Name:

Date:

B3 - Test 4
INFECTION AND RESPONSE
Intermediate

GCSE

BIOLOGY

AQA - Combined Science

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. A child has a sore throat. The mother takes the child to the doctor. The doctor says that the child has a bacterial infection.

Explain how the infection makes the child ill.

_____

_____

_____

_____

(Total 2 marks)

2. The table shows changes in resistance to the antibiotic penicillin in one species of bacterium between 1991 and 1996.

Years	Percentage of cases where bacteria were resistant to penicillin
1991 – 92	7
1993 – 94	14
1995 – 96	22

A doctor was asked to treat a patient who had a sore throat.

(i) How does penicillin help to treat infection?

_____

(1)

(ii) Use the data in the table to suggest why the doctor should **not** prescribe penicillin.

_____

_____

_____

_____

(2)

(Total 3 marks)

3. The body's immune system protects us from diseases.

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

_____

_____

_____

_____

_____

_____

_____

_____

_____

(Total 4 marks)

4. (i) Give **two** ways in which white blood cells protect us from disease.

1. _____

_____

2. _____

_____

(2)

(ii) Explain, as fully as you can, how immunisation protects us from disease.

_____

_____

_____

_____

_____

_____

(3)

(Total 5 marks)

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

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

_____

_____

_____

_____

(2)

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

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

Explain why the death rate fell.

_____

_____

(1)

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

_____

_____

_____

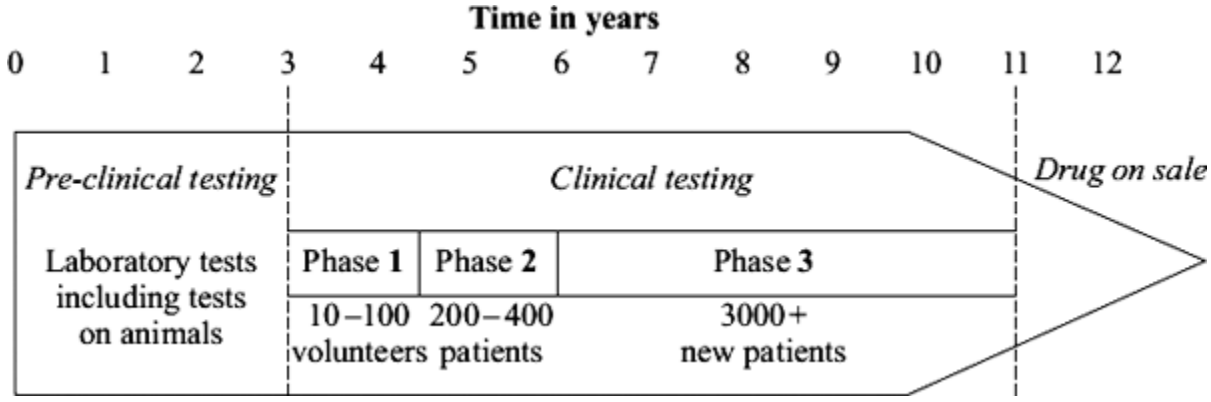
_____

(2)

(Total 5 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 ☐

Only the doctors ☐

Both patients and doctors ☐

Neither patients nor doctors ☐

(1)

(Total 6 marks)

7. (a) Name **two** types of microbe which cause disease in humans.

1 _____

2 _____

(2)

(b) Why do we feel ill when we have an infectious disease?

_____

_____

(1)

(c) Give **two** ways in which white blood cells protect us against disease.

1. _____

_____

2. _____

_____

(2)

(d) Explain, as fully as you can, how immunisation protects us against a named disease.

Name of disease: _____

How immunisation protects us: _____

_____

_____

_____

_____

(3)

(Total 8 marks)

8. Read the following passage.

> One of the deadliest diseases seems to be making a comeback in Britain. Doctors are alarmed at the rising number of cases of tuberculosis (TB). TB is caused by microbes called bacteria. When people carrying the TB bacteria cough or sneeze, the TB bacteria get into the air. Other people may then breathe them in.

(a) Which organs will be infected first when someone breathes in the TB bacteria?

_____

(1)

(b) Explain how the TB bacteria inside the body may cause disease.

_____

_____

(2)

(c) Name **one other** group of microbes that often causes disease.

_____

(1)

(d) Suggest why people who live in overcrowded areas are more likely to catch TB than people who live in less crowded areas.

_____

_____

(1)

(e) People infected with a small number of TB bacteria often do **not** develop the disease.

Explain, as fully as you can, how the body defends itself against the TB bacteria.

_____

_____

_____

_____

_____

_____

(3)

(Total 8 marks)

9. Diet and exercise affect health.

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

Obesity can lead to heart disease.

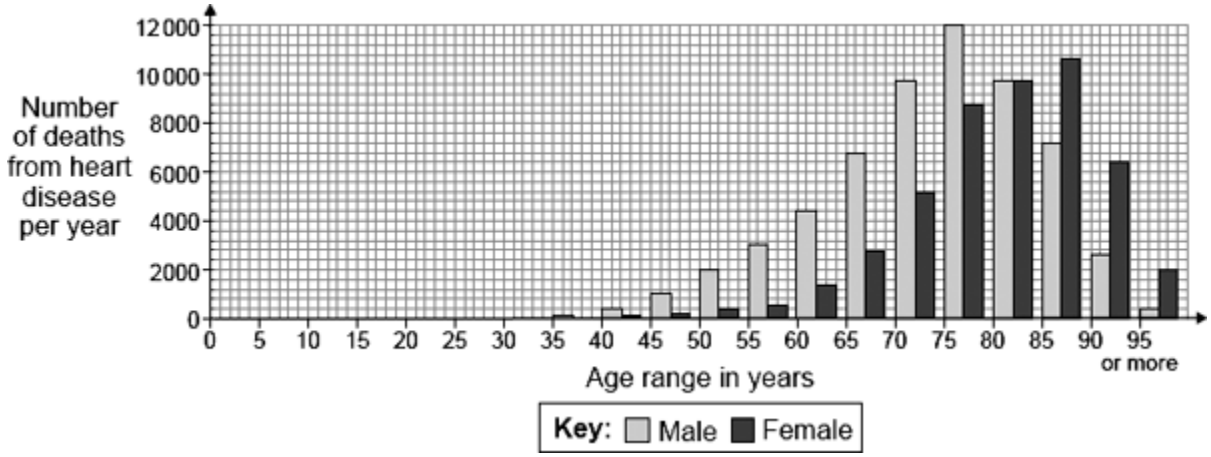
Other than heart disease, name **two** conditions which are linked to obesity.

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. _____

_____

2. _____

_____

3. _____

_____

(3)

(Total 9 marks)

10. Scientists at a drug company developed a new pain-killing drug, drug **X**.

(a) Painkillers do **not** cure infectious diseases.

Why?

_____

(1)

(b) The scientists compared drug **X** with two other pain-killing drugs, drug **A** and drug **B**.
In their investigation the scientists:

- chose 600 volunteers. The volunteers were all in pain
- gave 200 of the volunteers a standard dose of drug **A**
- gave 200 of the volunteers a standard dose of drug **B**
- gave 200 of the volunteers a standard dose of drug **X**.

Over the next seven hours the volunteers recorded how much pain they felt.

To get valid results the three groups of volunteers should be matched for as many factors as possible.

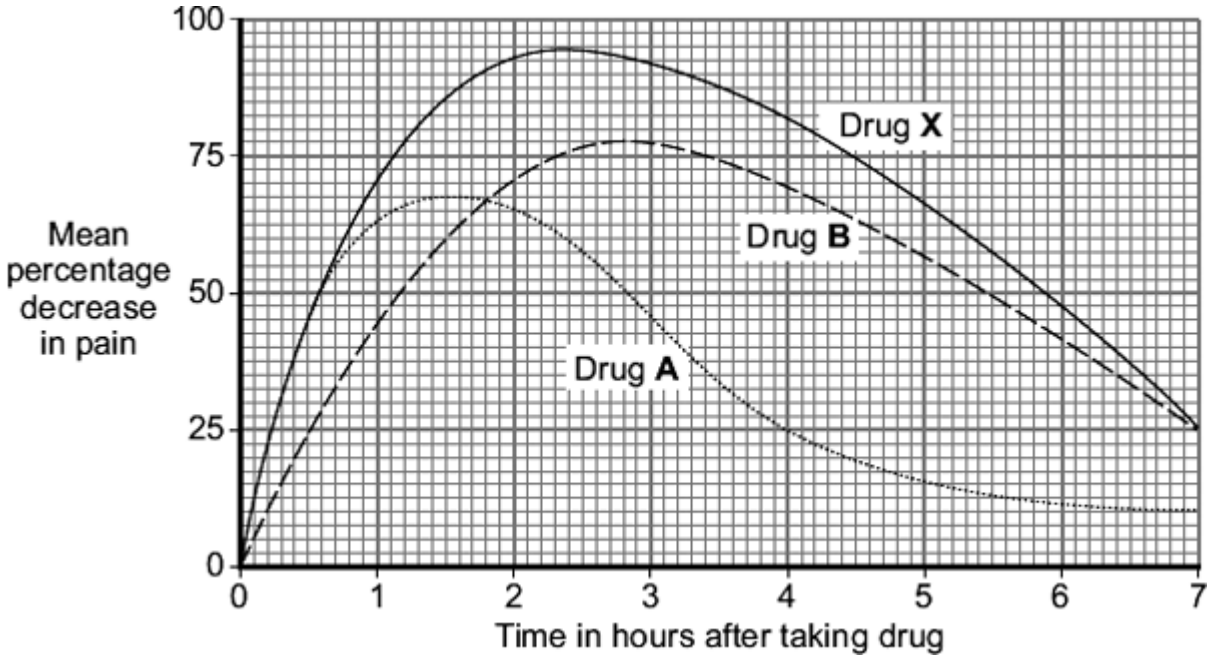
Suggest **two** of the factors that should be matched.

_____

_____

(2)

(c) The graph shows the results of the investigation.



(i) How much pain did the volunteers still feel, four hours after taking drug **A**?

_____ percent

(1)

(ii) Give **one** advantage of taking drug **A** and **not** drug **B**.

_____

_____

(1)

(iii) Give **two** advantages of taking drug **B** and **not** drug **A**.

_____

_____

_____

_____

(2)

(d) Drug **X** is much more expensive than both drug **A** and drug **B**.

A pharmacist advised a customer that it would be just as good to take drug **A** and drug **B** together instead of drug **X**.

Do you agree with the pharmacist's advice?

Give reasons for your answer.

(3)

(Total 10 marks)

11. Some infections are caused by bacteria.

(a) The genetic material is arranged differently in the cells of bacteria compared with animal and plant cells.

Describe **two** differences.

(2)

(b) Tuberculosis (TB) is an infection caused by bacteria.

The table below shows the number of cases of TB in different regions of southern England from 2000–2011.

Number of cases of TB per 100 000 people

Year	London	South East	South West
2000	37	5	3
2001	36	6	4
2002	42	6	6
2003	42	7	4
2004	42	7	5
2005	49	8	5
2006	44	8	3
2007	43	8	5
2008	44	8	5
2009	44	9	6
2010	42	9	5
2011	45	10	5

(i) How does the number of cases of TB for London compare with the rest of southern England?

_____

_____

_____

(1)

(ii) Describe the pattern in the data for cases of TB in the South East.

_____

_____

(1)

(iii) Describe the pattern in the data for cases of TB in the South West.

_____

_____

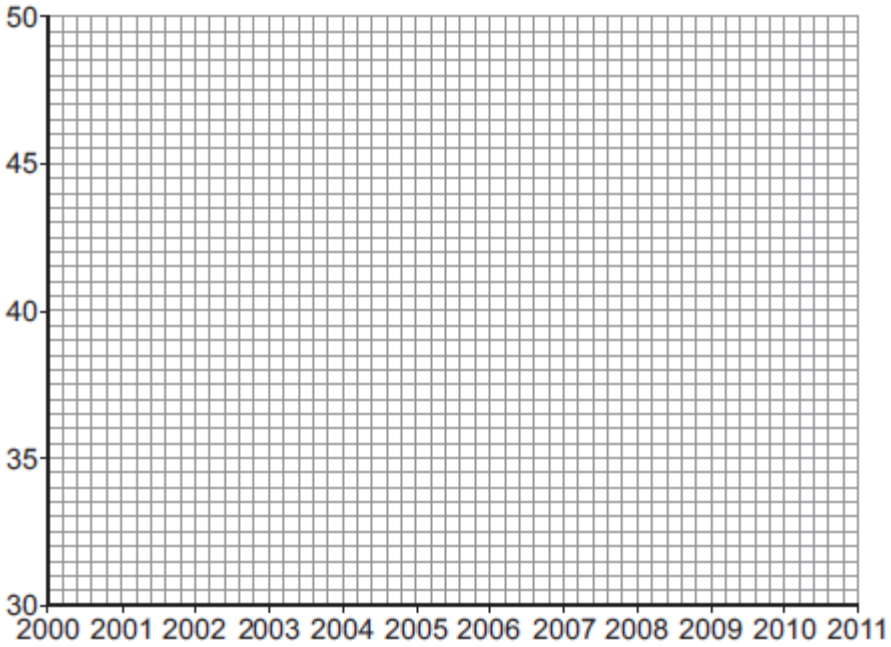
_____

_____

(2)

(c) (i) On the graph paper below:

- plot the number of cases of TB in **London**
- label both the axes on the graph
- draw a line of best fit.



(4)

(ii) Suggest why a student thought the value for 2005 in London was anomalous.

_____

_____

(1)

(d) People can be vaccinated against TB.

Suggest how a vaccination programme would reduce the number of people with TB.

Details of how a vaccine works are **not** required.

_____

_____

_____

_____

(2)

(Total 13 marks)