AQA GCSE Biology | 8461

SPECIFICATION POINT 4.3.1.2

Viral diseases

Past-paper questions

Tier	**Foundation**
Question groups	**15**
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.

4.3.1.2 Viral diseases

Question 01

March 2007 | BLY1A | Original Q6 | Legacy

QUESTION SIX

Avian influenza (bird flu) is caused by a virus which was first identified in 1900. Recently there have been concerns that new strains of the virus may be able to infect humans.

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

A antibiotics

B natural selection

C pandemic

D resistance

Avian influenza cannot be treated with . . . **1** . . . .

The influenza virus may develop . . . **2** . . . to the drugs used as a result of . . . **3** . . . .

This may cause a . . . **4** . . . of the disease.

4.3.1.2 Viral diseases

Question 02

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

4.3.1.2 Viral diseases

Question 03

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.

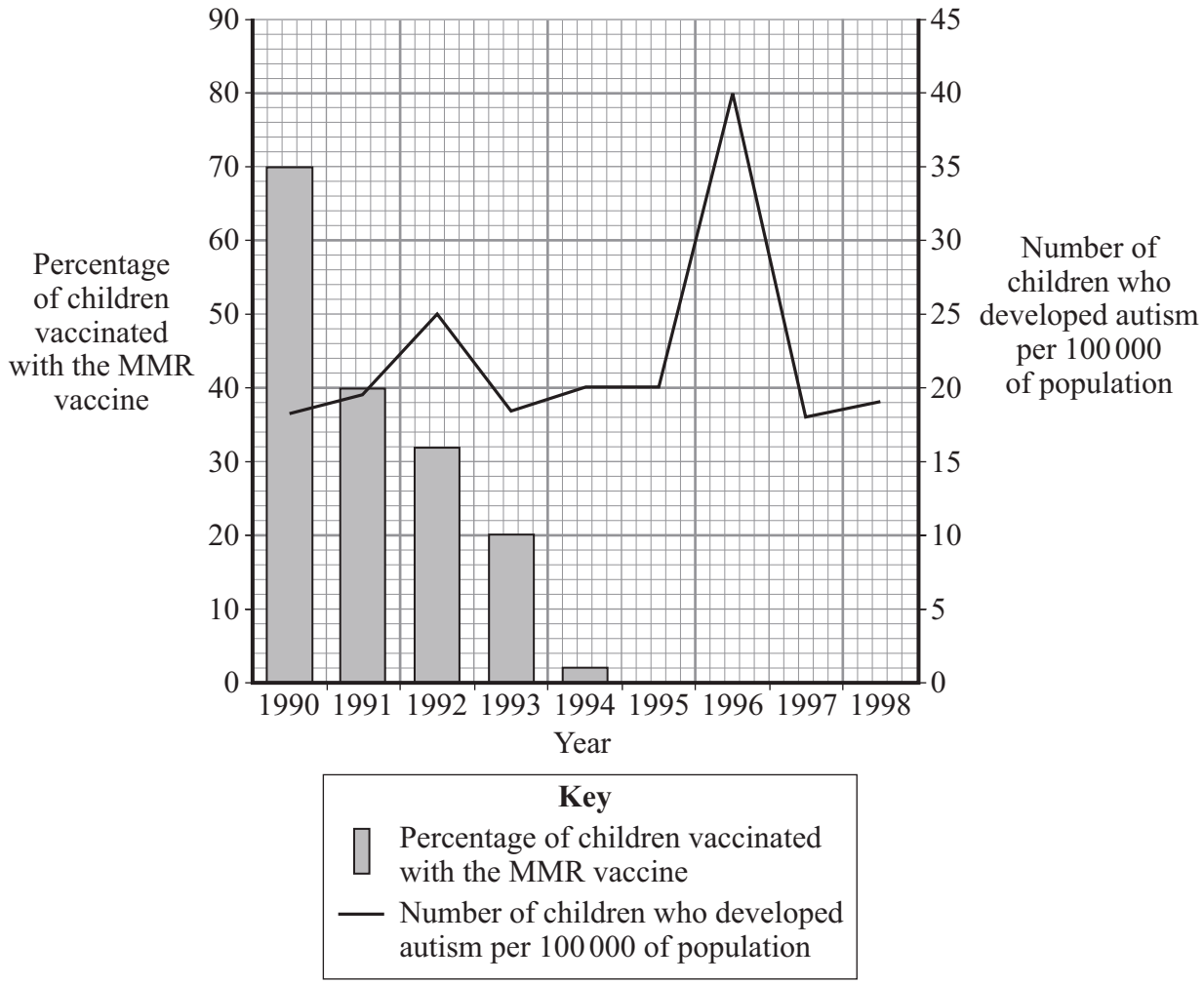
Vaccines stimulate white blood cells to produce ..... .

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.



4.3.1.2 Viral diseases

Question 03 · 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

4.3.1.2 Viral diseases

Question 04

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

4.3.1.2 Viral diseases

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

4.3.1.2 Viral diseases

Question 05

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.

4.3.1.2 Viral diseases

Question 05 · continued

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

4.3.1.2 Viral diseases

Question 06

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.

4.3.1.2 Viral diseases

Question 06 · continued

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.

4.3.1.2 Viral diseases

Question 07

June 2010 | BLY1F | Original Q9 | Legacy

9 Influenza is an infectious disease. The influenza virus often mutates.
This has made the World Health Organisation worried about another influenza *pandemic*.

9 (a) What is meant by a *pandemic*?

.....

.....

(1 mark)

9 (b) Explain why a mutation of the influenza virus might cause another influenza pandemic.

.....

.....

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.....

.....

(3 marks)

4

4.3.1.2 Viral diseases

Question 08

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.

4.3.1.2 Viral diseases

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.'

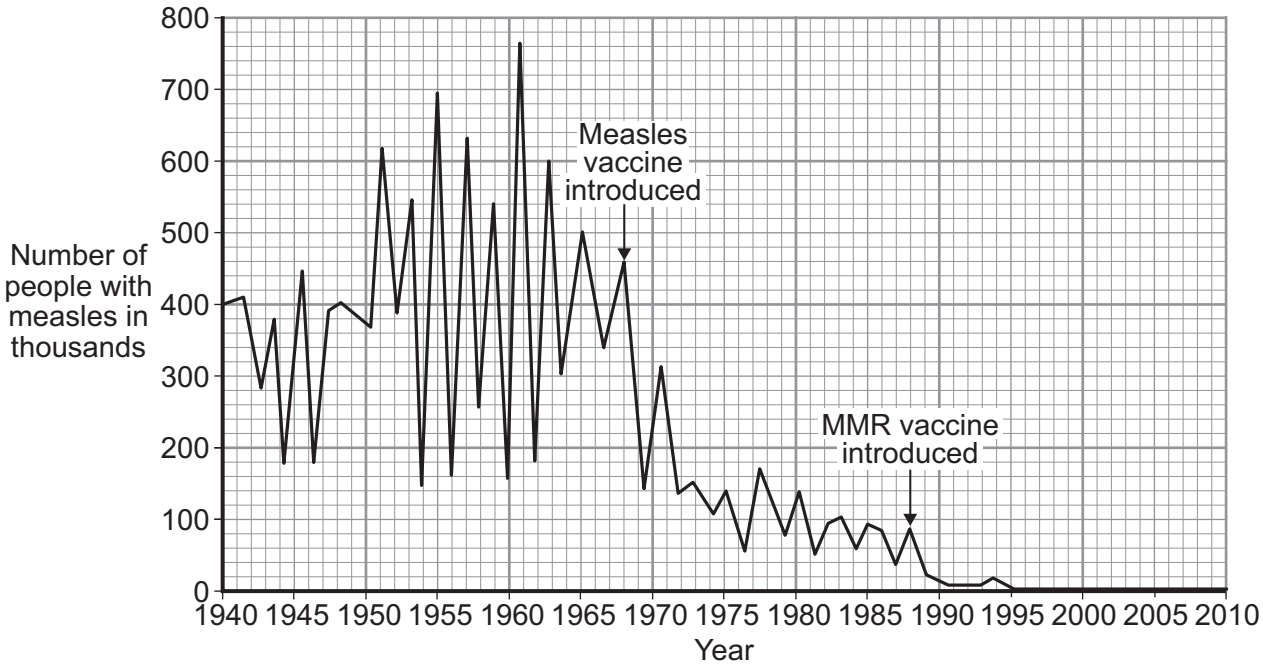
END OF TEST

4.3.1.2 Viral diseases

Question 09

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.

.....

.....

.....

.....

.....

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.....

.....

(3 marks)

4.3.1.2 Viral diseases

Question 09 · 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

4.3.1.2 Viral diseases

Question 10

June 2014 | BL1FP | Original Q4 | Legacy

4 Drugs affect the human body.

4 (a) Draw **one** line from each drug to the correct information about the drug.

[4 marks]

Drug	Information
Cannabis	Used to boost heart rate
Steroid	Used to treat leprosy
Stimulant	May cause mental illness in some people
Thalidomide	Used to increase muscle growth
	Used to treat measles

4 (b) New drugs must be tested and trialled before being used.

4 (b) (i) New drugs are tested in a laboratory before they are trialled on people.

What are new drugs tested on in a laboratory?

[1 mark]

.....

4.3.1.2 Viral diseases

Question 10 · continued

4 (b) (ii) Why is it important that drugs are trialled before doctors give them to patients?

Tick (✓) **two** boxes.

[2 marks]

- To check that the drug works ☐
- To check the cost of the drug ☐
- To find out if the drug is legal ☐
- To find the best dose to use ☐

4 (b) (iii) In a double blind drug trial, only some people know which patients have been given the drug.

Who knows which patients have been given the drug?

Tick (✓) **one** box.

[1 mark]

- The patient and the doctor ☐
- Only the doctor ☐
- Only scientists at the drug company ☐

Question 4 continues on the next page

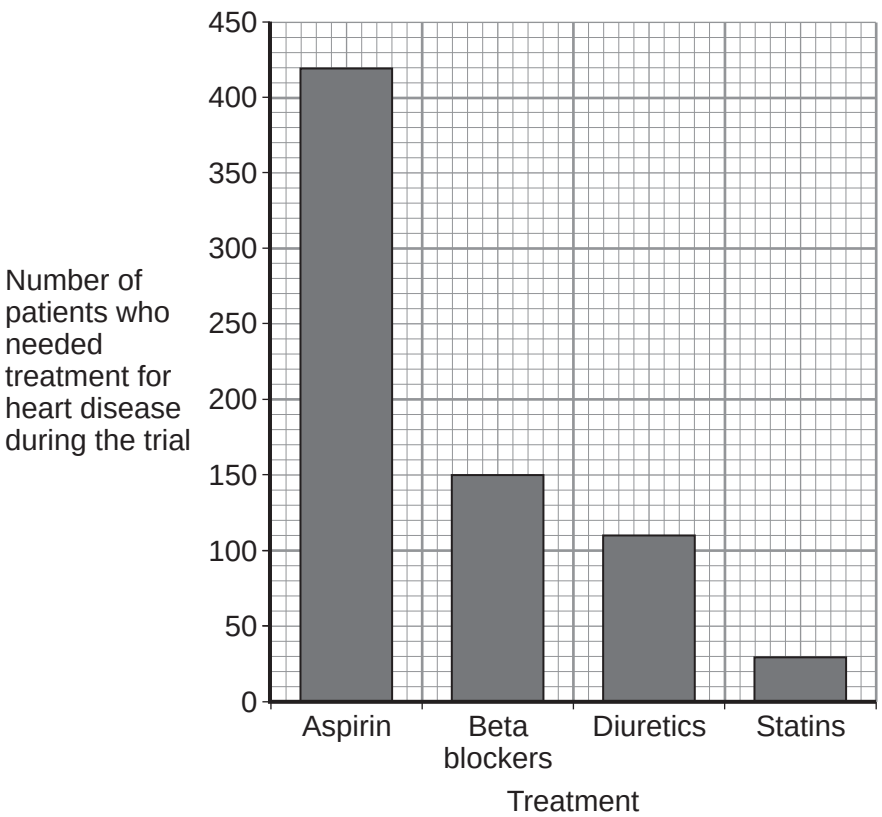
4.3.1.2 Viral diseases

Question 10 · continued

4 (c) Doctors trialled four different treatments for reducing the risk of heart disease.
Each treatment was trialled on the same number of patients for 5 years.
The patients did **not** have heart disease at the start of the trial.

Figure 5 shows the results.

Figure 5



4 (c) (i) How many patients who took aspirin needed treatment for heart disease during the trial?

[1 mark]

Number of patients = ...

4 (c) (ii) Based **only** on the evidence in **Figure 5**, which would be the best treatment to reduce the risk of developing heart disease?

[1 mark]

.....

4 (c) (iii) Suggest **one** other factor that a doctor might consider before deciding which treatment to use for a patient.

[1 mark]

.....

11

4.3.1.2 Viral diseases

Question 11

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. ☐

4.3.1.2 Viral diseases

Question 11 · 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

Question 11 · 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

4.3.1.2 Viral diseases

Question 11 · 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

4.3.1.2 Viral diseases

Question 12

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.

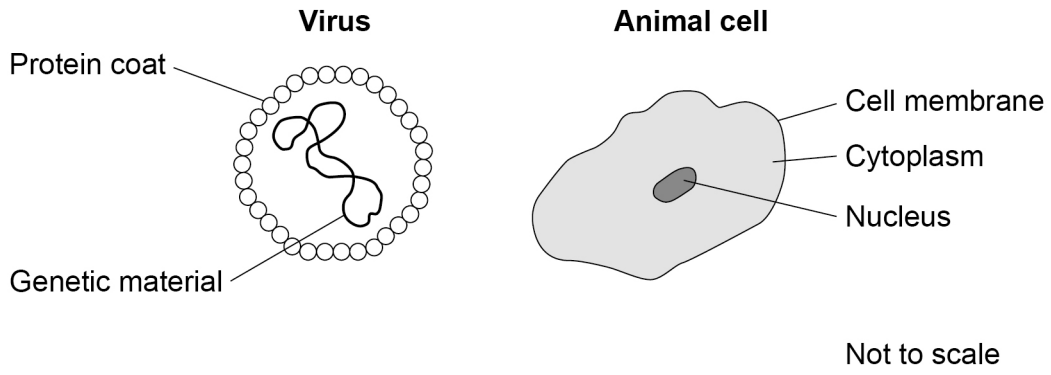
- Viruses engulf white blood cells, destroying them. ☐
- Viruses produce antibodies that damage tissues. ☐
- Viruses reproduce inside cells, damaging them. ☐

4.3.1.2 Viral diseases

Question 12 · 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

4.3.1.2 Viral diseases

Question 12 · 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

Antibody concentration

Time ☐

Antibody concentration

Time ☐

Antibody concentration

Time ☐

4.3.1.2 Viral diseases

Question 12 · 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

Question 12 · 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

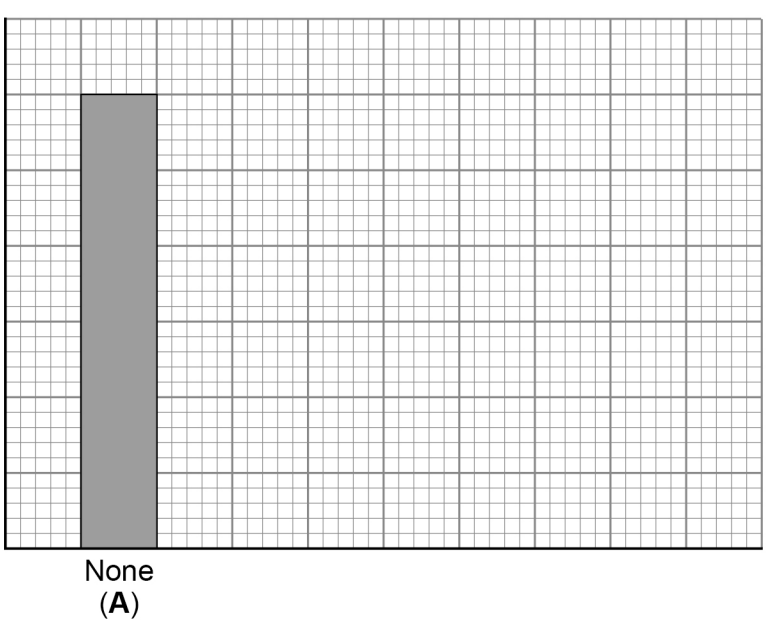
0 2 . 7 Complete **Figure 5**.

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



4.3.1.2 Viral diseases

Question 12 · 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

4.3.1.2 Viral diseases

Question 13

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]

4.3.1.2 Viral diseases

Question 13 · 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

4.3.1.2 Viral diseases

Question 13 · 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. ☐

4.3.1.2 Viral diseases

Question 13 · 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

4.3.1.2 Viral diseases

Question 14

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]

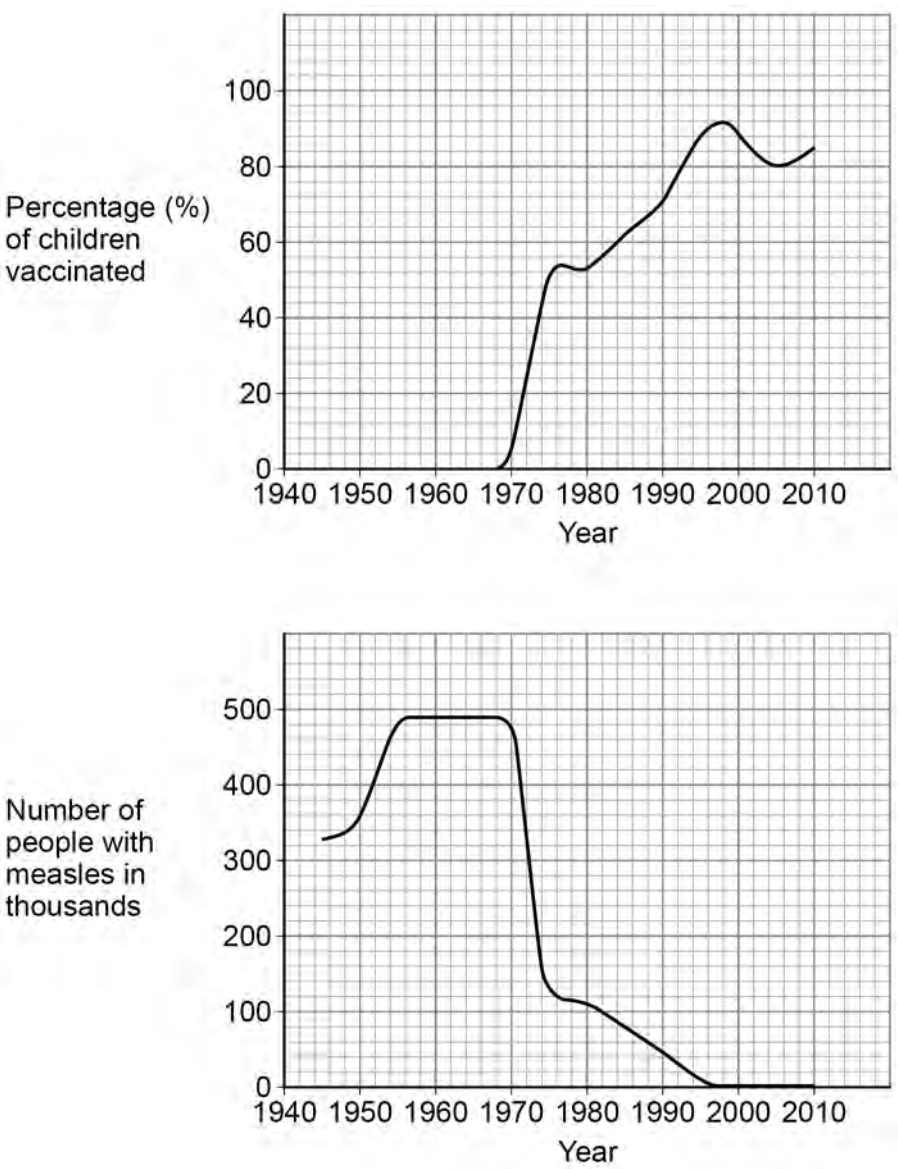
Blood component	Function
	Help clot the blood where the vaccine was injected
Platelets	Produce antibodies to the measles virus
White blood cells	Produce the measles skin rash
	Transport oxygen to the measles virus

Question 3 continues on the next page

Figure 3 shows information about trends in the UK for:

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

Figure 3



4.3.1.2 Viral diseases

Question 14 · 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

Question 14 · 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

4.3.1.2 Viral diseases

Question 15

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]

4.3.1.2 Viral diseases

Question 15 · 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]

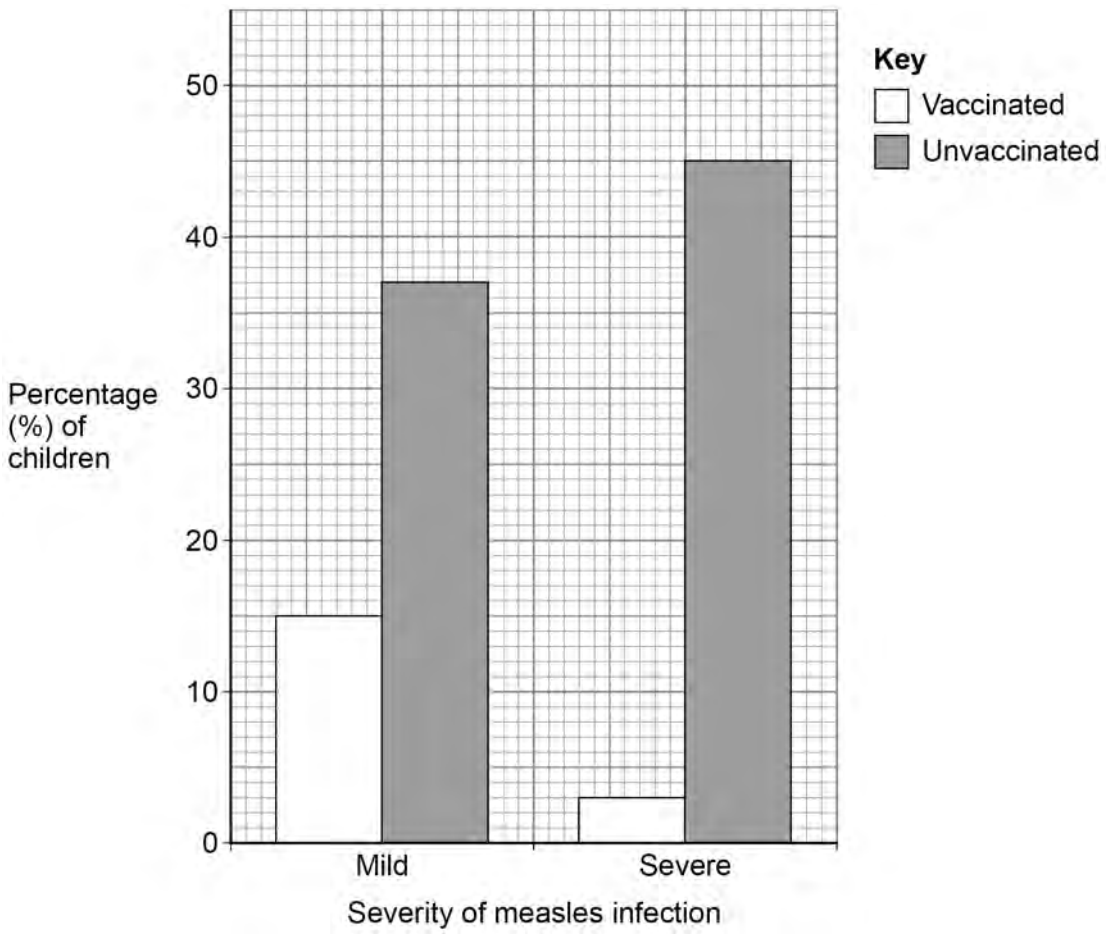
Question 6 continues on the next page

4.3.1.2 Viral diseases

Question 15 · 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 = _____

4.3.1.2 Viral diseases

Question 15 · 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