Global challenges – 2022 GCSE Gateway Biology A

1. June/2022/Paper_J247/04/No.8

Which is a description of an antigen?

A A chemical group on the surface of a pathogen.

B A chemical that kills bacteria or stops them dividing.

C A drug that is used to kill viruses.

D A protein molecule made by white blood cells.

Your answer ☐ **[1]**

2. June/2022/Paper_J247/04/No.10

Which statement is correct about HIV/AIDS?

A AIDS is a virus that weakens the immune system.

B HIV and AIDS are alternative names for the same disease.

C HIV is a pathogen and AIDS is a set of infections.

D HIV is a virus that produces toxins which kill an infected person.

Your answer ☐ **[1]**

3. June/2022/Paper_J247/04/No.11

New medicines can be tested in different ways.

Which is the main reason for testing a new medicine using tissue culture?

A To predict the effects on body systems.

B To see if it affects other organs.

C To see if it harms cells.

D To see if it reduces symptoms.

Your answer ☐ **[1]**

4. June/2022/Paper_J247/04/No.21

Measles is an infectious disease caused by a virus.

A vaccine is available to protect people against measles.

(a) Explain how vaccinations can protect people against diseases such as measles.

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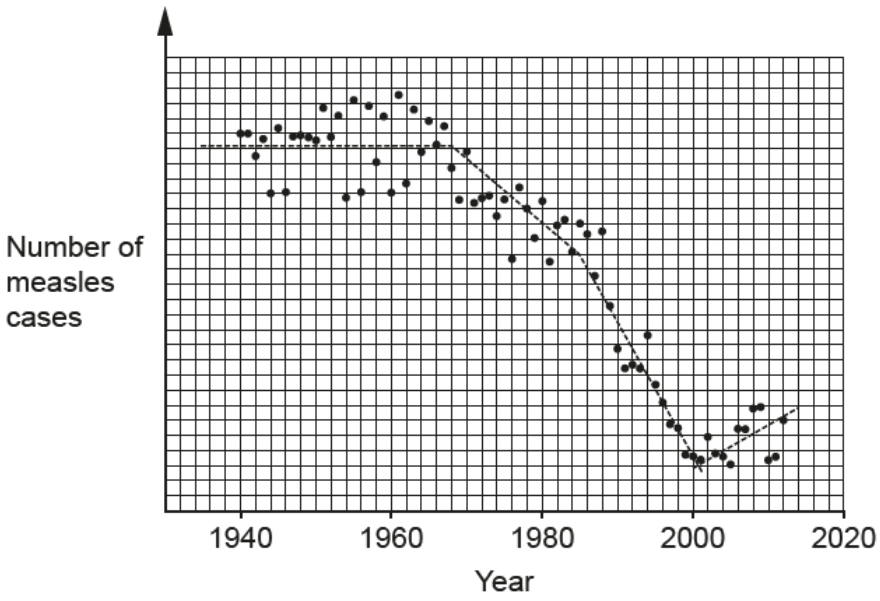
(b) The graph shows the number of cases of measles in the UK from 1940 to 2012.



In 1968, vaccinations against measles started for children.
Since then, there have been two other significant events that have affected the number of measles cases.

Use the graph to suggest a year when each event occurred.
Give **one** reason for your choice of year for each event.

(i) The measles vaccine was given as a triple vaccine called MMR. This was more convenient because MMR vaccinated children for three diseases at the same time.

Year .....

Reason .....

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..... **[2]**

(ii) A report claiming a link between the MMR vaccine and an increased risk of the disorder called autism.

Year .....

Reason .....

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..... **[2]**

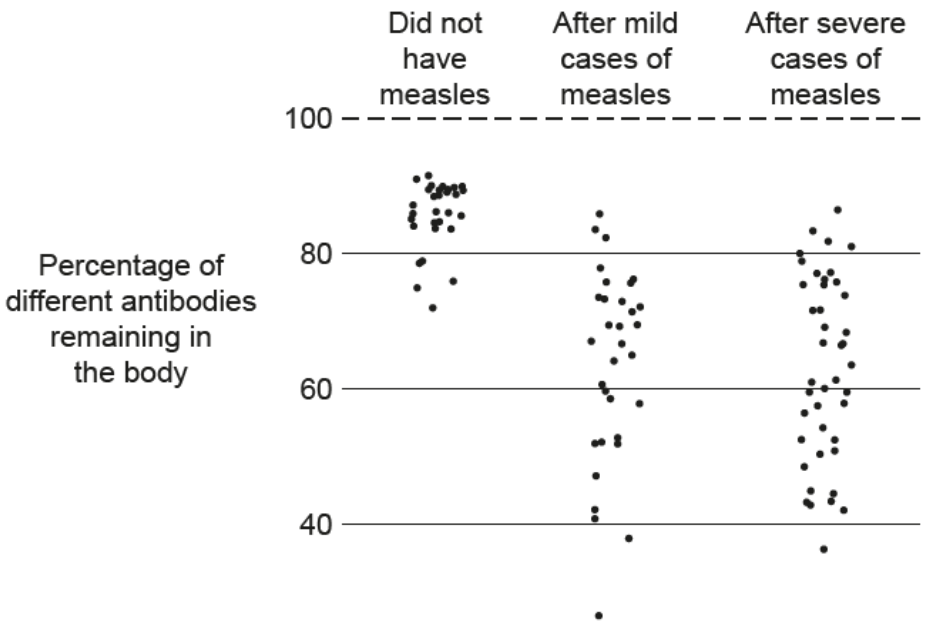
(c) A study looked at how measles infections can affect the number of antibodies for other pathogens in a person's body.

The study included three groups of children:

- children who did not have measles
- children with mild cases of measles
- children with severe cases of measles.

The study measured the percentage of different antibodies remaining in the children six weeks after infection.

The diagram shows the results. The result for each child is marked with a dot.



Most people recover from measles but may get ill again with different symptoms afterwards.

How do the findings shown in this diagram explain this after-effect of a measles infection?

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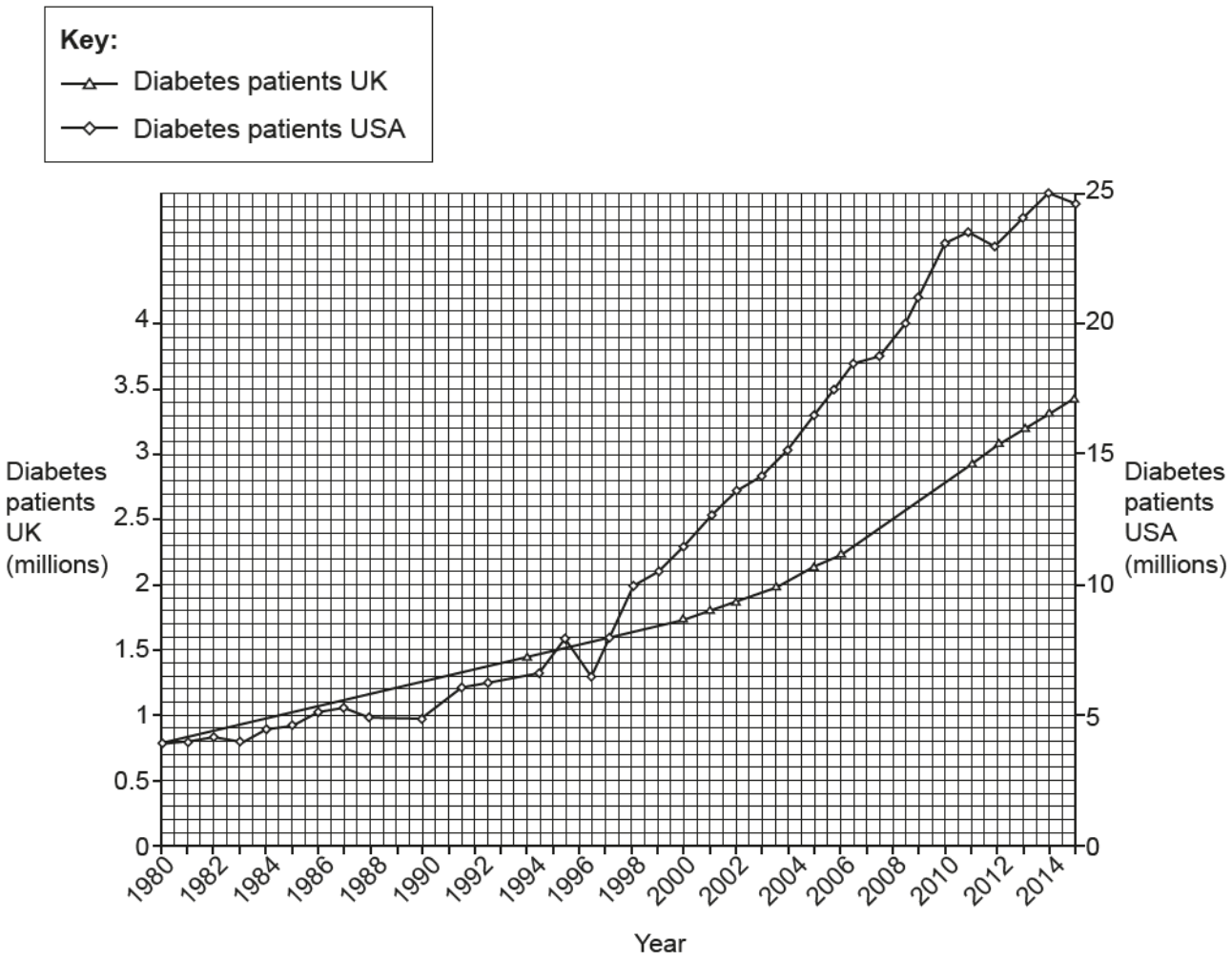
5. June/2022/Paper_J247/01/No.22

The graph shows the number of patients with diabetes in the UK and the USA from 1980 to 2015.



(a) How many patients had diabetes in the UK in the year 2000?

Number = ... million **[1]**

(b) Calculate the difference between the number of patients with diabetes in the UK and the number with diabetes in USA for the year 2000.

Number = ... million **[2]**

(c) Describe how the number of patients with diabetes has changed in **both** countries from 1980 to 2015.

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..... **[2]**

(d) The numbers presented in this graph may not be accurate.

Suggest why.

..... **[1]**

(e) Diabetes can be Type 1 or Type 2.

Describe **two** differences between the treatments for Type 1 and Type 2 diabetes.

1 .....

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2 .....

.....

[2]

6. June/2022/Paper_J247/02/No.8

Which disease is classed as a communicable disease?

A Cirrhosis of the liver

B Tuberculosis

C Type 1 diabetes

D Type 2 diabetes

Your answer ☐ **[1]**

7. June/2022/Paper_J247/02/No.10

Which process causes the loss of biomass from a food web?

A Growth

B Photosynthesis

C Predation

D Respiration

Your answer ☐ **[1]**

8. June/2022/Paper_J247/02/No.11

Which is a description of an antibiotic?

A A chemical group on the surface of a pathogen.

B A chemical that kills bacteria or stops them dividing.

C A drug that is used to kill viruses.

D A protein molecule made by white blood cells.

Your answer ☐ **[1]**

9. June/2022/Paper_J247/02/No.18

The diagram shows a tulip plant. Many gardeners like to grow tulip plants.

(a) Tulips can be grown from seeds produced from sexual reproduction.

They can also be grown from bulbs that are produced by asexual reproduction.

Which statements explain why gardeners usually choose to plant bulbs that were produced asexually?

Tick (✓) **two** boxes.

Bulbs will grow much faster than seeds. ☐

The gardener will know the colour of the flowers from bulbs. ☐

Tulip plants grown from seed will not need to photosynthesise. ☐

Tulips grown from seeds will not require water. ☐

Tulips grown from seeds will all look exactly the same. ☐

[2]

(b) In 1637, tulip growers found that a small number of their tulip plants produced flowers with different coloured stripes.

The growers did not know what was causing the colour changes.

Complete the sentences to show **two** possible explanations for the colour changes.
Use words from the list.

antibody	**gene**	**mutation**
pathogen	**phenotype**	**producer**

The tulips could be diseased because they have been infected by a ..... .

This has altered the production of a chemical that colours the flowers.

Another explanation is that a ..... has occurred in the DNA of the tulip.

This is a change in the ..... that codes for a coloured chemical.

[3]

(c) It was not until 1960 that scientists could show that the tulips were infected with a virus.

Viruses are much smaller than human cells.

Suggest why it took so long to identify the cause of the infection.

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..... **[1]**

(d)* This virus is spread by insects that feed on the tulips.

Although infected bulbs produced attractive flowers, growers found that the bulbs became weaker every year until they died.

To stop the spread of the disease, growers can use two approaches:

- Dig up and burn any tulips as soon as they show signs of infection
- Spray their fields with insecticides.

Explain how these **two** different methods would control the disease.
Discuss the advantages and disadvantages of each method.

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..... **[6]**

10. June/2022/Paper_J247/02/No.21

Measles is an infectious disease caused by a virus.

(a) Most people recover well from measles but often get other diseases afterwards. Doctors think that this is because the measles virus weakens the immune system.

Name **one** other virus that severely weakens the immune system.

..... **[1]**

(b) Measles spreads easily from one person to the next as it spreads through the air.

(i) Describe **one** way that a person who has measles can try and reduce the chance of passing it on to another person.

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..... **[1]**

(ii) Describe **one** way that the natural defence mechanisms of the human body may prevent the virus from entering the lungs.

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..... **[2]**

(c) A vaccine is available to protect people against measles.

What does the measles vaccine contain to provide this protection?

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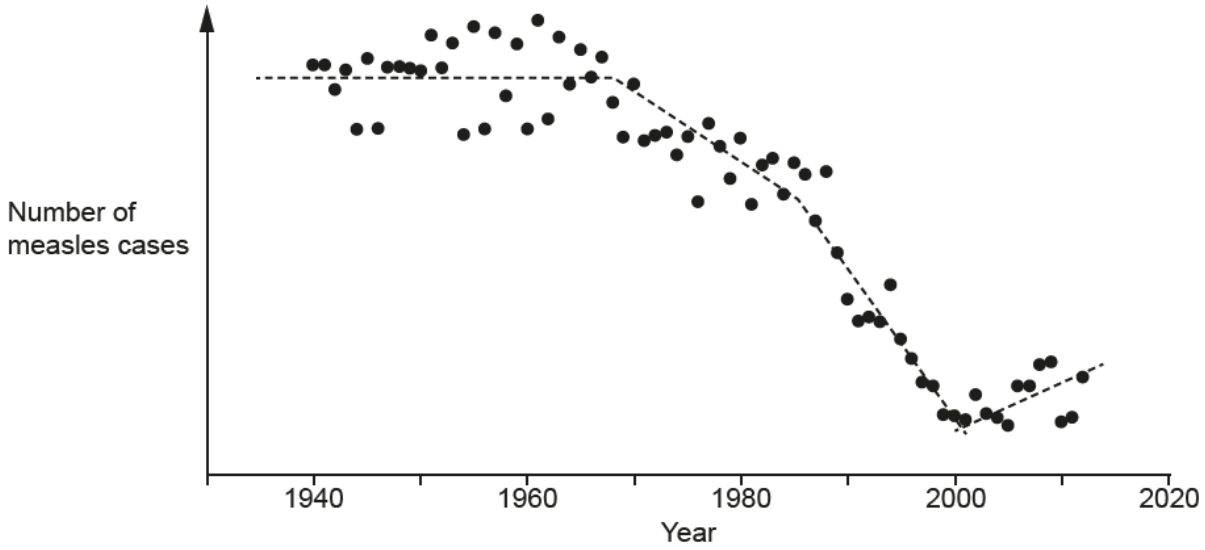
..... **[1]**

(d) The graph shows the number of cases of measles in the UK from 1940 to 2012.



During these years, two events have affected the number of measles cases.

(i) In 1968, vaccinations against measles started for children.

Explain the effect that this had on the number of measles cases.

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..... **[2]**

(ii) In 1998, a report claimed a link between the measles vaccine and an increased risk of a disorder called autism.

Explain the effect that this had on the number of measles cases.

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..... **[2]**