AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



EXAM QUESTION PACK

4.3.1 COMMUNICABLE DISEASES (PACK 2)

SCORE	PERCENTAGE
/217	%

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Q1.

(a) Explain how vaccination makes a person immune to a disease.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(4)

(b) Scientists are trialling a 'nicotine vaccine' that might help **wean smokers off** the drug nicotine.
The trials so far have produced very mixed results.
Nicotine molecules are very small and can get through the protective layers around the brain.

(i) How does nicotine cause a person to become addicted?

_____

_____

(1)

(ii) The 'nicotine vaccine' is made by attaching proteins to nicotine molecules. After 'vaccination' the body reacts to the nicotine in the same way as it reacts to pathogens.

Suggest how the 'nicotine vaccine' might help wean a smoker off nicotine.

_____

_____

_____

_____

(2)

(Total 7 marks)

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Q2.

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.

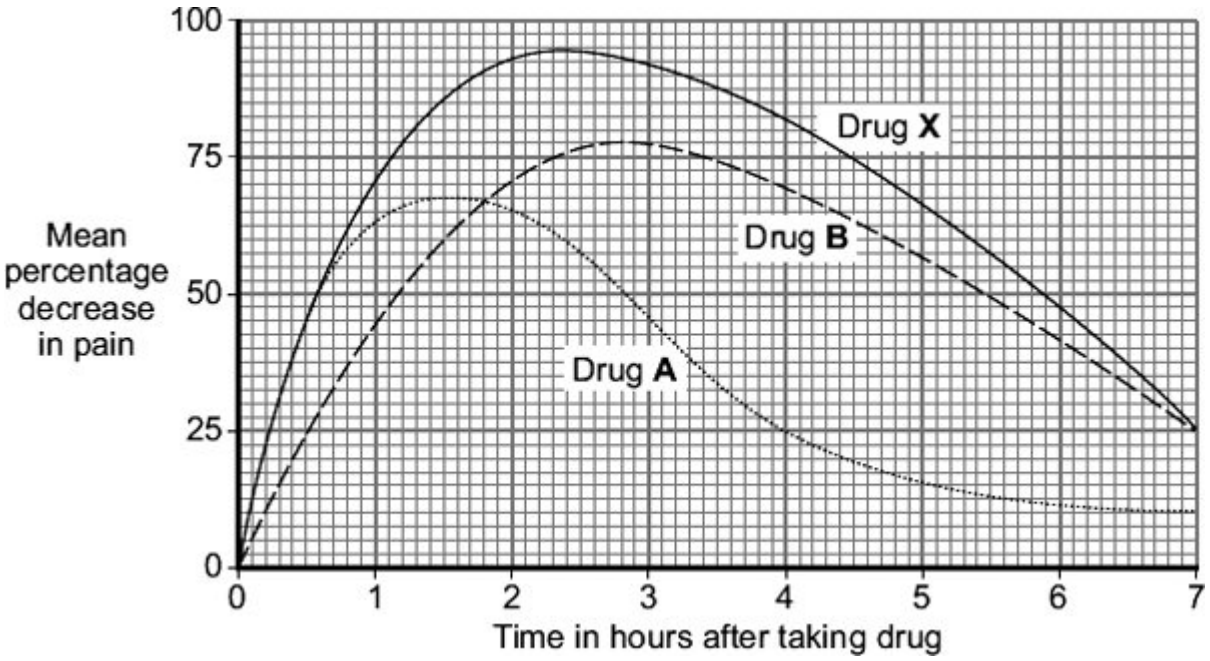
Suggest **two** of the factors that should be matched.

_____

_____

(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**?

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_____ 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)

Q3.

People may be immunised against diseases using vaccines.

(a) (i) Which part of the vaccine stimulates the body's defence system?

_____

_____

_____

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_____

(2)

(ii) A person has been vaccinated against measles. The person comes in contact with the measles pathogen. The person does **not** catch measles.

Explain why.

_____

_____

_____

_____

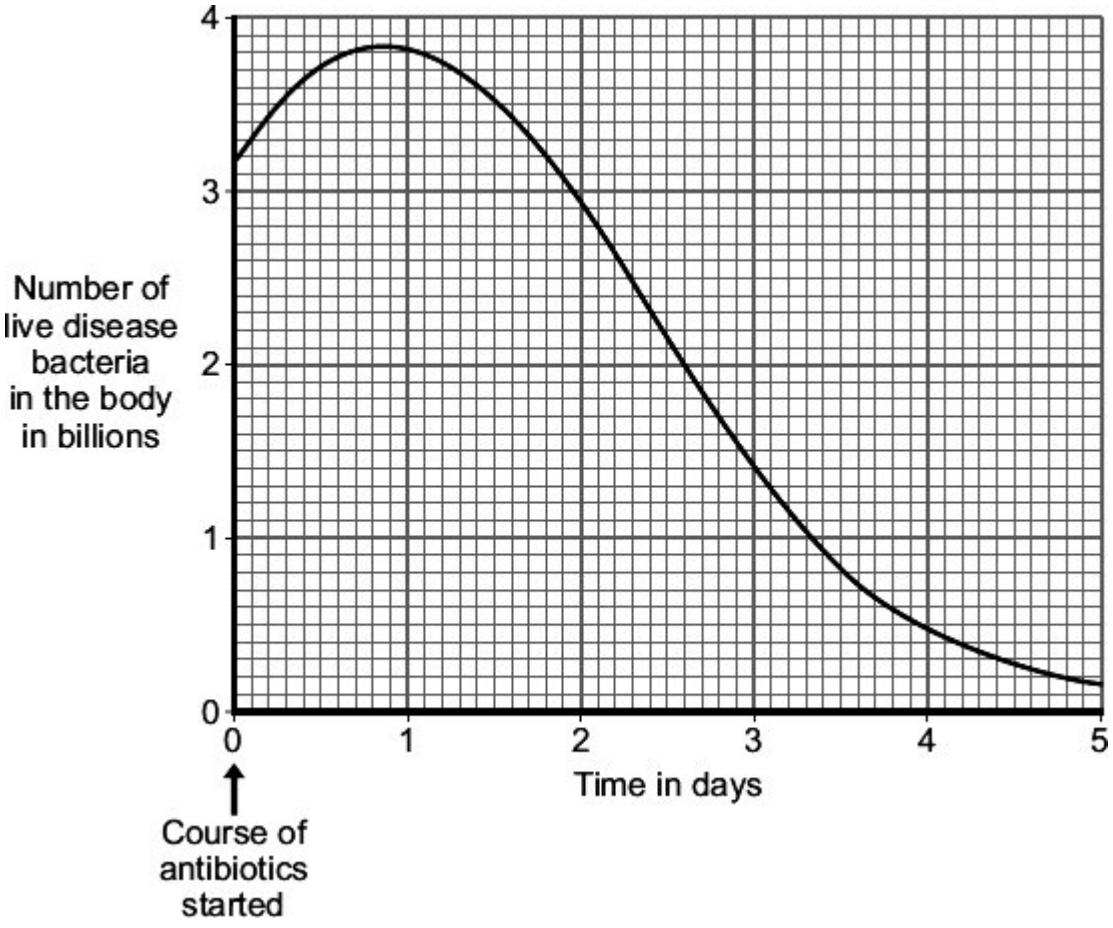
_____

_____

(3)

(b) A man catches a disease. The man has **not** been immunised against this disease. A doctor gives the man a course of antibiotics.

The graph shows how the number of live disease bacteria in the body changes when the man is taking the antibiotics.



(i) Four days after starting the course of antibiotics the man feels well again. It is important that the man does **not** stop taking the antibiotics.

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Explain why.

Use information from the graph.

_____

_____

_____

_____

(2)

(ii) Occasionally a new, resistant strain of a pathogen appears.

The new strain may spread rapidly.

Explain why.

_____

_____

_____

_____

_____

_____

(3)

(Total 10 marks)

Q4.

(a) **List A** gives the names of three substances. The substances can help ill people.

List B gives information about the three substances.

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

List A **Substance**	**List B** **Information**
	White blood cells produce this substance
Antibiotic	

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	This substance is used to kill bacteria
Antitoxin	
	This substance lowers blood cholesterol levels
Painkiller	
	This substance relieves only the symptoms of a disease

(3)

(b) Complete the sentences.

A vaccine contains an _____ form of a pathogen.

(1)

The MMR vaccine protects children against measles,

mumps and _____

(1)

(Total 5 marks)

Q5.

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

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(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)

Q6.

(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	**List B Information**
	Used to find if the drug is toxic
Tests on humans including a placebo	
	The first stage in the clinical trials of the drug
Tests on humans using very small quantities of the drug	
	Used to find the optimum dose of the drug
Tests on animals	

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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.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(Total 6 marks)

Q7.

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.

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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.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

(Total 5 marks)

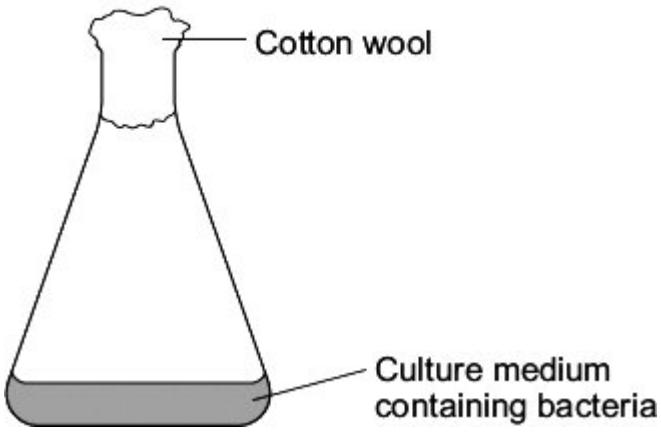
Q8.

Some students grew one species of bacterium in a flask.

Diagram 1 shows the flask.

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Diagram 1



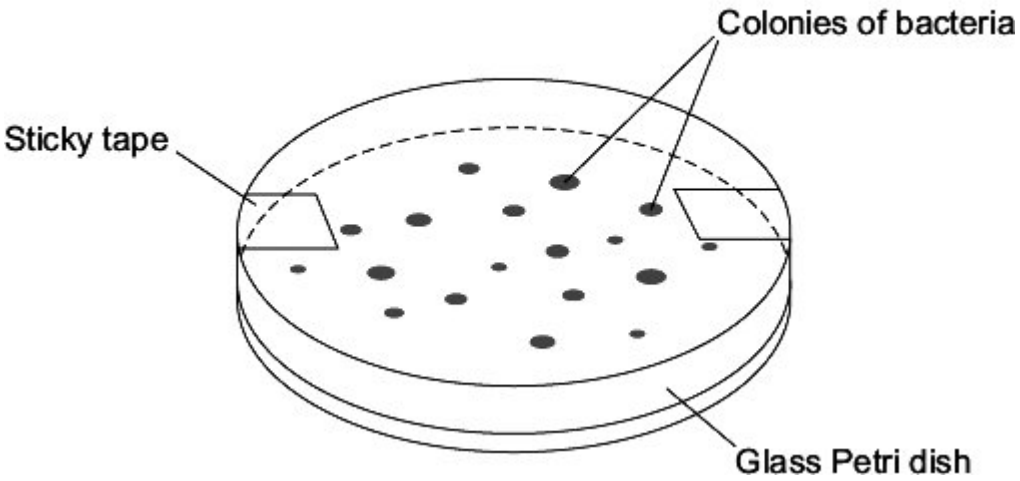
The students wanted to find the number of bacteria in 1 cm^3 of the culture medium.

The students:

- diluted 1 cm^3 of the culture medium from the flask with 999 cm^3 of water
- added 1 cm^3 of diluted culture to sterilised nutrient agar in a Petri dish
- placed the Petri dish in an incubator at 25 °C.

Diagram 2 shows the Petri dish after 3 days in the incubator.

Diagram 2



(a) Each colony of bacteria is formed where one bacterium landed on the agar jelly.

How is each colony formed?

_____

_____

(1)

(b) Complete the following calculation to find how many bacteria there were in 1 cm^3 of the undiluted culture.

Number of colonies of bacteria in the Petri dish = _____

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These colonies were formed from 1 cm^3 of the culture diluted × 1000.

Therefore, number of bacteria in 1 cm^3 of undiluted culture = _____

(2)

(c) It is important to sterilise the culture medium and all the apparatus before use.

Explain why.

_____

_____

_____

_____

(2)

(d) The bacteria would grow faster at 35 °C. In a school laboratory, the Petri dish should **not** be incubated at a temperature higher than 25 °C.

Why?

_____

_____

(1)

(e) The students decided to repeat their investigation.

Why?

_____

_____

(1)

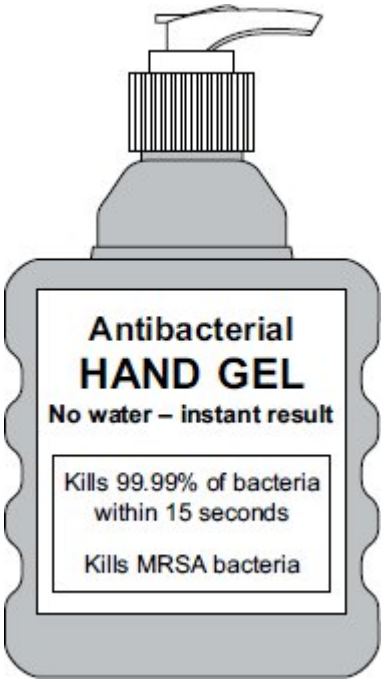
(Total 7 marks)

Q9.

MRSA strains of bacteria are causing problems in many hospitals.

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

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

Explain why.

_____

_____

_____

_____

(2)

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

_____

_____

_____

_____

_____

_____

(3)

(Total 5 marks)

Q10.

Scientists have trialled a new statin called rosuvastatin.

- 17 802 people took part in the trial.
- All of these people had high levels of a protein called CRP in their blood.

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- The higher the level of CRP in the blood, the higher the risk of a heart attack.
- None of these people had heart conditions at the beginning of the investigation.
- None of these people had high LDL (low density lipoprotein) levels.
- All of these people were aged 50 or above.
- Half the people were given a rosuvastatin tablet each day; the other half were given a placebo.
- The trial was stopped 7 months early when it was found that the people given rosuvastatin were 54% less likely to have a heart attack than people given the placebo.

(a) Give **two** control variables in this investigation.

1. _____

2. _____

(2)

(b) What would the placebo be in this investigation?

_____

_____

(1)

(c) The trial gave reliable results.

Give **one** reason why.

_____

_____

(1)

(d) The trial was stopped 7 months early.

Give **one** reason why.

_____

_____

(1)

(e) The manufacturers of rosuvastatin paid for the trial.

However, the manufacturers took no part in the trial.

Suggest **one** reason why the manufacturers did not take part in the trial.

_____

_____

(1)

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(f) The table shows some of the results of the trial.

Substance	Concentration in blood in mg per 100 cm^3 after 3 years of trial	
	People given rosuvastatin	People given placebo
LDL cholesterol	53	106
HDL cholesterol	50	49
Saturated fats	106	123

Rosuvastatin reduces the risk of heart attacks.

Use the data in the table to explain why.

_____

_____

_____

_____

(2)

(Total 8 marks)

Q11.

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)

Q12.

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Vaccines protect us against diseases.

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

Tick (✓) **three** boxes.

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

(3)

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

Vaccines cause white blood cells to produce

antibodies.

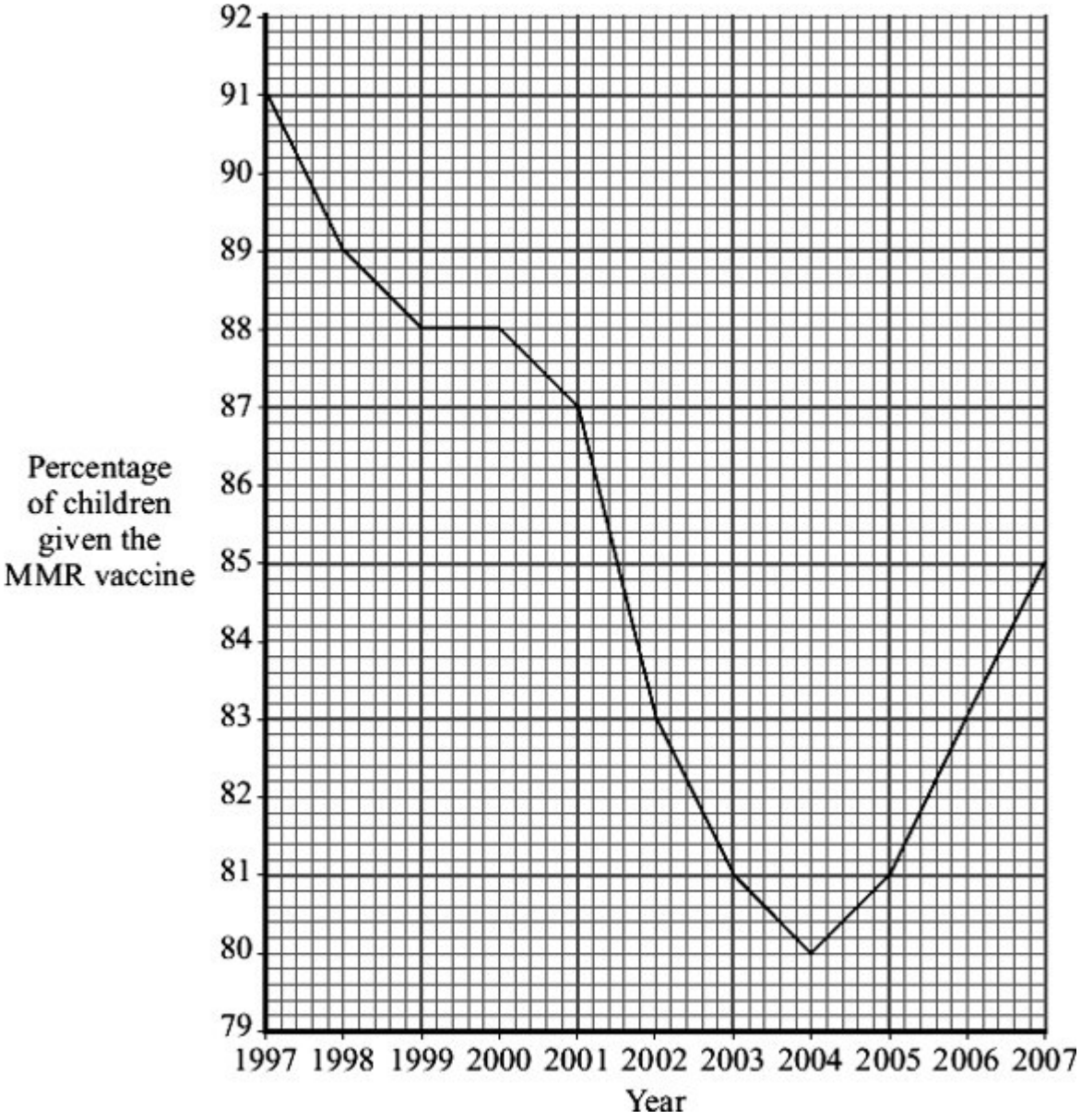
cholesterol.

penicillin.

(1)

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

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

_____

_____

_____

_____

(2)

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

_____

_____

(1)

(Total 7 marks)

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Q13.

Medicinal drugs are used to treat diseases.

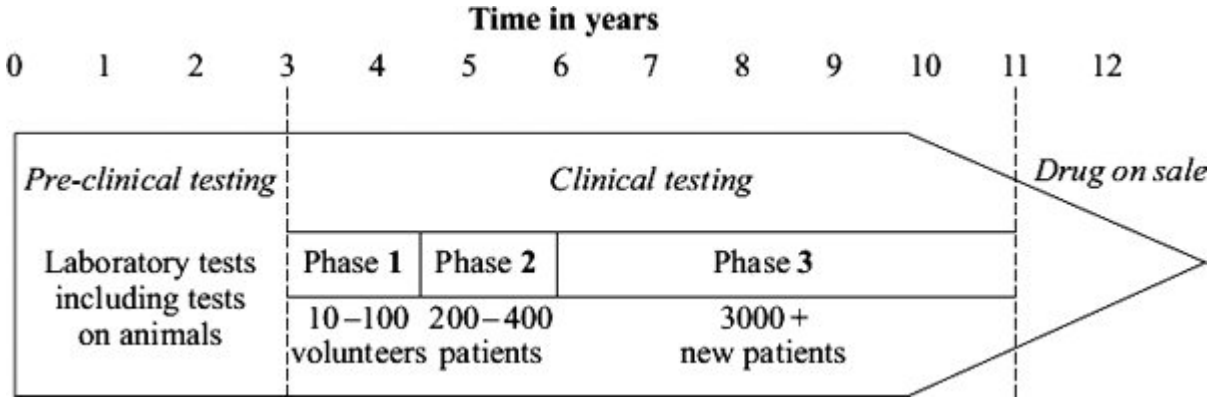
(a) Draw **one** line from each drug to its correct use.

Drug	Use
Painkiller	Used as a fertility drug
Statin	Used to relieve disease symptoms
Thalidomide	Used to treat leprosy
	Used to lower blood cholesterol

(3)

(b) New drugs need to be tested before going on sale.

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



(i) How long do trials on humans take? _____ years

(1)

(ii) What is the minimum number of humans the drug is tested on throughout *clinical testing?*

_____

(1)

(c) Draw a ring around the correct answer to complete each sentence.

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(i) A new drug is first tested in the laboratory to find

if it is toxic.
if it is cost effective.
the optimum dose.

(1)

(ii) The drug is then tested on a few volunteers to find

if it is cost effective.
if it has side effects.
the optimum dose.

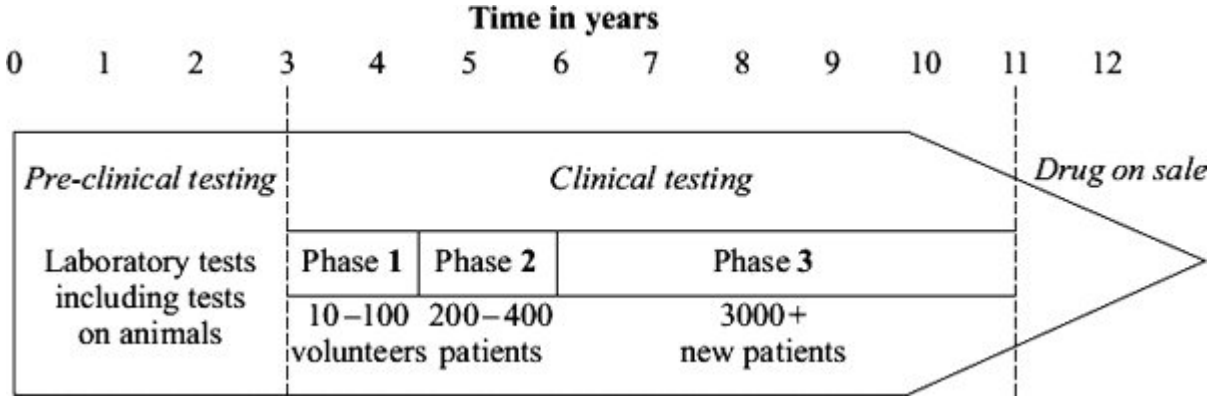
(1)

(Total 7 marks)

Q14.

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.

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_____

_____

(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)

Q15.

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.

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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.

_____

_____

_____

_____

_____

_____

_____

_____

(3)

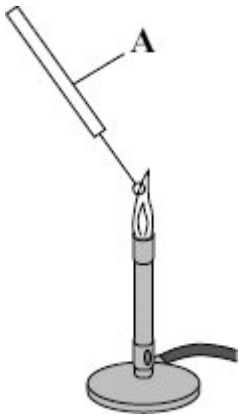
(Total 4 marks)

Q16.

(a) It is important to prevent contamination when growing microorganisms.

The diagram shows the transfer and culturing of microorganisms.

Stage V  A Petri dish with agar is heated to 150 °C for 50 minutes, then cooled

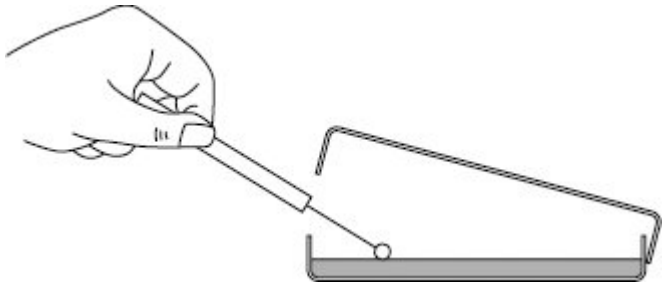
Stage W 

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Stage X



Stage Y



Stage Z



Petri dish kept at 25 °C for 48 hours

(i) Name the apparatus labelled **A** in stage **W**.

Draw a ring around **one** answer.

inoculating loop **pipette** **thermometer**

(1)

(ii) Give the letters of the **two** stages from **V**, **W**, **X**, **Y** and **Z**, which are carried out to kill microorganisms.

Stages ☐ and ☐

(2)

(iii) Give the letter of the stage, **V**, **W**, **X**, **Y** or **Z**, where incubation takes place.

Stage ☐

(1)

(b) A culture medium used for growing microorganisms contains various nutrients.

Which nutrient is the main source of energy for the microorganisms?

Draw a ring around **one** answer.

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carbohydrates **mineral ions** **vitamins**

(1)

(Total 5 marks)

Q17.

Diet and exercise affect health.

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

Obesity can lead to heart disease.

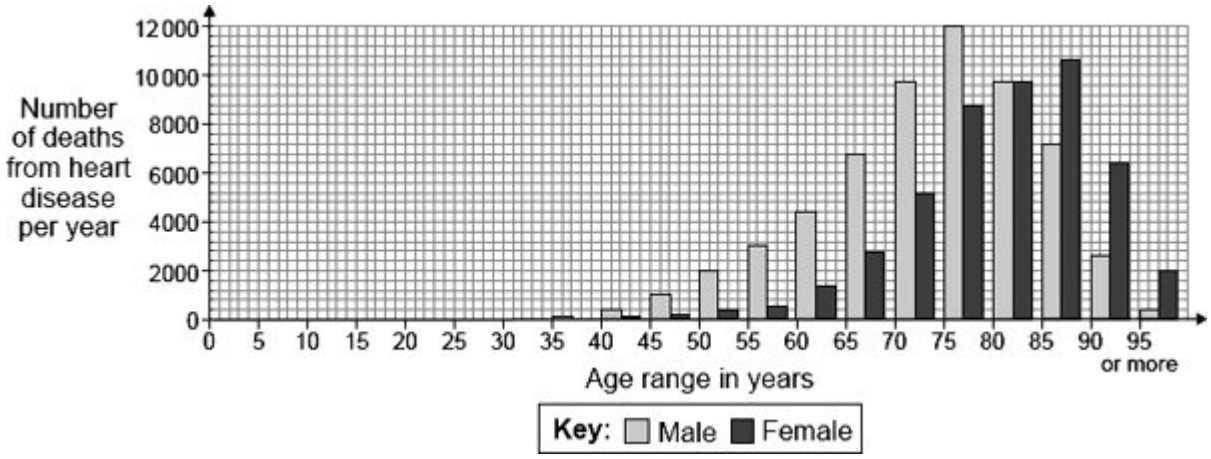
Other than heart disease, name **two** conditions which are linked to obesity.

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. _____

_____

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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)

Q18.

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 _____ .

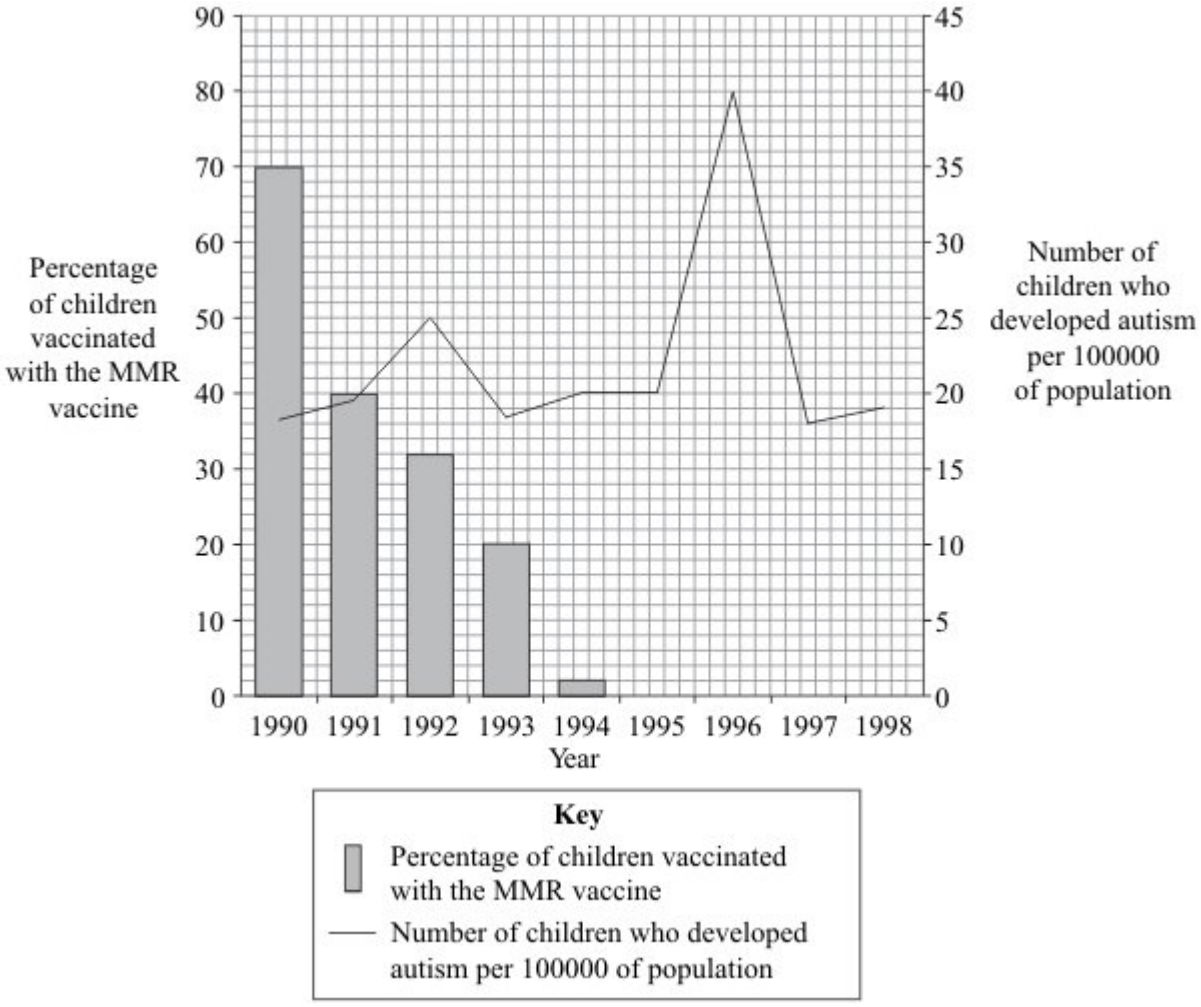
This makes children _____ to the pathogen.

(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.

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(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)

Q19.

Some students investigated the effect of pH on the growth of one species of bacterium.

They transferred samples of bacteria from a culture of this species to each of eight flasks. Each flask contained a solution of nutrients but at a different pH.

After 24 hours, the students measured the amount of bacterial growth.

(a) It was important that the flasks in which the bacteria grew were not contaminated with other microorganisms.

Describe **two** precautions the students should have taken to prevent this contamination.

1. _____

_____

2. _____

_____

(2)

(b) To see the effect of pH on the growth of the bacteria, other conditions should be kept constant.

Suggest **two** conditions which should have been kept constant for all eight flasks.

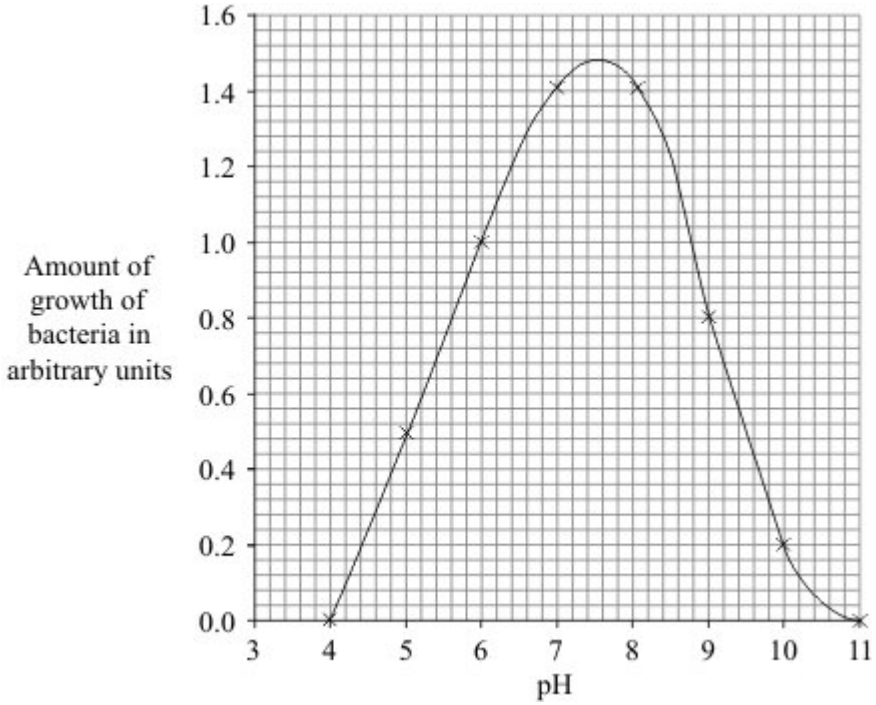
1. _____

2. _____

(2)

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

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The students wanted to find the best pH for the growth of this species of bacterium.

(i) Use the graph to estimate the pH at which the bacteria would grow best.

pH _____

(1)

(ii) What could the students do to find a more accurate value for the best pH for growth of the bacteria?

_____

_____

(1)

(Total 6 marks)

Q20.

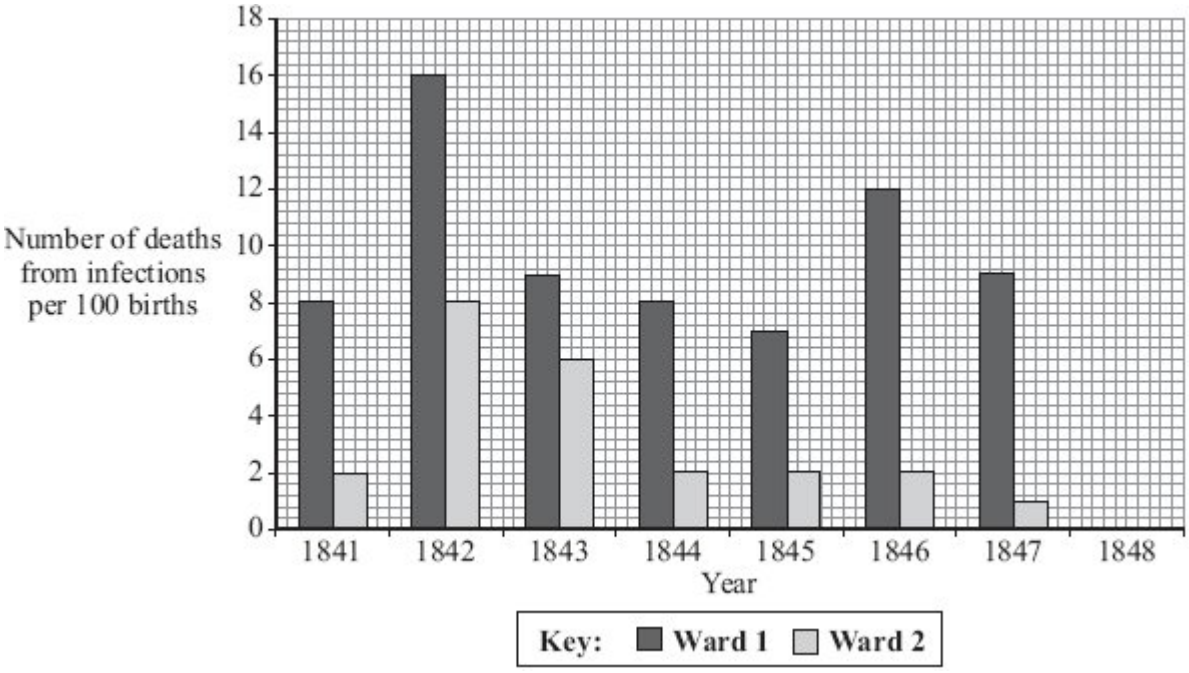
In the 19th century, Dr Semmelweiss investigated infection in a hospital.

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.

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(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

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(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)

Q21.

Influenza is a disease caused by a virus.

(a) Explain why it is difficult to treat diseases caused by viruses.

_____

_____

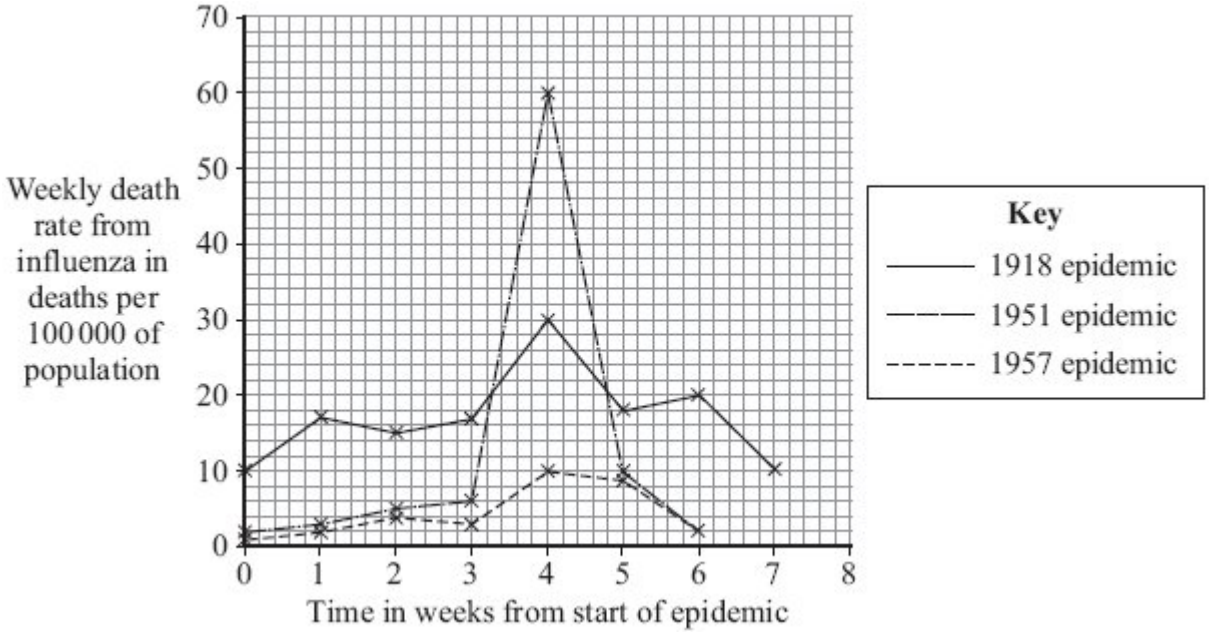
_____

_____

(2)

(b) In some years there are influenza epidemics.

The graph shows the death rate in Liverpool during three influenza epidemics.



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(i) The population of Liverpool in 1951 was approximately 700 000.

Calculate the approximate number of deaths from influenza in week 4 of the 1951 epidemic.

Show clearly how you work out your answer.

_____

_____

Number of deaths _____

(2)

(ii) In most years, the number of deaths from influenza in Liverpool is very low.

Explain, in terms of the influenza virus and the body's immune system, why there were large numbers of deaths in years such as 1918 and 1951.

_____

_____

_____

_____

_____

_____

(3)

(Total 7 marks)

Q22.

(a) Microorganisms can be grown on agar jelly in a Petri dish.

List A gives three actions used when growing microorganisms.
List B gives four possible effects of these actions.

Draw a straight line from each action in **List A** to its effect in **List B**.

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List A – Action	List B – Effect
	To reduce the growth of pathogens
The agar jelly is heated at 120°C for 30 minutes	
	To kill unwanted microorganisms
Make sure the temperature for growing the microorganisms is no higher than 25 °C	
	To prevent microorganisms from the air getting into the Petri dish
The lid of the Petri dish is held on with tape	
	To prevent oxygen entering the Petri dish

(3)

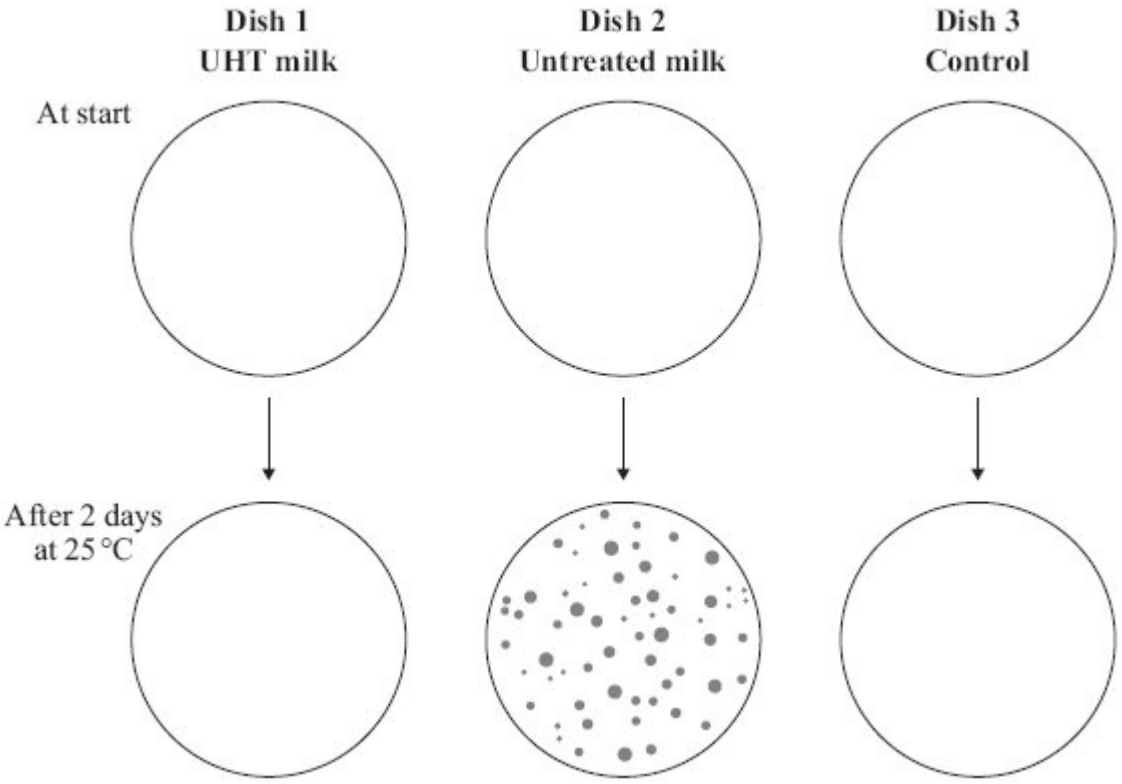
(b) UHT milk is milk that has been heated to 135 °C, then cooled.

In an investigation, three sterile Petri dishes containing sterile agar jelly were set up as follows.

- UHT milk was added to dish **1**.
- Untreated milk was added to dish **2**.
- Dish **3** was left unopened as a control.
- The dishes were kept at 25 °C for two days.

The results are shown in the diagram below.

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(i) Describe the difference in appearance between dishes **1** and **2** after two days.

_____

_____

(1)

(ii) Give **one** reason for this difference.

_____

_____

(1)

(iii) There was no change in the appearance of dish **3** after two days.

Give **one** reason why.

_____

_____

(1)

(Total 6 marks)

Q23.

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

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because the virus

is not affected by drugs
lives inside cells
produces antitoxins

(1)

(ii) The vaccine contains an

active
infective
inactive

form of the polio virus.

(1)

(iii) The vaccine stimulates the white blood cells to

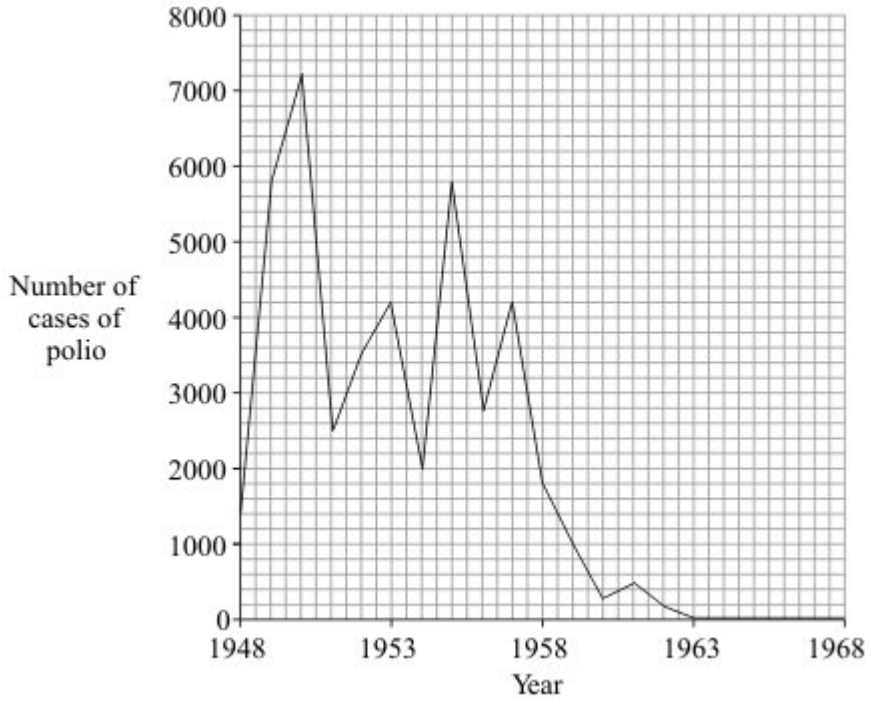
produce

antibiotics
antibodies
drugs

which destroy the virus.

(1)

(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)

(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?

_____

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(1)

(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)

(Total 6 marks)

Q24.

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

(a) Explain, as fully as you can, how the MMR vaccine protects children from these diseases.

_____

_____

_____

_____

_____

_____

_____

(3)

(b) Read the passage.

> Autism is a brain disorder that can result in behavioural problems. In 1998, Dr Andrew Wakefield published a report in a medical journal. Dr Wakefield and his colleagues had carried out tests on 12 autistic children.
>
> Dr Wakefield and his colleagues claimed to have found a possible link between the MMR vaccine and autism.
>
> Dr Wakefield wrote that the parents of eight of the twelve children blamed the MMR vaccine for autism. He said that symptoms of autism had started within days of vaccination.
>
> Some newspapers used parts of the report in scare stories about the MMR vaccine. As a result, many parents refused to have their children vaccinated.
>
> Dr Wakefield's research was being funded through solicitors for the twelve children. The lawyers wanted evidence to use against vaccine manufacturers.

Use information from the passage above to answer these questions.

(i) Was Dr Wakefield's report based on reliable scientific evidence?

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Explain the reasons for your answer.

_____

_____

_____

_____

(2)

(ii) Might Dr Wakefield's report have been biased?

Give the reason for your answer.

_____

_____

_____

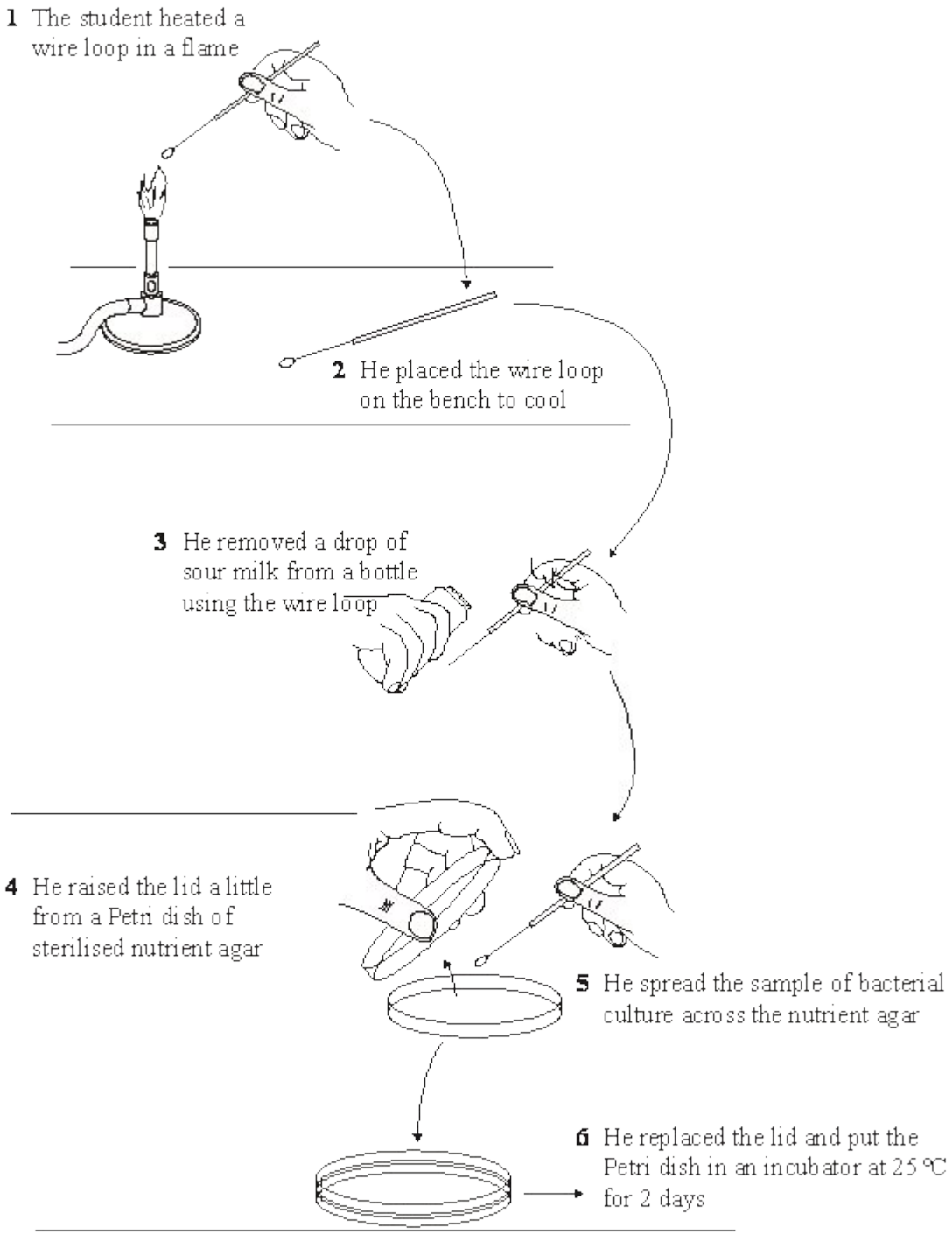
(1)

(Total 6 marks)

Q25.

The diagram shows how a student transferred some sour milk from a bottle to a Petri dish of nutrient agar.

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List A gives four actions carried out by the student.
List B gives five possible effects of these actions.

Draw a straight line from each action in List **A** to its effect in List **B**.
Draw only **one** line from each action.

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List A – Action	List B – Effect
Heating loop in flame	Risk of contamination with bacteria increased
Placing loop on bench to cool	Risk of bacteria entering decreased
Only lifting lid of petri dish a little	Kills bacteria
Placing petri dish in incubator at 25°C rather than 35°C	Prevents air entering
	Risk of growth of pathogens decreased

(Total 4 marks)

Q26.

Pathogens can enter the body and cause disease.

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

_____

(1)

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

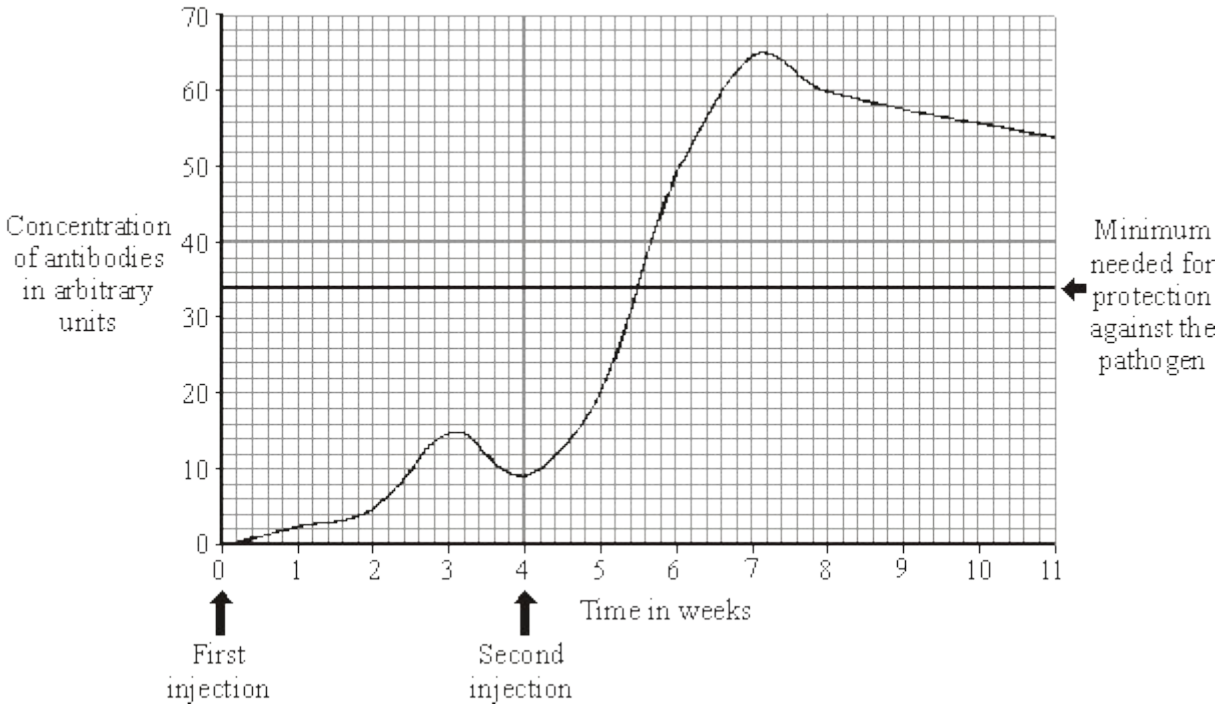
_____

(1)

(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.

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(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)

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

_____

_____

_____

_____

_____

_____

_____

(3)

(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)

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(Total 7 marks)

Q27.

Pathogenic bacteria and viruses may make us feel ill if they enter our bodies.

(a) Why do bacteria and viruses make us feel ill?

Bacteria _____

_____

Viruses _____

_____

(2)

(b) Most drugs that kill bacteria cannot be used to treat viral infections.

Explain why.

_____

_____

_____

_____

_____

_____

(2)

(c) Antibiotic-resistant strains of bacteria are causing problems in most hospitals.

Explain, as fully as you can, why there has been a large increase in the number of antibiotic-resistant strains of bacteria.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

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(4)
(Total 8 marks)

Q28.

(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)

(b) The MMR vaccine protects people against three diseases.

Write down the names of **two** of these diseases.

1. _____

2. _____

(2)

(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

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.

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_____

_____

_____

_____

(2)

(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)

(Total 9 marks)

Q29.

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)

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

_____

_____

_____

_____

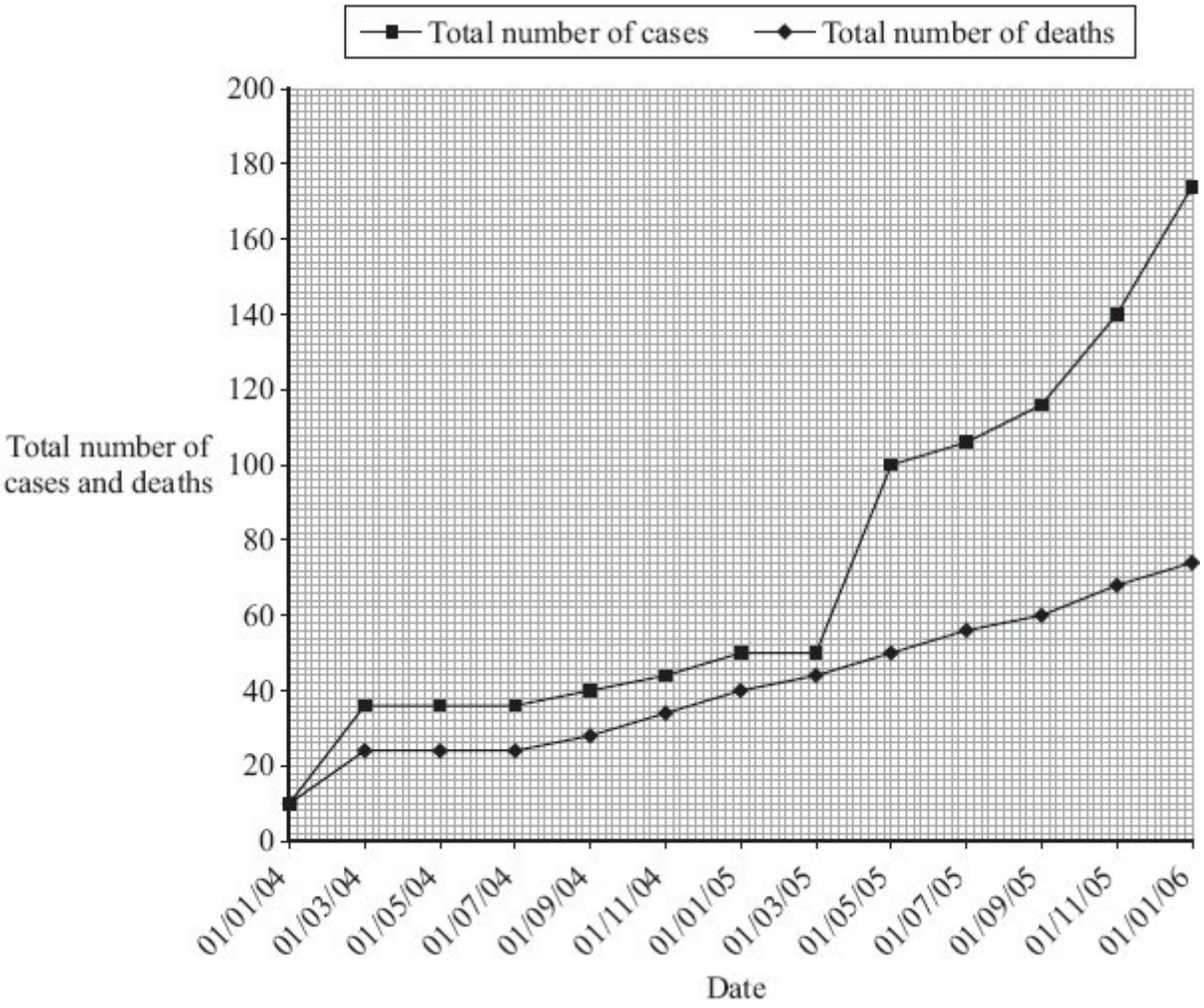
(2)

(Total 5 marks)

Q30.

Scientists began to keep records of cases of H5N1 bird flu in humans in January 2004.

The graph shows the total number of cases of bird flu in humans and the total number of deaths up to January 2006.



(a) (i) How many people had died from bird flu up to 01/07/05?

_____

(1)

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(ii) Describe, as fully as you can, how the number of cases of bird flu in humans changed between 01/07/04 and 01/01/06.

_____

_____

_____

_____

(2)

(b) At present, humans can only catch bird flu from contact with infected birds. The bird flu virus may mutate into a form that can be passed from one human to another.

Explain why millions of people may die if the bird flu virus mutates in this way.

_____

_____

_____

_____

(2)

(Total 5 marks)

Q31.

(a) (i) Some diseases can be tackled by using antibiotics and vaccination. Explain fully why antibiotics cannot be used to cure viral diseases.

_____

_____

_____

_____

(2)

(ii) A recent study found that babies in 90 % of hospitals are infected with the MRSA bacterium.

Explain how the MRSA bacterium has developed resistance to antibiotics.

_____

_____

_____

_____

(2)

(b) A person can be immunised against a disease by injecting them with an inactive form of a pathogen.

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Explain how this makes the person immune to the disease.

_____

_____

_____

_____

_____

_____

(3)

(Total 7 marks)

Q32.

In the eighteenth century, surgeons did not wear special clothing or wash their hands before operations. Many of their patients died from infections.

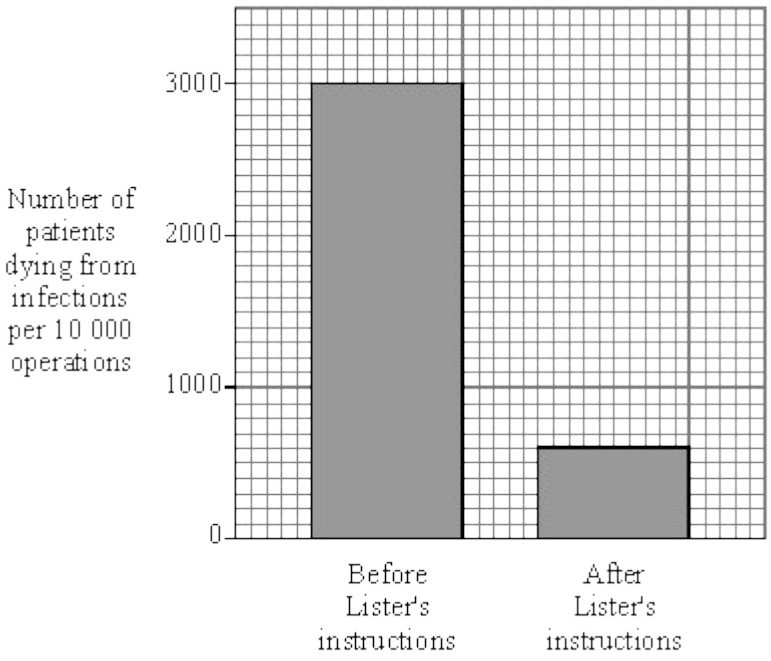
(a) Suggest why patients often died from infections after operations.

_____

(1)

(b) In the nineteenth century, Joseph Lister told surgeons to use sprays of carbolic acid in operating theatres and to wash their hands.

The graph shows the effect that using Lister's instructions had on the number of patients who died from infections after surgery.



Describe how Lister's instructions affected the number of patients dying from infections after surgery.

_____

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_____

_____

(2)

(Total 3 marks)

Q33.

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)

Q34.

Mumps is a disease caused by a virus. Mumps vaccine is usually given to children as part of the MMR vaccine.

(a) What diseases, other than mumps, does the MMR vaccine protect against?

_____

(2)

(b) Mumps vaccines contain mumps viruses. Suggest why these viruses do not cause mumps.

_____

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_____

(1)

(c) Explain how the vaccine makes someone immune to mumps.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

(5)

(d) A child who has not been given the mumps vaccine catches mumps. Suggest why a doctor would **not** give antibiotics to cure the child of mumps.

_____

_____

(1)

(Total 9 marks)

Q35.

Hepatitis B is a liver disease caused by a virus. The virus is found in body fluids such as blood, saliva and urine. Diagram **1** shows the structure of the virus in cross section.

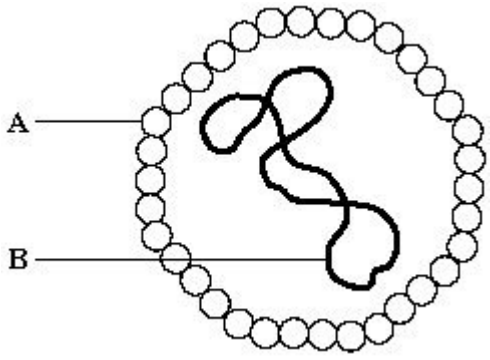


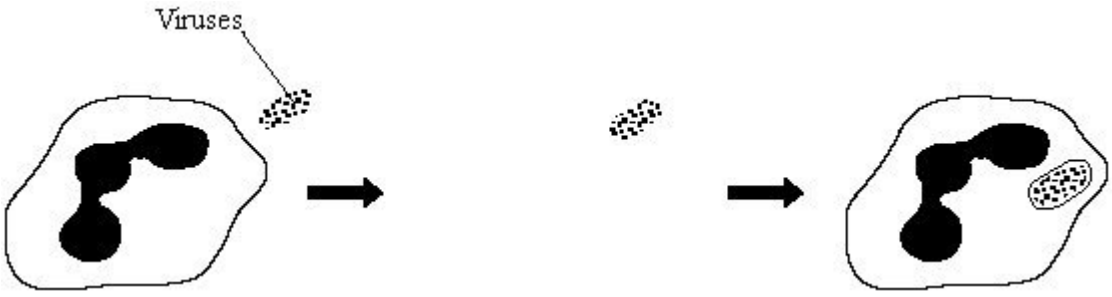
Diagram 1

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(a) The human body has several natural defences against viruses. Some of these prevent viruses from entering the body. Others act once the viruses have entered.

(i) Diagram **2** shows a white blood cell attacking a group of viruses.

Complete diagram **2** by drawing the 2nd stage.



1st stage **2nd stage** **3rd Stage**

Diagram 2

(1)

(ii) What type of chemical is released by some white blood cells to attack viruses?

_____

(1)

(b) Hepatitis B is more likely to be spread among people who share needles when they inject drugs. Use information given at the beginning of this question to explain why this is so.

_____

_____

_____

_____

(2)

(Total 4 marks)

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