

Name:

Date:

B3 - Test 3
INFECTION & RESPONSE

GCSE
AQA
BIOLOGY

Mark

Grade

Materials

For this paper you must have:

- Ruler
- Pencil and Rubber
- Scientific calculator, which you are expected to use when appropriate

Instructions

- Answer all questions
- Answer questions in the space provided
- All working must be shown

Information

- The marks for the questions are shown in brackets

1

Obesity is linked to several diseases.

(a) Name **two** diseases linked to obesity.

1

2

(2)

(b) Scientists trialled a new slimming drug.

The table shows their results after one year.

Percentage change in mass of each volunteer	Number of volunteers
gained mass or lost 0 to 3.9 %	1900
lost 4.0 to 4.9 %	1100
lost 5.0 to 9.9 %	1500
lost 10 % or more	1500

(i) Calculate the proportion of the volunteers who lost 10 % or more of their mass.

You should first calculate the total number of volunteers, then work out the proportion.

.....

.....

Proportion of volunteers =

(2)

(ii) The National Health Service (NHS) gave permission for the drug to be used.

Use information from the table to suggest a reason why the NHS gave permission for the drug to be used.

.....

.....

(1)

(Total 5 marks)

2

(a) **List A** gives the names of three stages in trialling a new drug.

List B gives information about the three stages.

Draw a line from each stage in **List A** to the correct information in **List B**.

**List A
Stage**

Tests on humans
including a placebo

Tests on humans using
very small quantities of
the drug

Tests on animals

**List B
Information**

Used to find if the drug is toxic

The first stage in the clinical trials
of the drug

Used to find the optimum dose
of the drug

Used to prove that the drug is
effective on humans

(3)

(b) Read the passage.

Daily coffee dose delays development of Alzheimer's in humans.

Alzheimer's is a brain disease that causes memory loss in elderly people. Scientists studied 56 mice that had been genetically engineered to develop Alzheimer's.

Before treatment all the mice did badly in memory tests.

Half the mice were given a daily dose of caffeine in their drinking water. The dose was equivalent to the amount of caffeine in six cups of coffee for a human.

The other mice were given ordinary water.

After two months, the caffeine-drinking mice did better in memory tests than the mice drinking ordinary water.

The headline for the passage is not justified.

Explain why as fully as possible.

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(3)
(Total 6 marks)

3

Many strains of bacteria have developed resistance to antibiotics.

The table shows the number of people infected with a resistant strain of one species of bacterium in the UK.

Year	2004	2005	2006	2007	2008
Number of people infected with the resistant strain	3499	3553	3767	3809	4131

- (a) Calculate the percentage increase in the number of people infected with the resistant strain between 2004 and 2008.

Show clearly how you work out your answer.

.....
.....

Percentage increase =

(2)

- (b) Explain, in terms of natural selection, why the number of people infected with the resistant strain of the bacterium is increasing.

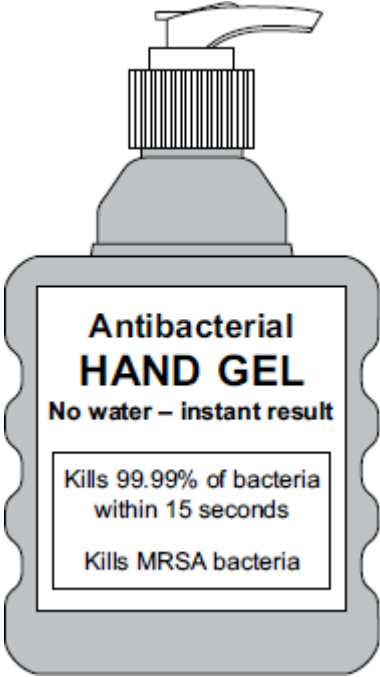
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(3)
(Total 5 marks)

4

MRSA strains of bacteria are causing problems in many hospitals.

(a) The diagram shows a hand-gel dispenser.



Hand-gel dispensers are now placed at the entrance of most hospital wards.

Explain why.

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(2)

(b) Explain, as fully as you can, how MRSA strains of bacteria became difficult to treat.

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(3)
(Total 5 marks)

5

The body's immune system protects us from diseases.

Describe the different ways in which white blood cells protect us from infectious diseases.

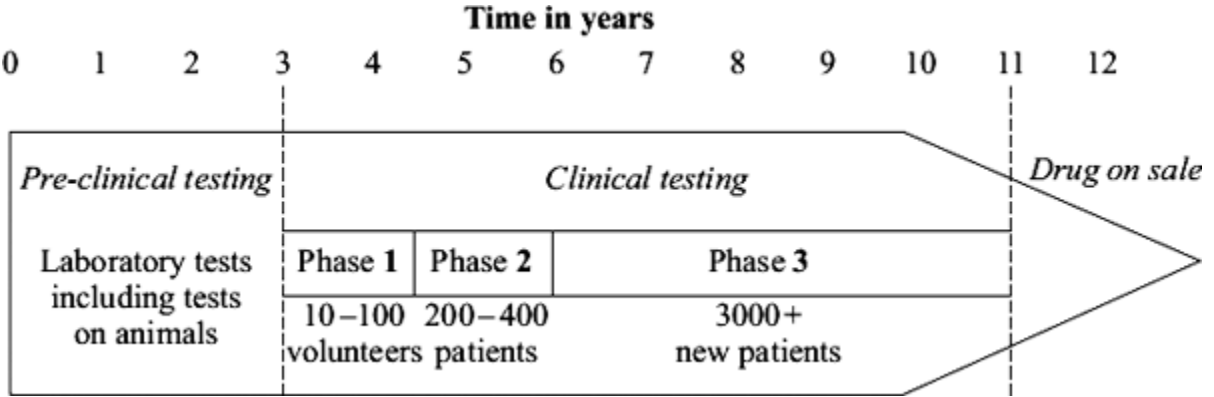
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(Total 4 marks)

6

New drugs have to be thoroughly tested before they are sold.

The diagram shows a time line for the testing of a new drug.



(a) What is the main purpose of *pre-clinical testing*?

.....
.....

(1)

(b) In Phase 1 of the *clinical testing*, very low doses of the new drug are used on a small number of volunteers.

(i) What is the main purpose of Phase 1 testing?

.....
.....

(1)

(ii) In Phase 1 testing, healthy volunteers are used rather than patients.

Suggest **one** reason for this.

.....
.....

(1)

(c) What is the main purpose of the Phase 2 and Phase 3 testing?

.....
.....

(1)

(d) During Phase 3 testing, many of the patients are given a *placebo*.

(i) What is meant by a *placebo*?

.....
.....

(1)

(ii) During the testing, who knows which patients are receiving the *placebo*?

Tick (✓) **one** box.

Only the patients	<input type="checkbox"/>
Only the doctors	<input type="checkbox"/>
Both patients and doctors	<input type="checkbox"/>
Neither patients nor doctors	<input type="checkbox"/>

(1)

(Total 6 marks)

7

Influenza is caused by a virus.

(a) How do viruses cause illness?

.....
.....

(1)

- (b) A British company making a reality television show in the Peruvian Amazon has been accused of starting an influenza epidemic. This epidemic allegedly killed four members of a remote Indian tribe and left others seriously ill.

The members of the television crew did not show symptoms of influenza, but members of the Indian tribe died from the disease.

Suggest an explanation for this.

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(3)
(Total 4 marks)

8

Diet and exercise affect health.

- (a) Many people are obese (very overweight).

Obesity can lead to heart disease.

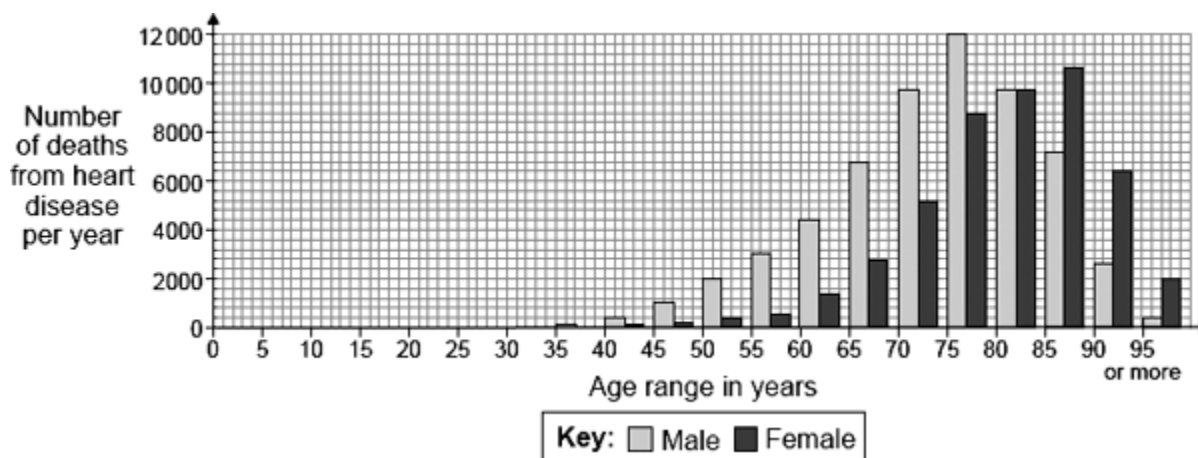
Other than heart disease, name **two** conditions which are linked to obesity.

1

2

(2)

(b) The graph shows the number of deaths from heart disease each year in the UK.



The pattern for deaths from heart disease in men is different from the pattern in women.

(i) Give **two** differences between the patterns for men and women.

- 1
-
- 2
-

(2)

(ii) Suggest **two** reasons for the difference in the number of deaths from heart disease in men and women between the ages of 40 and 60.

- 1
-
- 2
-

(2)

(c) Scientists have developed drugs to reduce the concentration of cholesterol in the blood.

Give the **three** main stages in testing a new drug before it is sold to the public.

1

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2

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3

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(3)
(Total 9 marks)

9

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

(a) Complete the sentences about vaccination.

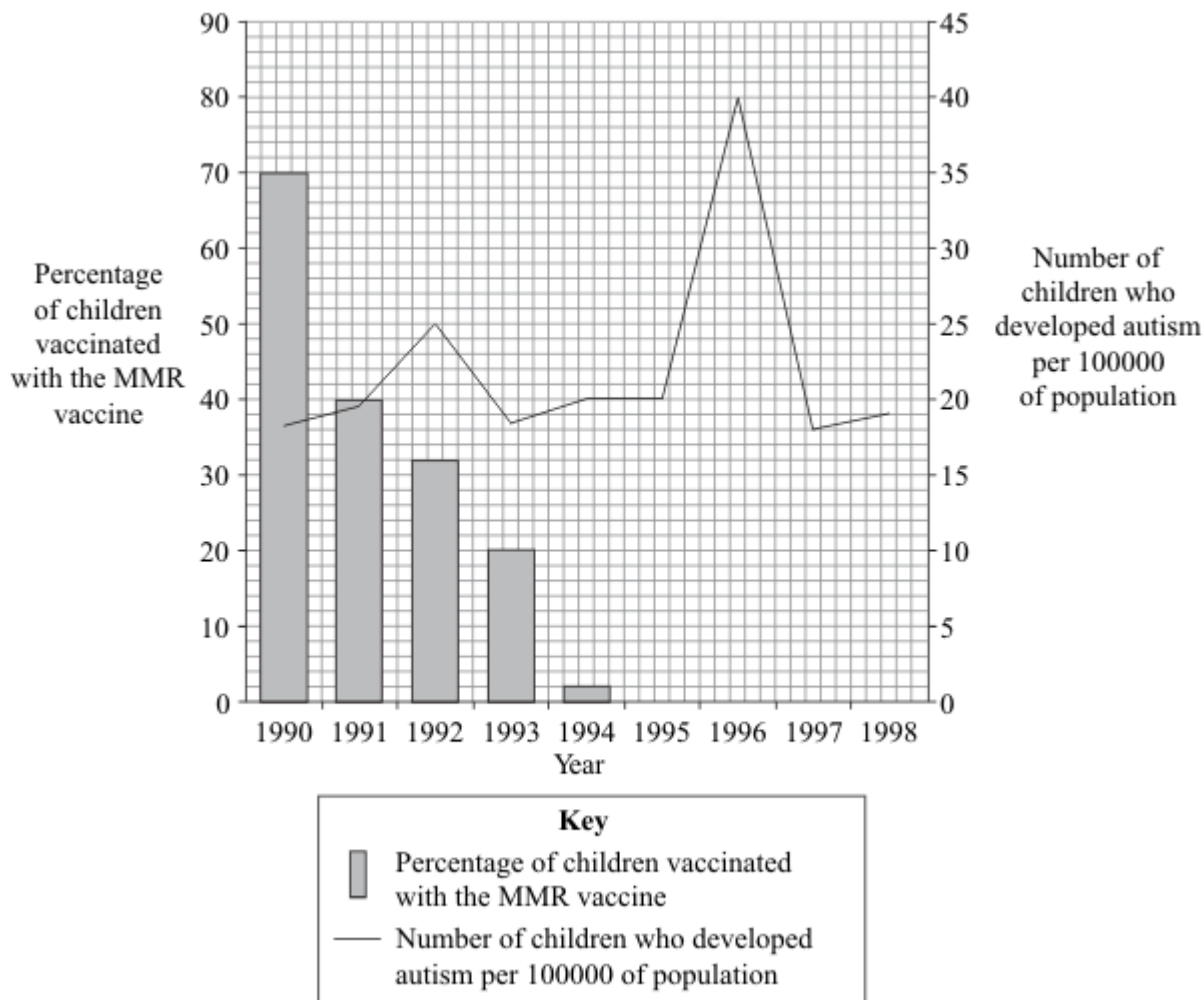
Vaccines stimulate white blood cells to produce

This makes children to the pathogen.

(2)

- (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.



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

.....

.....

.....

.....

.....

(2)

(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.

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(2)
(Total 6 marks)

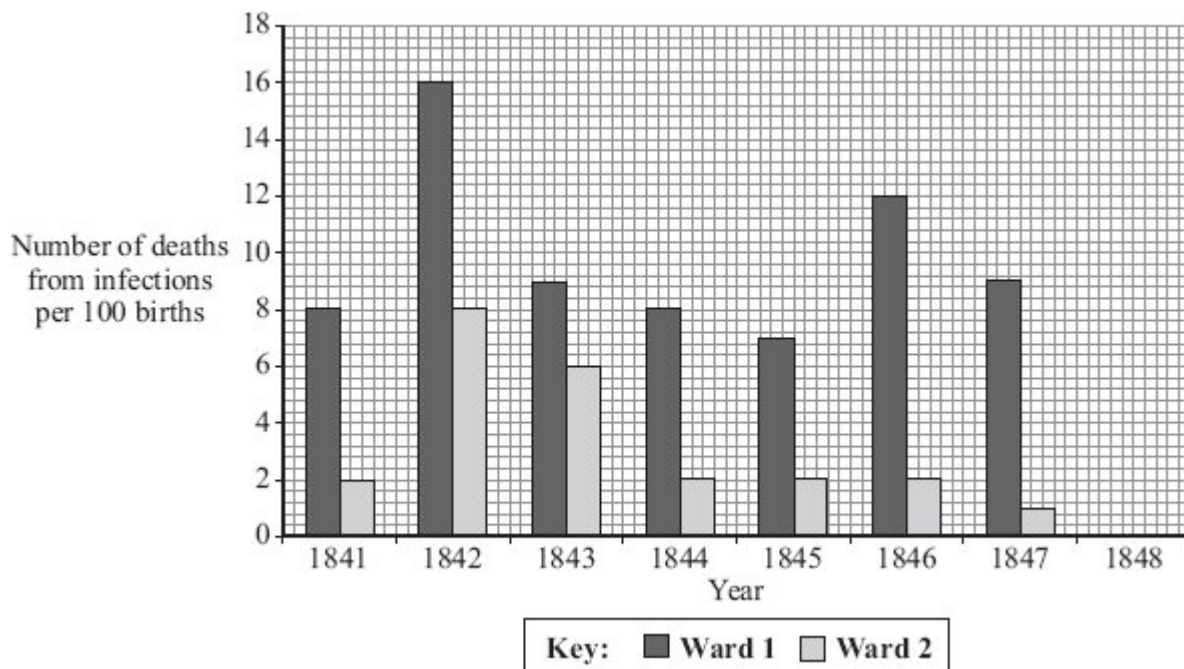
10

In the 19th century, Dr Semmelweiss investigated infection in a hospital.

He compared the number of deaths of mothers on two maternity wards.

- On **Ward 1**, babies were delivered mainly by doctors. These doctors worked on many different wards in the hospital.
- On **Ward 2**, babies were delivered by midwives. The midwives did **not** work on other wards.

The bar chart shows the results of his investigations.



(a) (i) 600 mothers gave birth on **Ward 2** in 1845.

How many mothers died from infections on **Ward 2** in 1845?

Show clearly how you work out your answer.

.....
.....

Number of mothers who died

(2)

(ii) Which was the safer ward on which to have a baby?

Draw a ring around your answer. **Ward 1 / Ward 2.**

Using data from the bar chart, give a reason for your answer.

.....
.....

(1)

(b) In January 1848, Dr Semmelweiss asked all doctors to wash their hands before delivering babies.

The table shows the number of deaths on the two wards in 1848.

Ward	Number of deaths from infections per 100 births
Ward 1	3
Ward 2	1

(i) Plot this data on the bar chart above.

(1)

(ii) What was the effect on the death rate on **Ward 1** of doctors washing their hands before delivering babies?

.....
.....

(1)

(iii) Suggest an explanation for this effect.

.....
.....

(1)
(Total 6 marks)