-effects.

4 cannot afford vaccination.

END OF TEST

4.3.1.7 Vaccination

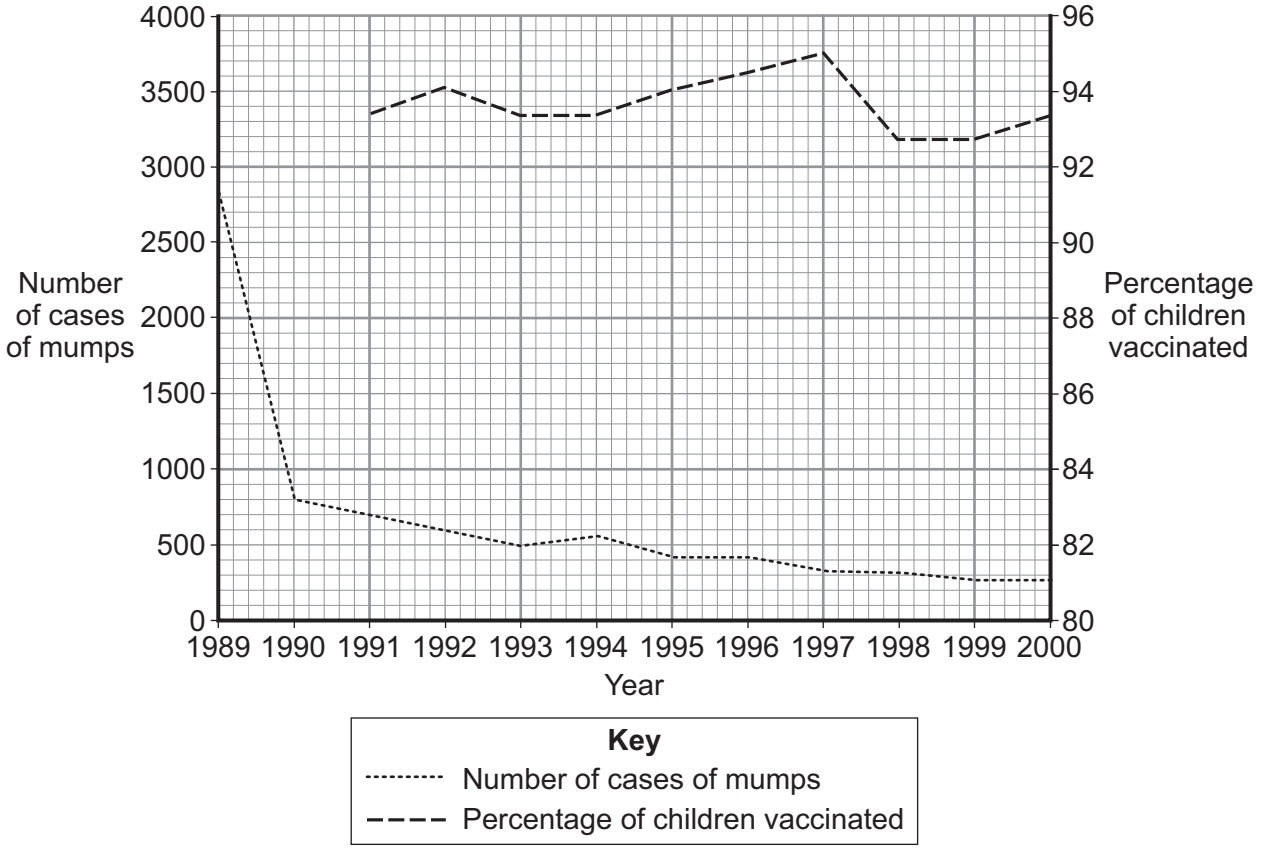
Question 22

November 2011 | BLY1AP | Original Q4 | Legacy

QUESTION FOUR

The graph shows the number of cases of mumps in Scotland between 1989 and 2000.

The graph also shows the percentage of children vaccinated against mumps.



Match numbers, **A**, **B**, **C** and **D**, with the statements **1**–**4** in the table.

A 1991

B 1994

C 1997

D 2000

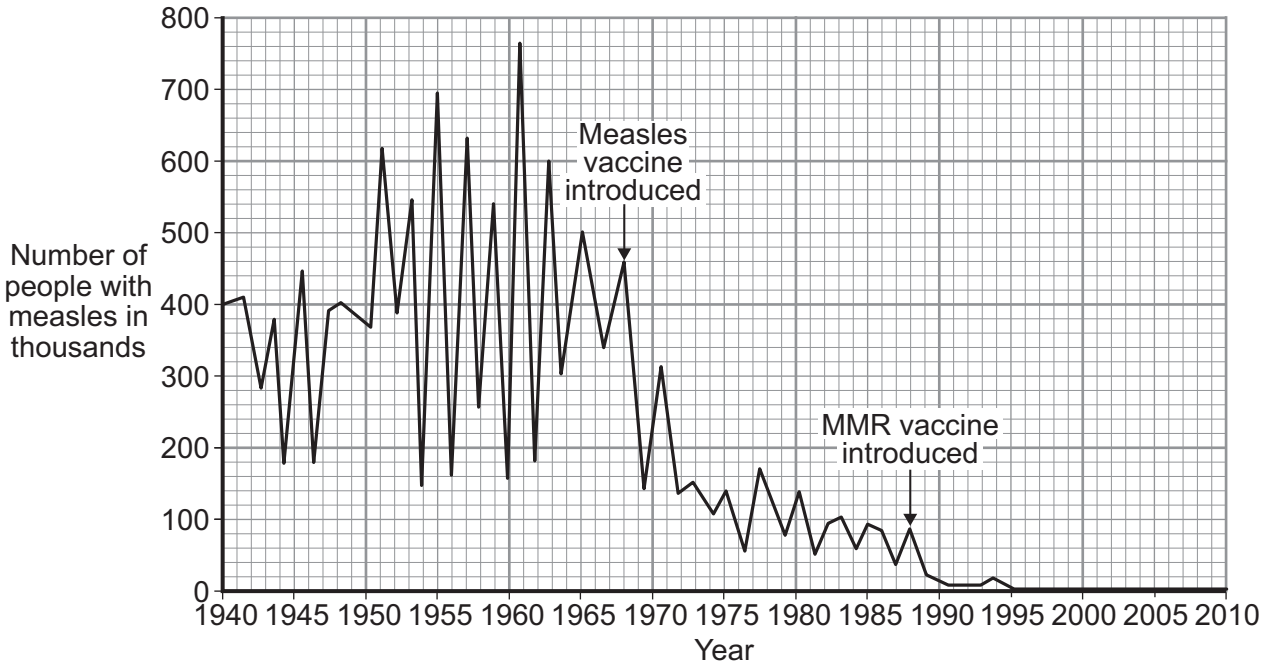
1	the year when vaccination started
2	the year when the highest percentage of children were vaccinated
3	the only year when there was an increase in the number of cases of mumps
4	the decrease in the number of cases of mumps between 1989 and 1990

4.3.1.7 Vaccination

Question 23

January 2012 | BL1FP | Original Q8 | Legacy

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



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

Use data from the graph.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

4.3.1.7 Vaccination

Question 23 · continued

8 (b) The MMR vaccine was introduced in 1988.

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

1 ..... 2 .....

(2 marks)

8 (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)

8

4.3.1.7 Vaccination

Question 24

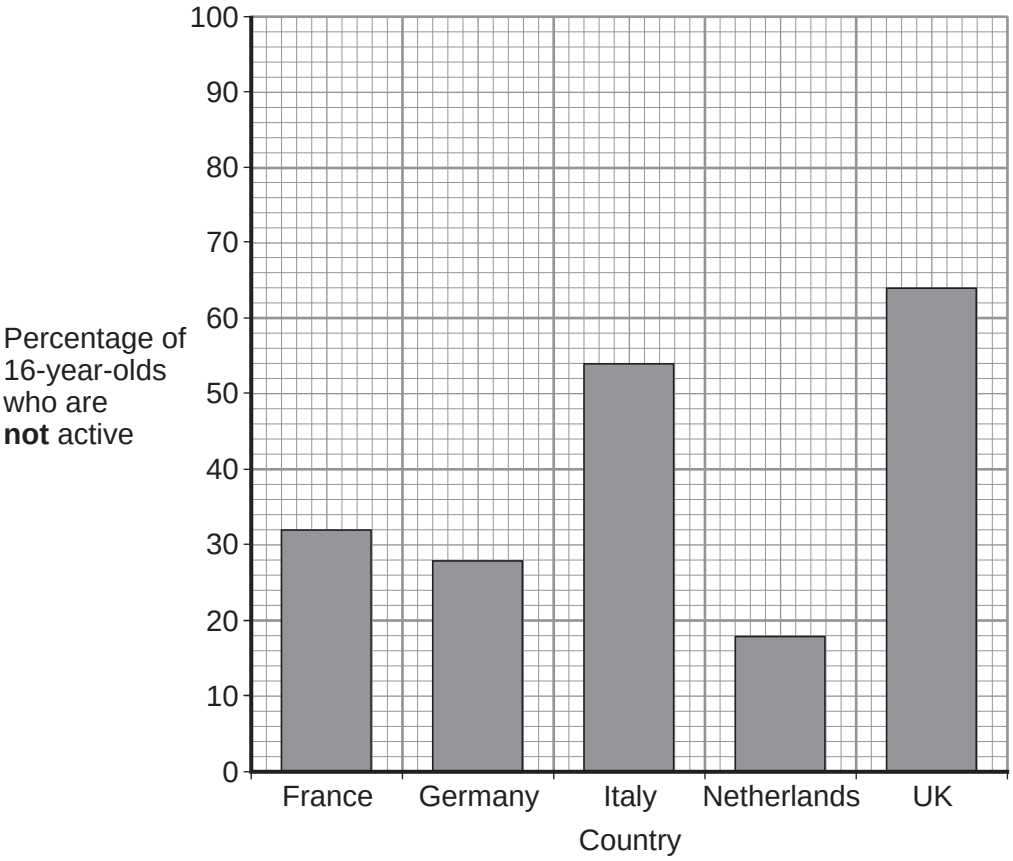
June 2015 | BL1FP | Original Q2 | Legacy

2 Scientists investigated the effect of different factors on health.

2 (a) People who are **not** active may have health problems.

Figure 3 shows the percentage of 16-year-olds in some countries who are **not** active.

Figure 3



2 (a) (i) What percentage of 16-year-olds in the UK are **not** active?

[1 mark]

..... %

2 (a) (ii) What percentage of 16-year-olds in the UK are **active**?

[1 mark]

..... %

4.3.1.7 Vaccination

Question 24 · continued

2 (a) (iii) A newspaper headline states:

People in the UK are the laziest in the world.

Information in **Figure 3** does **not** support the newspaper headline.

Suggest **one** reason why the newspaper headline may be wrong.

[1 mark]

.....

.....

2 (b) Doctors gave a percentage rating to the health of 16-year-olds.
100% is perfect health.

Table 2 shows the amount of exercise 16-year-olds do and their health rating.

Table 2

Amount of exercise done in minutes every week	Health rating as %
Less than 30	72
90	76
180	82
300	92

What conclusion can be made about the effect of exercise on health?

Use information from **Table 2**.

[1 mark]

.....

.....

Question 2 continues on the next page

4.3.1.7 Vaccination

Question 24 · continued

2 (c) Inherited factors can also affect health.

Give **one** health problem that may be affected by the genes someone inherits.

Draw a ring around the correct answer.

[1 mark]

being malnourished	**having a high cholesterol level**	**having a deficiency disease**

2 (d) White blood cells are part of the immune system.

Use the correct answer from the box to complete each sentence.

antibiotics	**antibodies**	**pathogens**	**vaccines**

2 (d) (i) When we are ill, white blood cells produce ..... to kill microorganisms.

[1 mark]

2 (d) (ii) Many strains of bacteria, including MRSA, have developed resistance to drugs called ..... .

[1 mark]

7

4.3.1.7 Vaccination

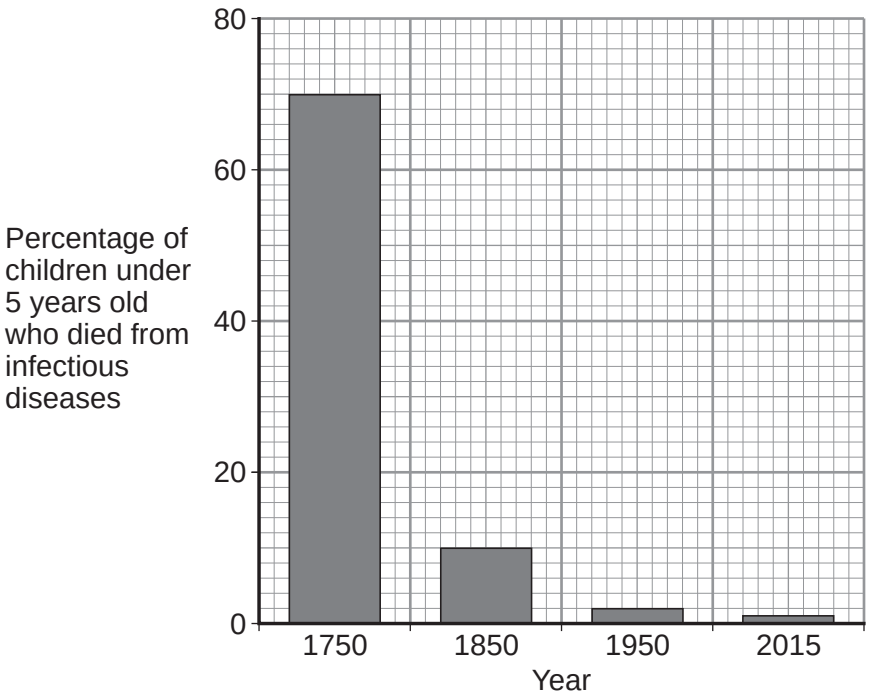
Question 25

June 2016 | BL1FP | Original Q5 | Legacy

5 Pathogens are microorganisms that cause infectious diseases.

5 (a) **Figure 7** shows the percentage of children under 5 years old who died from infectious diseases, in the UK, in four different years.

Figure 7



5 (a) (i) In the 1840s Dr Semmelweis introduced a new idea into hospitals.
What was this idea?

[1 mark]

Tick (✓) **one** box.

- hand-washing ☐
- immunisation ☐
- painkillers ☐

5 (a) (ii) Between 1750 and 1850 vaccinations were also developed.
What is in a vaccine?

[1 mark]

Tick (✓) **one** box.

- large amounts of dead pathogens ☐
- large amounts of live pathogens ☐
- small amounts of dead pathogens ☐

4.3.1.7 Vaccination

Question 25 · continued

5 (a) (iii) The advances in medicine had an effect on death rate.

Describe the effect these advances had between 1750 and 1850.

To gain full marks you should include data from **Figure 7**.

[2 marks]

5 (b) Antibiotics were developed in the 1940s. Antibiotics kill bacteria.

5 (b) (i) Which **one** of the following is an antibiotic?

[1 mark]

Draw a ring around the correct answer.

cholesterol **penicillin** **thalidomide**

5 (b) (ii) The use of antibiotics has **not** reduced the death rate due to all diseases to zero.

Suggest **two** reasons why.

[2 marks]

1

2

5 (c) In school laboratories, bacteria should be grown at a maximum temperature of 25 °C.

Give **one** reason why companies testing new antibiotics grow bacteria at 37 °C.

[1 mark]

8

4.3.1.7 Vaccination

Question 26

June 2018 | 8461/1F | Original Q7

0 7 Eating food containing *Salmonella* bacteria can cause illness.

0 7 . 1 Two symptoms of infection by *Salmonella* are vomiting and diarrhoea.

What causes these symptoms?

[1 mark]

0 7 . 2 Give **two** ways a person with a mild infection of *Salmonella* can help prevent the spread of the bacteria to other people.

[2 marks]

1

2

0 7 . 3 In very serious infections of *Salmonella*, a doctor can prescribe drugs to kill the bacteria.

What type of drug can the doctor prescribe to kill the bacteria?

[1 mark]

0 7 . 4 A person with AIDS may take longer than a healthy person to recover from a *Salmonella* infection.

Explain why.

[2 marks]

Question 26 · continued

0 7 . 5 *Salmonella* bacteria can be transmitted from chickens to humans. Chickens can be vaccinated to prevent the transmission of *Salmonella* bacteria to humans.

Suggest **one** other way farmers could prevent the transmission of *Salmonella* from chickens to humans.

[1 mark]

A restaurant owner employed a scientist to test the effectiveness of two kitchen cleaning liquids.

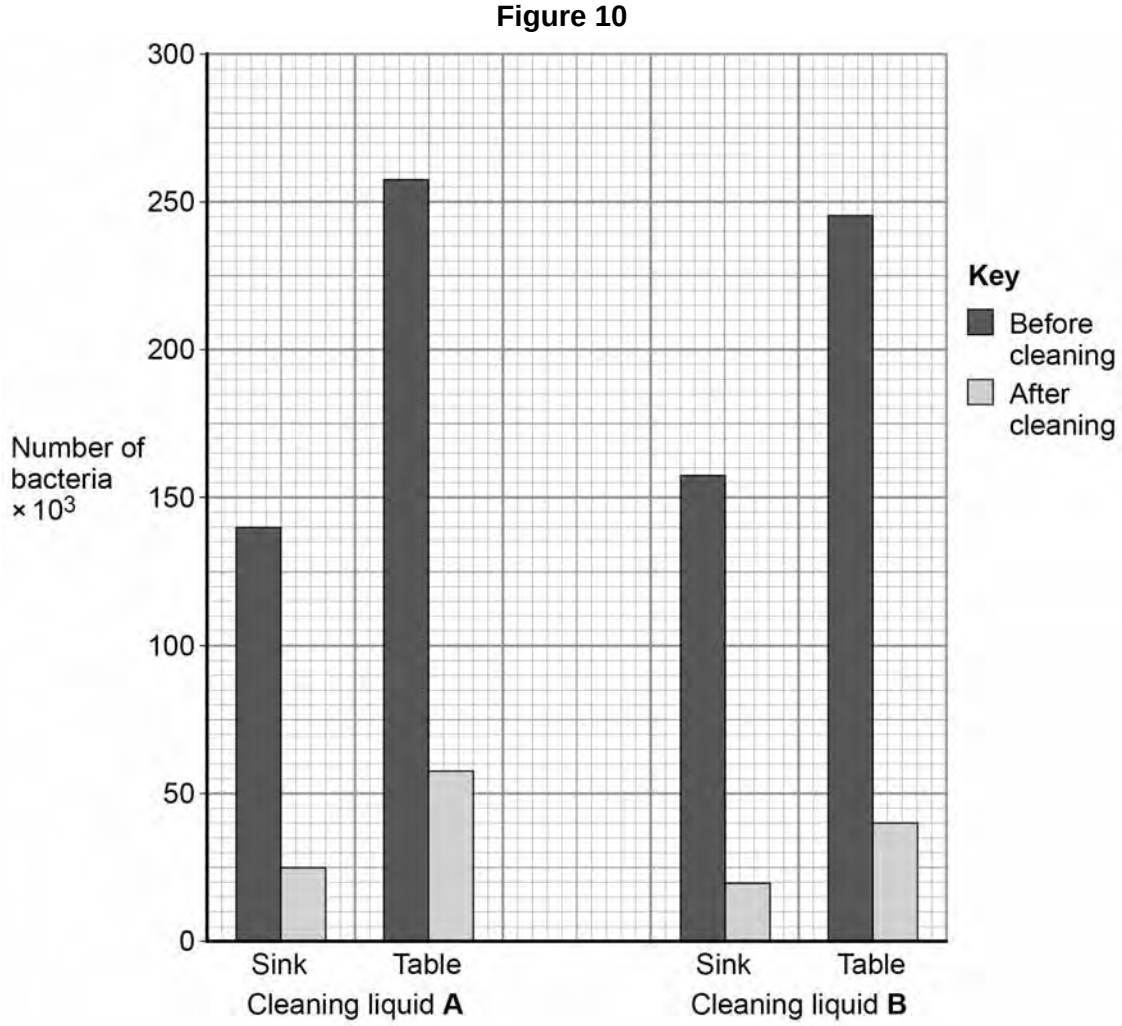
The scientist took samples from two work surfaces:

- before the surfaces had been cleaned with the cleaning liquids
- after the surfaces had been cleaned with the cleaning liquids.

The samples were then analysed for the number of bacteria they contained.

The results are shown in **Figure 10**.

Figure 10



4.3.1.7 Vaccination

Question 26 · continued

0 7 . 6 Which cleaning liquid is the more effective?

Give a reason for your answer.

[1 mark]

Cleaning liquid _____

Reason _____

_____

_____

Question 7 continues on the next page

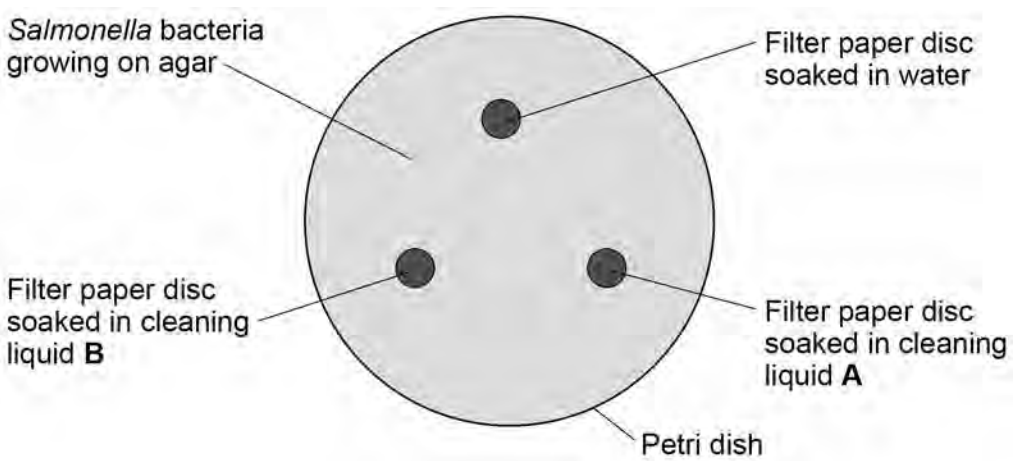
4.3.1.7 Vaccination

Question 26 · continued

The scientist investigated the effect of cleaning liquid **A** and cleaning liquid **B** on *Salmonella* bacteria grown in a laboratory.

Figure 11 shows the way the investigation was set up.

Figure 11



The Petri dish was placed in an incubator at 25 °C for 48 hours.

After 48 hours, the scientist calculated the area around each paper disc where no bacteria were growing.

The results are shown in **Table 4**.

Table 4

Filter paper disc	Area around disc with no bacteria growing in cm^2
Water	0
Cleaning liquid **A**	11
Cleaning liquid **B**	13

0 7 . 7 What measurement would the scientist need to take to calculate the area where no bacteria were growing?

[1 mark]

4.3.1.7 Vaccination

Question 26 · continued

June 2018 | 8461/1F | Original Q7

0 7 . 8 Give **one** change to the investigation that would allow the scientist to check if the results are repeatable.

[1 mark]

0 7 . 9 The scientist showed the results to the restaurant owner.

Both cleaning liquids cost the same per dm^3.

Suggest **one** other factor the restaurant owner should consider when choosing which cleaning liquid to use.

[1 mark]

11

4.3.1.7 Vaccination

Question 27

November 2020 | 8461/1F | Original Q3

0 3 The human body can defend itself against microorganisms that cause disease.

Viruses are one type of microorganism that cause disease.

0 3 . 1 Name **one** type of microorganism that causes disease in humans.

Do **not** refer to viruses in your answer.

[1 mark]

---

0 3 . 2 Which **two** defence systems prevent microorganisms infecting the human body?

[2 marks]

Tick (✓) **two** boxes.

- Air is warmed as it is breathed into the lungs. ☐
- Hairs on the skin trap microorganisms. ☐
- Hydrochloric acid is produced by the stomach. ☐
- Teeth in the mouth crush and kill microorganisms. ☐
- The skin is a barrier covering the whole body. ☐

0 3 . 3 If microorganisms enter the human body the immune system can destroy the microorganisms.

How does the immune system destroy microorganisms?

[1 mark]

Tick (✓) **one** box.

- Platelets kill the microorganisms. ☐
- Red blood cells stick to the microorganisms. ☐
- White blood cells engulf the microorganisms. ☐

4.3.1.7 Vaccination

Question 27 · continued

0 3 . 4 Vaccinations prevent people becoming ill with diseases such as measles.

Complete the sentences.

[2 marks]

Choose answers from the box.

active	**fast**	**resistant**	**slow**	**weakened**

In a vaccine the measles virus is _____.

If the measles virus enters the body after vaccination the immune system reaction will be _____.

0 3 . 5 How is the measles virus spread from one person to another?

[1 mark]

_____

_____

Question 3 continues on the next page

4.3.1.7 Vaccination

Question 27 · continued

Doctors investigated the spread of the virus that causes chickenpox.

The first symptom of chickenpox after exposure to the virus is spots on the body.

23 children were playing together at a party.

On the day of the party one of the children developed chickenpox spots.

Every two days after the party, the doctors recorded when the other 22 children first showed chickenpox spots.

Table 1 shows the results.

Table 1

Day when chickenpox spots first showed	Number of children
2	0
4	0
6	0
8	0
10	1
12	1
14	6
16	4
18	2
20	0
Total	**14**

0 3 . 6 What was the range for the days on which children first showed chickenpox spots?

Use **Table 1**.

[1 mark]

From day _____ to day _____

0 3 . 7 Incubation time is the usual time from exposure to a pathogen until the first symptoms appear.

Suggest the most likely incubation time for chickenpox.

[1 mark]

Incubation time = _____ days

4.3.1.7 Vaccination

Question 27 · continued

0 3 . 8 Suggest **one** reason why some of the children did **not** develop chickenpox.

[1 mark]

0 3 . 9 One mother gave antibiotics to her child who had chickenpox.

Suggest why this child did **not** recover more quickly than the other children who had chickenpox.

[1 mark]

11

Turn over for the next question

4.3.1.7 Vaccination

Question 28

November 2021 | 8461/1F | Original Q2

0 2 Viruses cause disease.

0 2 . 1 What name is given to microorganisms that cause disease?

[1 mark]

Tick (✓) **one** box.

Pathogens ☐

Predators ☐

Prokaryotes ☐

0 2 . 2 How do viruses cause the symptoms of disease?

[1 mark]

Tick (✓) **one** box.

Viruses engulf white blood cells, destroying them. ☐

Viruses produce antibodies that damage tissues. ☐

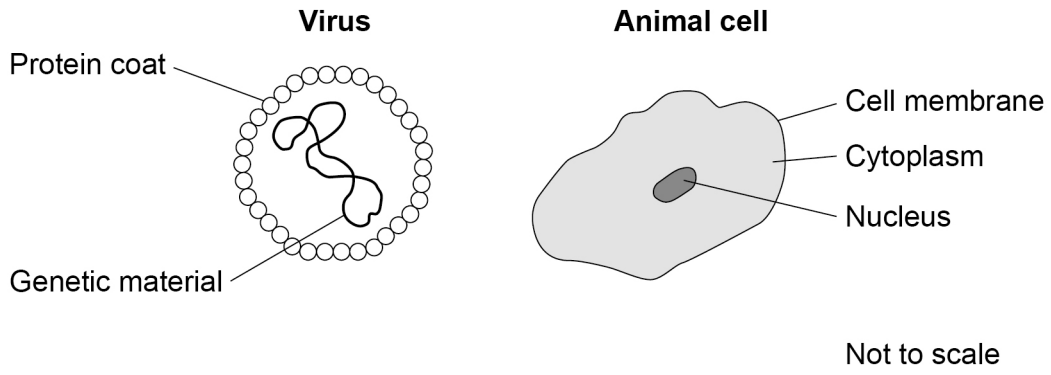
Viruses reproduce inside cells, damaging them. ☐

4.3.1.7 Vaccination

Question 28 · continued

Figure 4 shows a virus and an animal cell.

Figure 4



0 2 . 3 Suggest **one** reason why viruses are **not** classed as cells.

[1 mark]

A vaccine can protect humans from a viral disease.

0 2 . 4 What does the vaccine contain?

[1 mark]

Tick (✓) **one** box.

- A toxic form of a virus ☐
- A weakened form of a virus ☐
- An active form of a virus ☐

Question 2 continues on the next page

4.3.1.7 Vaccination

Question 28 · continued

In some cases, a first vaccination needs to be followed by a second vaccination some time later.

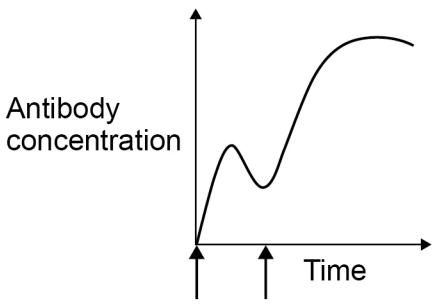
0 2 . 5 Which graph shows how the concentration of antibodies in a person's blood changes after the first and second vaccinations?

[1 mark]

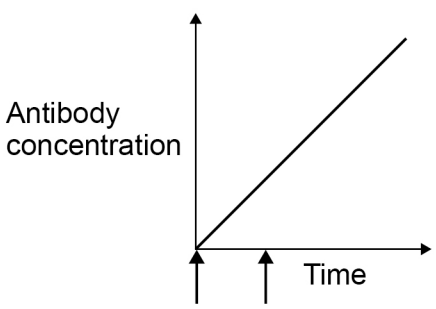
Tick (✓) **one** box.

Key

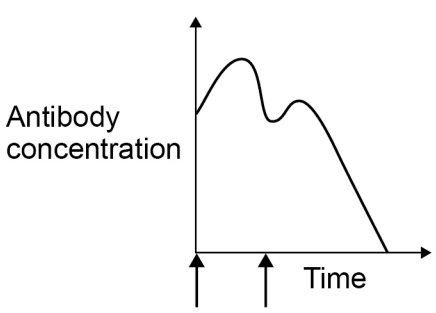
↑ Vaccination given



☐



☐



☐

4.3.1.7 Vaccination

Question 28 · continued

Tobacco mosaic virus (TMV) causes disease in plants.

TMV affects the rate of photosynthesis in plants.

0 2 . 6 Which part of a plant shows discolouration caused by TMV?

[1 mark]

Tick (✓) **one** box.

Flower ☐

Leaf ☐

Root ☐

Question 2 continues on the next page

4.3.1.7 Vaccination

Question 28 · continued

Table 1 shows the rate of photosynthesis in four different tobacco plants.

Table 1

Tobacco plant	Level of TMV infection in plant	Rate of photosynthesis in arbitrary units
A	None	15
B	Mild	13
C	Medium	7
D	High	3

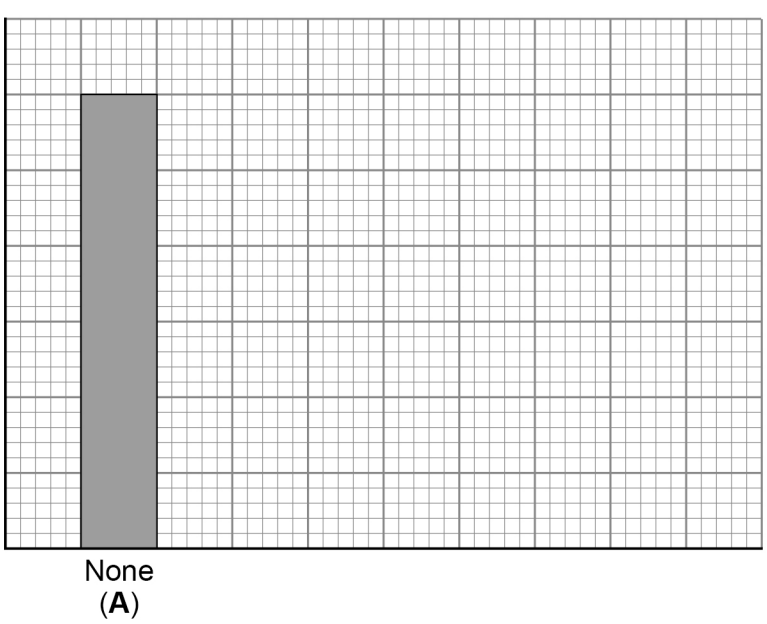
0 2 . 7 Complete **Figure 5**.

You should:

- label the y-axis
- add the correct scale to the y-axis
- plot the data from **Table 1**
- label each bar.

[5 marks]

Figure 5



4.3.1.7 Vaccination

Question 28 · continued

0 2 . 8 What conclusion can be made from the data in **Table 1**?

[1 mark]

0 2 . 9 Explain why a high level of TMV infection reduces growth in a plant.

[2 marks]

14

Turn over for the next question

4.3.1.7 Vaccination

Question 29

June 2022 | 8461/1F | Original Q1

0 1 HIV (Human Immunodeficiency Virus) is a pathogen.

0 1 . 1 How is HIV spread from one person to another person?

[1 mark]

Tick (✓) **one** box.

Coughing ☐

Sexual intercourse ☐

Touching door handles ☐

Table 1 shows information about new cases of HIV diagnosed in the UK.

Table 1

Year	Number of new HIV cases
2010	2642
2014	2767
2018	1530

0 1 . 2 Describe what happened to the number of new cases of HIV from 2010 to 2018.

[2 marks]

4.3.1.7 Vaccination

Question 29 · continued

0 1 . 3 What could cause a **decrease** in the number of new HIV cases in the future?

[1 mark]

Tick (✓) **one** box.

A higher population of people in the UK ☐

A lower number of trained HIV nurses ☐

Better education on how to prevent the spread of HIV ☐

0 1 . 4 Scientists have been working to produce a vaccine for HIV for many years.

How could a vaccine work to prevent a person being infected with HIV?

Write the stages **A**, **B**, **C**, **D** and **E** in the correct order.

[3 marks]

The first stage has been completed for you.

A Antibodies attach to the inactive virus.

B Antibodies destroy the inactive virus.

C An inactive form of the virus is injected into the body.

D If the active virus enters the body, antibodies are produced quickly.

E White blood cells produce antibodies to the inactive virus.

C ⟶ _____ ⟶ _____ ⟶ _____ ⟶ _____

Question 1 continues on the next page

4.3.1.7 Vaccination

Question 29 · continued

0 1 . 5 When scientists produce a vaccine for a disease the vaccine is tested on live animals.

What is the next stage in testing the vaccine?

[1 mark]

Tick (✓) **one** box.

- Testing on cells in a laboratory ☐
- Testing on healthy volunteers ☐
- Testing on the whole human population ☐

0 1 . 6 A vaccine for HIV is important because it is difficult to develop safe drugs to destroy viruses.

Why is it difficult to develop safe drugs to destroy viruses?

[1 mark]

Tick (✓) **one** box.

- Drugs that destroy viruses also damage body tissues. ☐
- There are too many viruses for the drugs to destroy. ☐
- Viruses are too big for the drugs to destroy. ☐

4.3.1.7 Vaccination

Question 29 · continued

0 1 . 7 Some drugs originated from plants.

Draw **one** line from each drug to the plant the drug originated from.

[2 marks]

Drug	Plant the drug originated from
Aspirin	Foxglove
	Rose
Digitalis	Tobacco
	Willow

11

4.3.1.7 Vaccination

Question 30

June 2023 | 8461/1F | Original Q2

0 2 Viruses cause disease.

0 2 . 1 What name is given to microorganisms that cause disease?

[1 mark]

Tick (✓) **one** box.

- Pathogens ☐
- Predators ☐
- Producers ☐

0 2 . 2 The body has defences to stop viruses entering.

Draw **one** line from each defence to the part of the body that provides the defence.

[2 marks]

Defence	Part of the body that provides the defence
	Brain
A physical barrier that stops viruses entering	Heart
Mucus that traps viruses	Nose
	Skin

4.3.1.7 Vaccination

Question 30 · continued

Some viruses can cause tumours to develop.

0 2 . 3 Complete the sentence.

Choose the answer from the box.

[1 mark]

digestion	division	metabolism

A tumour can form when changes to cells cause uncontrolled

cell _____.

0 2 . 4 Malignant tumours are cancers.

Which **two** sentences describe malignant tumours?

[2 marks]

Tick (✓) **two** boxes.

- Malignant tumours are only found in the reproductive system. ☐
- Malignant tumours contain digestive enzymes. ☐
- Malignant tumours do not change in size. ☐
- Malignant tumours have cells that can spread to other parts of the body. ☐
- Malignant tumours may form secondary tumours. ☐

Question 2 continues on the next page

Question 30 · continued

HPV is a virus that can cause one type of cancer in females.

In the UK since 2008, most 12 to 13-year-old females have been vaccinated against HPV.

Scientists investigated the percentage of 16 to 18-year-old females with HPV.

Table 2 shows the results.

Table 2

Year	Percentage (%) of 16 to 18-year-old females with HPV
2010	8.2
2012	3.2
2014	2.0
2016	1.6

0 2 . 5 What does **Table 2** show about the percentage of females with HPV from 2010 to 2016?

[1 mark]

0 2 . 6 Suggest the reason for the change you described in Question **02.5**.

[1 mark]

4.3.1.7 Vaccination

Question 30 · continued

The HPV vaccine contains an inactive form of the virus.

The inactive form of the virus is injected into the body.

0 2 . 7 Which part of the blood responds to the inactive virus?

[1 mark]

Tick (✓) **one** box.

- Platelets ☐
- Red blood cells ☐
- White blood cells ☐

0 2 . 8 What is produced by the body in response to the inactive virus?

[1 mark]

Tick (✓) **one** box.

- Antibiotics ☐
- Antibodies ☐
- Antiseptics ☐

0 2 . 9 Suggest **one** reason why some **parents** refuse to allow their children to have the HPV vaccine.

Do **not** refer to the pain of the injection in your answer.

[1 mark]

_____

_____

11

4.3.1.7 Vaccination

Question 31

0 3 Measles is caused by a virus.

0 3 . 1 The measles vaccine is given to children to prevent them becoming ill with measles.

Draw **one** line from each blood component to its function when someone is vaccinated against measles.

[2 marks]

Blood component	Function
	Help clot the blood where the vaccine was injected
Platelets	Produce antibodies to the measles virus
White blood cells	Produce the measles skin rash
	Transport oxygen to the measles virus

Question 3 continues on the next page

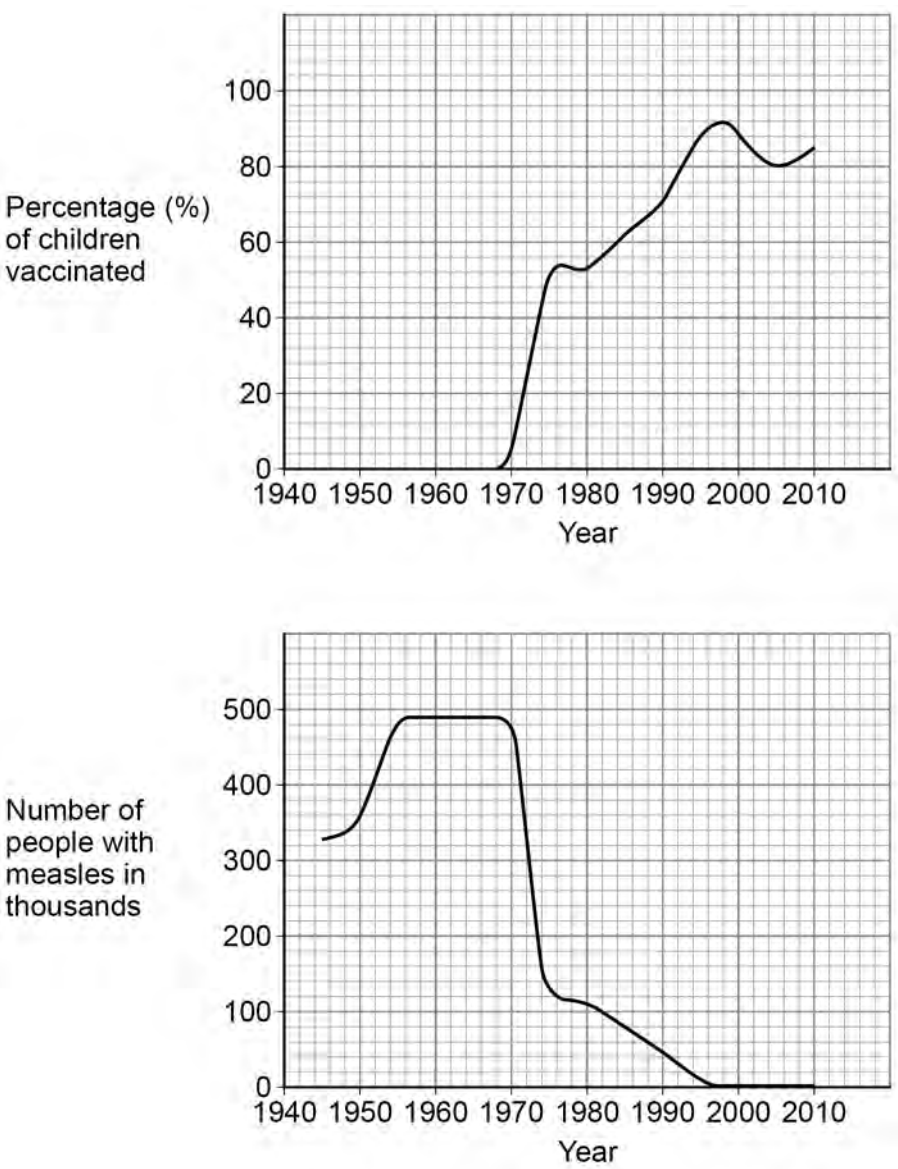
4.3.1.7 Vaccination

Question 31 · continued

Figure 3 shows information about trends in the UK for:

- percentage of children vaccinated
- the number of people with measles.

Figure 3



4.3.1.7 Vaccination

Question 31 · continued

0 3 . 2 What year was the measles vaccine first used?

Use **Figure 3**.

[1 mark]

0 3 . 3 Describe the trend in the **number of people with measles** from 1945 to 1975.

Use **Figure 3**.

[3 marks]

In **1998**, a scientific paper was published suggesting a link between condition **X** and one type of measles vaccine.

0 3 . 4 What happened to the **percentage of children vaccinated** against measles after the scientific paper was published in 1998?

Use **Figure 3**.

[1 mark]

Question 3 continues on the next page

4.3.1.7 Vaccination

Question 31 · continued

0 3 . 5 Why might the claims made in the scientific paper have affected the percentage of children vaccinated?

[1 mark]

Tick (✓) **one** box.

The measles pathogen did not exist in the UK anymore. ☐

Parents were worried their children would get condition **X**. ☐

The health service in the UK did not have any vaccines. ☐

0 3 . 6 In 2010, the scientific paper linking condition **X** and the measles vaccine was shown to be based on false claims.

What should scientists do with scientific research to help detect false claims?

[1 mark]

Tick (✓) **one** box.

Have the research peer reviewed. ☐

Publish the research on the internet. ☐

Send a research questionnaire to the public. ☐

0 3 . 7 The person who wrote the scientific paper was paid to research the link between condition **X** and the measles vaccine.

Why are the claims in the scientific paper likely to be considered **not** valid?

[1 mark]

_____

_____

10

4.3.1.7 Vaccination

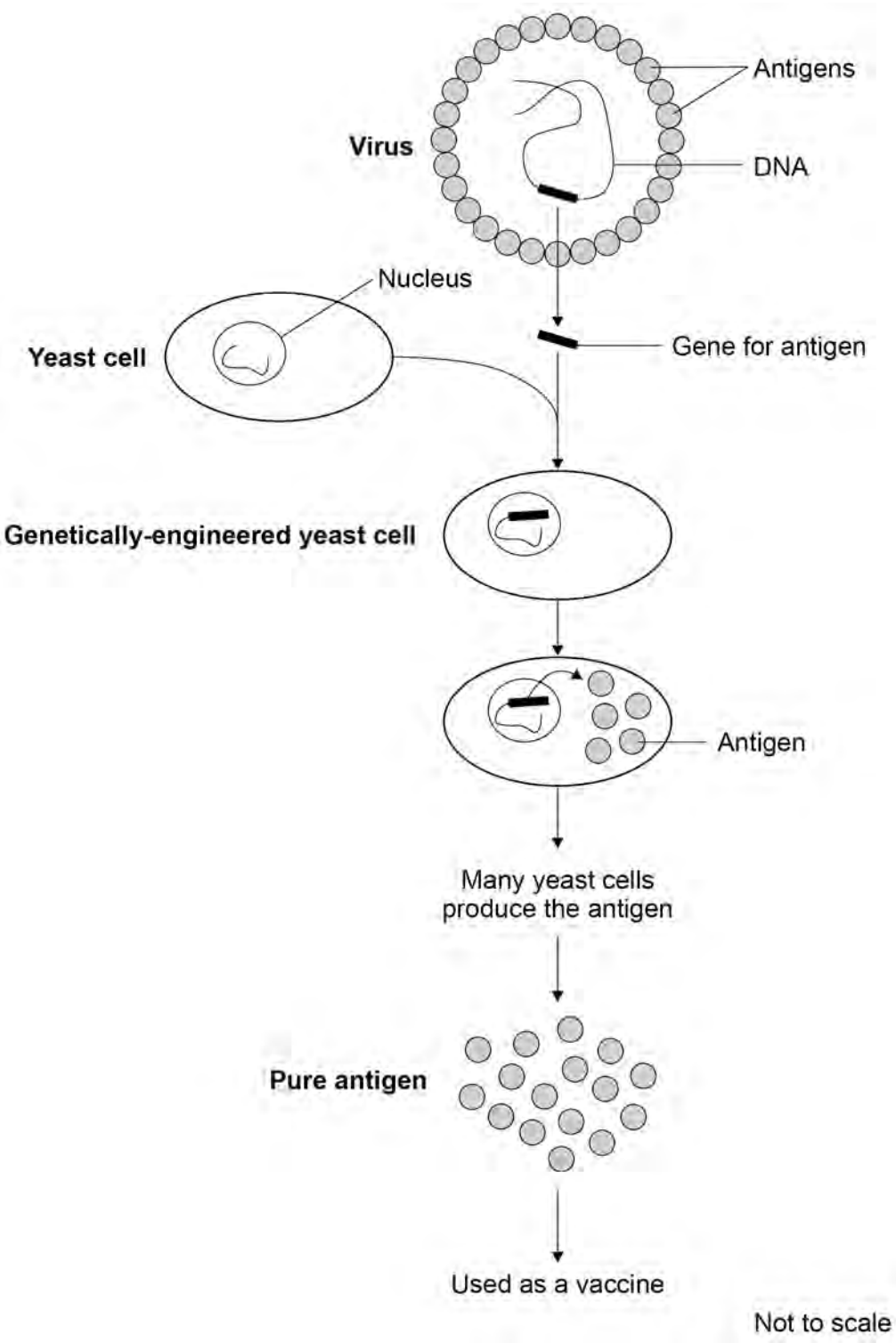
Question 32

June 2024 | 8461/2F | Original Q3

0 3 Genetic engineering can be used for making many useful products.

Figure 3 shows how a vaccine against a virus can be made by genetic engineering.

Figure 3



4.3.1.7 Vaccination

Question 32 · continued

Use information from **Figure 3** to answer questions **03.1** and **03.2**.

0 3 . 1 Which part of the virus is put into the yeast cell?

[1 mark]

0 3 . 2 Which part of the virus is made by the yeast cell?

[1 mark]

0 3 . 3 A long time ago, vaccines were made in a different way.

The virus was heated to stop it reproducing.

The vaccine contained whole viruses.

Why might the vaccine containing heat-treated viruses be dangerous?

[1 mark]

Tick (✓) **one** box.

- The viruses may be inactive. ☐
- The viruses may cause an infection. ☐
- The viruses will not mutate. ☐

Question 3 continues on the next page

4.3.1.7 Vaccination

Question 32 · continued

Genetic engineering can also be used in agriculture.

Weeds are a problem for farmers because the weeds compete with crop plants.

0 3 . 4 Give **three** factors that the weeds and crop plants compete for.

[3 marks]

1 _____

2 _____

3 _____

Glyphosate is a weed killer used in agriculture.

Genetically modified (GM) maize is a food crop that is resistant to glyphosate weed killer.

Farmers can spray glyphosate on a field to kill the weeds where the GM maize is growing.

0 3 . 5 Suggest **one** advantage of using glyphosate on fields where GM maize is growing.

[1 mark]

_____

_____

0 3 . 6 Suggest **one** problem of using glyphosate on fields where GM maize is growing.

Do **not** refer to cost in your answer.

[1 mark]

_____

_____

8

4.3.1.7 Vaccination

Question 33

June 2025 | 8461/1F | Original Q6

0 6 Measles is an infectious disease caused by a pathogen.

0 6 . 1 What type of pathogen causes measles?

[1 mark]

0 6 . 2 Give **one** way measles is spread from one person to another person.

[1 mark]

0 6 . 3 One symptom of measles is pain.

In adults, aspirin can be used to treat the pain.

Which plant did aspirin originate from?

[1 mark]

0 6 . 4 Give **one** other symptom of measles.

Do **not** refer to pain in your answer.

[1 mark]

4.3.1.7 Vaccination

Question 33 · continued

The spread of measles can be reduced by vaccination.

0 6 . 5 Explain why vaccinating large numbers of children helps to reduce the spread of the measles pathogen in the population.

[2 marks]

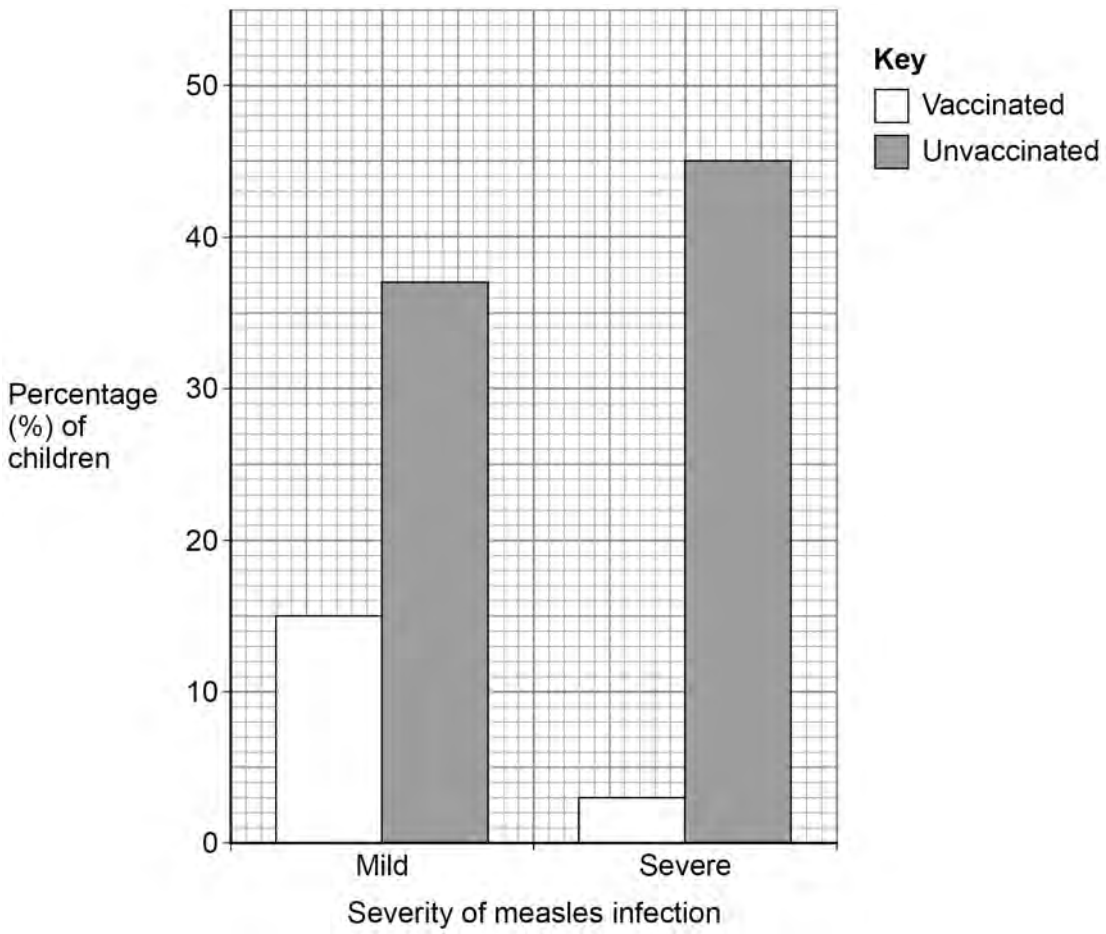
Question 6 continues on the next page

4.3.1.7 Vaccination

Question 33 · continued

Figure 9 shows information about the severity of measles infection in vaccinated and unvaccinated children.

Figure 9



0 6 . 6 There were 240 children in the survey.

Calculate how many **unvaccinated** children had a severe measles infection.

Use **Figure 9**.

[3 marks]

Number of unvaccinated children = _____

4.3.1.7 Vaccination

Question 33 · continued

0 6 . 7 It is recommended that all children are given a measles vaccination.

Give evidence from **Figure 9** to support the recommendation.

Include data from **Figure 9** in your answer.

[2 marks]

11

Turn over for the next question