4.3 Infection and Response Foundation

Name: _____

Class: _____

Date: _____
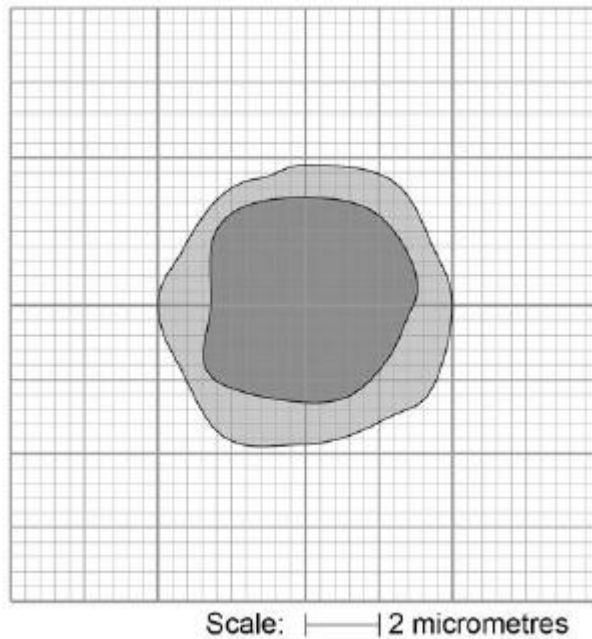
Time: **122 minutes**

Marks: **119 marks**

Comments:

Q1.

The figure below shows a scale drawing of one type of cell in blood.

Scale: ⊢———⊣ 2 micrometres

(a)   Use the scale to determine the width of the cell.

Give your answer to the nearest micrometre.

_____

_____

Width of cell = _____ micrometres

(1)

(b)   Complete the table below.

Part of the blood	Function
	Carries oxygen around the body
	Protects the body against infection
Plasma	

(3)

(c)   Platelets are fragments of cells.

Platelets help the blood to clot.

Suggest what might happen if the blood did **not** clot.

_____

_____

(1)

Q2.

Pathogens cause infectious diseases in animals and plants.

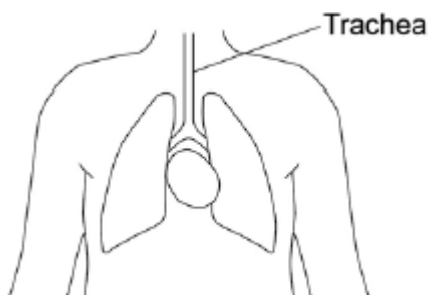(a)   Draw **one** line from each disease to the type of pathogen that causes the disease.

Disease   **Type of pathogen**

Bacterium

Gonorrhoea

Fungus

Malaria

Protist

Measles

Virus

(3)

(b)   Some parts of the human body have adaptations to reduce the entry of live pathogens.

Look at **Figure 1**.

Figure 1

Trachea

Explain how the trachea is adapted to reduce the entry of live pathogens.

_____

_____

_____
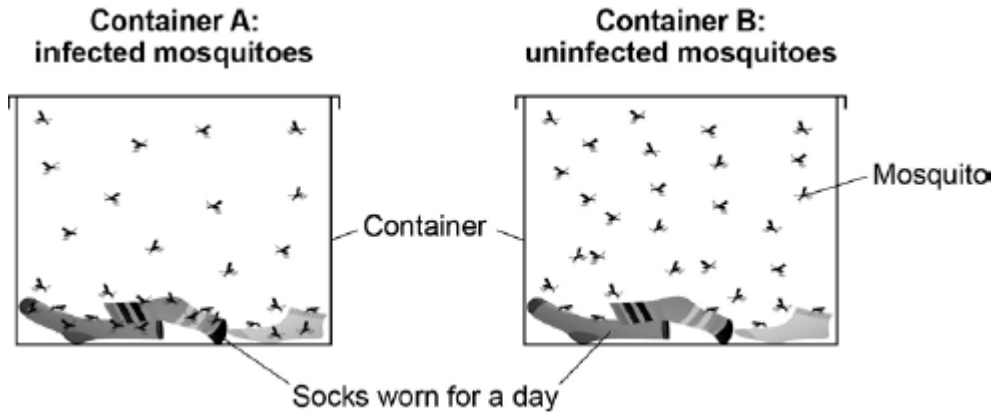
_____

_____

_____

_____

_____

(4)

(c)   Malaria is a serious disease that can be fatal.

Malaria is spread to humans by infected mosquitoes.

Scientists investigated the behaviour of mosquitoes to understand how the spread of malaria could be controlled.

Figure 2 shows the equipment the scientists used.

Figure 2

This is the method used.

1.   30 mosquitoes **infected with malaria** were placed in Container **A**.

2.   30 **uninfected** mosquitoes were placed in Container **B**.

3.   The total number of times the mosquitoes landed on the socks was recorded.

Name the dependent variable and suggest **one** control variable in this investigation.

Dependent variable _____

_____

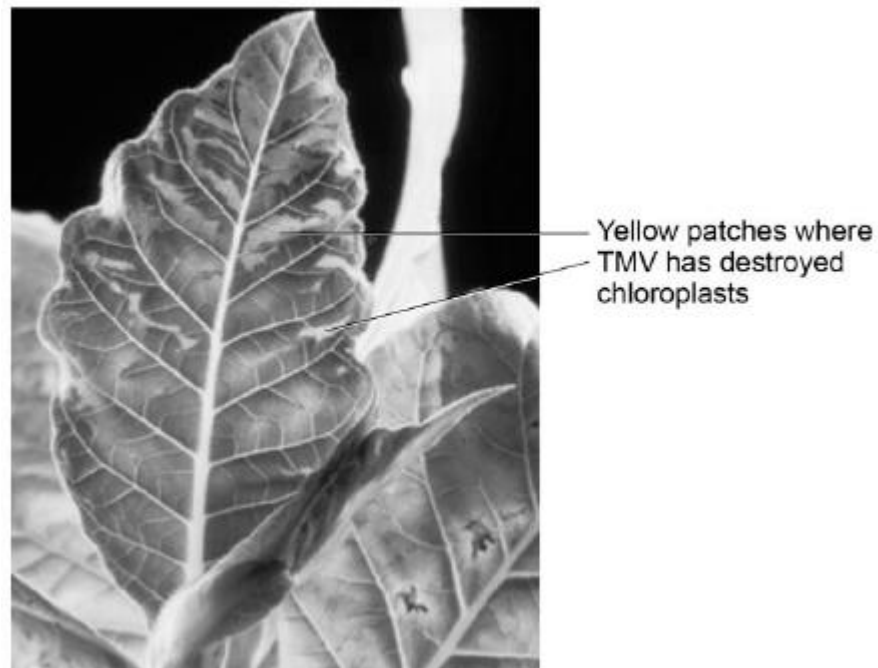Control variable _____

_____

(2)

(d)   Infected mosquitoes landed on the socks three times more often than uninfected mosquitoes.

Explain how this information can be used to reduce the spread of malaria.

_____

_____

_____

_____

(2)

(e)   Tobacco mosaic virus (TMV) affects many species of plant.

Figure 3 shows a leaf infected with TMV.

Figure 3

Yellow patches where
TMV has destroyed
chloroplasts

© Nigel Cattlin/Getty Images

TMV destroys chloroplasts in the leaf.

Explain how this could affect the growth of the plant.

_____

_____

_____

_____

_____

_____

(3)
(Total 14 marks)

Q3.

Pathogens are microorganisms that cause infectious disease.

(a)   Draw **one** line from each disease to the way the disease is spread.

Disease

Way the disease is spread

Animals that draw blood

Cholera		Drinking contaminated water

Cold		Droplets in the air when people cough or sneeze

Malaria		Eating food that is contaminated

		Breathing air polluted with carbon dioxide

(3)

(b) One way the human body protects itself against the entry of pathogens is by producing antimicrobial chemicals.

Antimicrobial chemicals kill pathogens.

Give **two** other ways the human body protects itself against the **entry** of pathogens.

1. _____

_____

2. _____

_____

(2)

(c) Measles is a childhood disease caused by a microorganism.

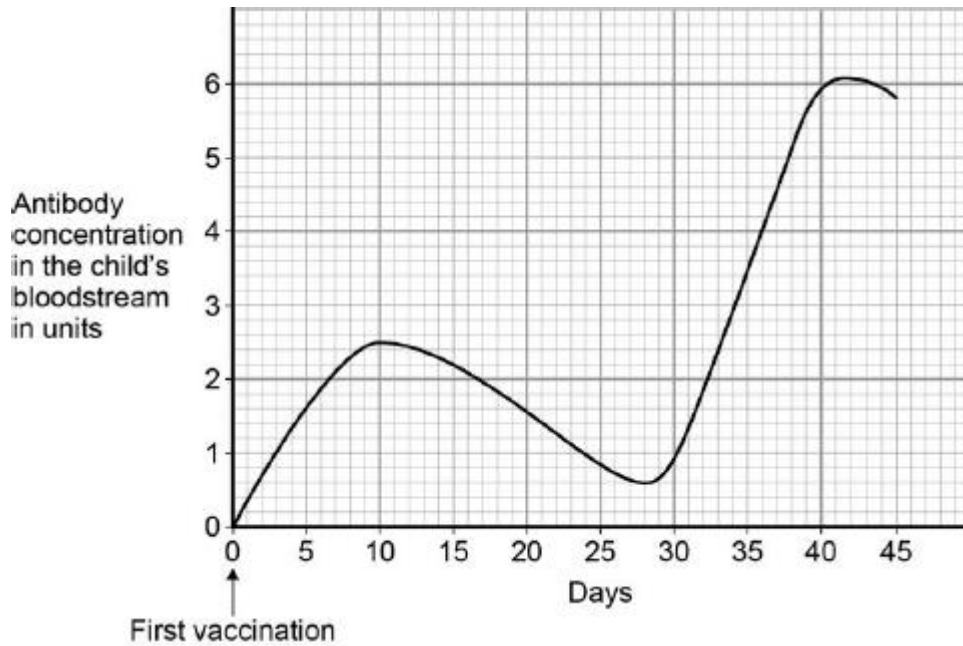Measles is **not** treated by antibiotics.

Give the reason why.

_____

(1)

(d) Vaccinations help people become immune to infections.

In 2013, 92% of children in the UK had two vaccination injections against measles.

The figure below shows how the concentration of antibodies in the blood changes after each measles vaccination.

Suggest what day the second vaccination was given.

_____

(1)

(e) What is the highest concentration of antibodies produced by the first vaccination?

_____

(1)

(f) How will the number of children getting measles change as more children are vaccinated against measles?

Give a reason for your answer.

Change _____

Reason _____

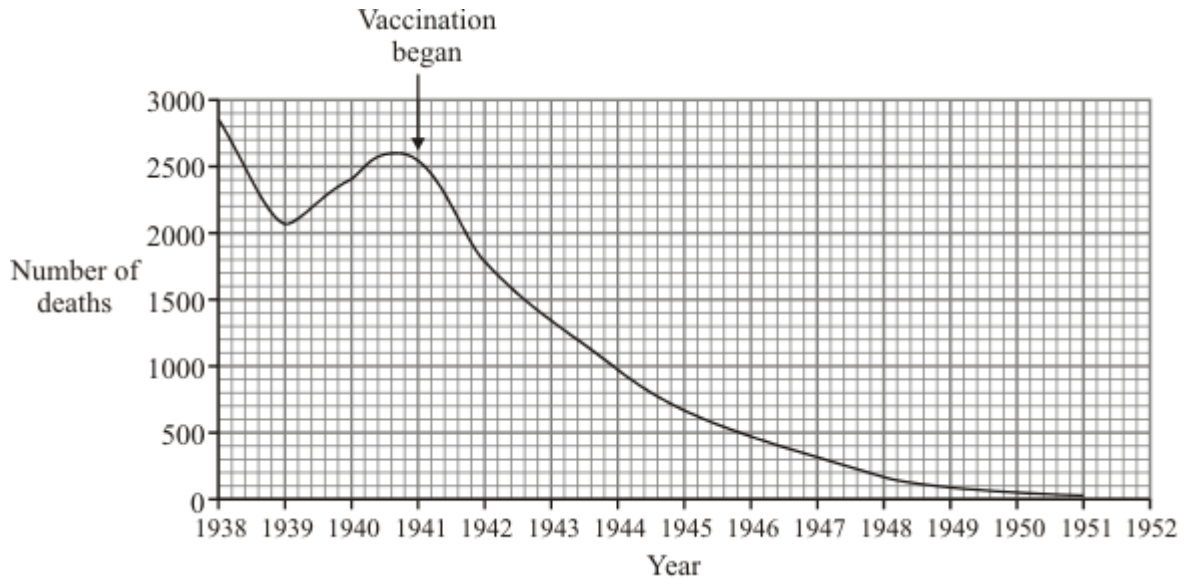_____

(2)
(Total 10 marks)

Q4.

Diphtheria is a disease of the human breathing system. The graph shows the number of deaths from diphtheria in the United Kingdom between 1938 and 1951. Vaccination against diphtheria was begun in 1941.

(a) What evidence in the graph suggests that vaccination protects people from diphtheria?

_____

(1)

(b) Complete the passage by choosing the correct words from the box.

antibodies	**bacteria**	**platelets**
red blood cells		**white blood cells**

During vaccination, harmless _____ are injected into the body.

This causes _____ to make _____

which help to protect the body against diphtheria.

(3)
(Total 4 marks)

Q5.

Drugs affect our body chemistry.

(a) **List A** gives the names of some drugs.
     List B gives the uses of some drugs.

Draw **one** line from each drug in **List A** to the use of the drug in **List B**.

         List A   List B
         Drug   Use

To increase fertility in women

Anabolic steroid		To treat leprosy
Statin		To stimulate muscle growth
Thalidomide		To reduce the risk of heart and circulatory diseases

(3)

(b) A new drug was trialled on 80 healthy volunteers.
The volunteers were asked to report any side effects.

The results of the trial are shown in the table.

Reported effects	Number of volunteers
No side effects	20
Severe sickness	42
Itchy skin	18

Based on the results of this trial, what should the drug company do next?

Tick (✔) **one** box.

Test on a small group of patients to find the optimum dose ☐

Test on a large group of patients to see if the drug works on ill people ☐

Stop the trial ☐

Give a reason for your answer.

_____

_____

(2)
(Total 5 marks)

Q6.

A scientist investigated how effective 5 different antibiotics were at killing two types of bacteria, *E.coli* and *S.aureus*.

•   The scientist grew the bacteria on agar in two different Petri dishes.

- He placed paper discs soaked in the 5 different antibiotic solutions, **A**, **B**, **C**, **D** and **E**, onto the agar.

- He used the same concentration of each antibiotic and the same sized paperdiscs.

- The Petri dishes were incubated at 25°C for 3 days.

A clear area around the paper disc means that the antibiotic has killed the bacteria there.

The results are shown in the diagram.

Petri dish containing *E.coli*

Petri dish containing *S.aureus*
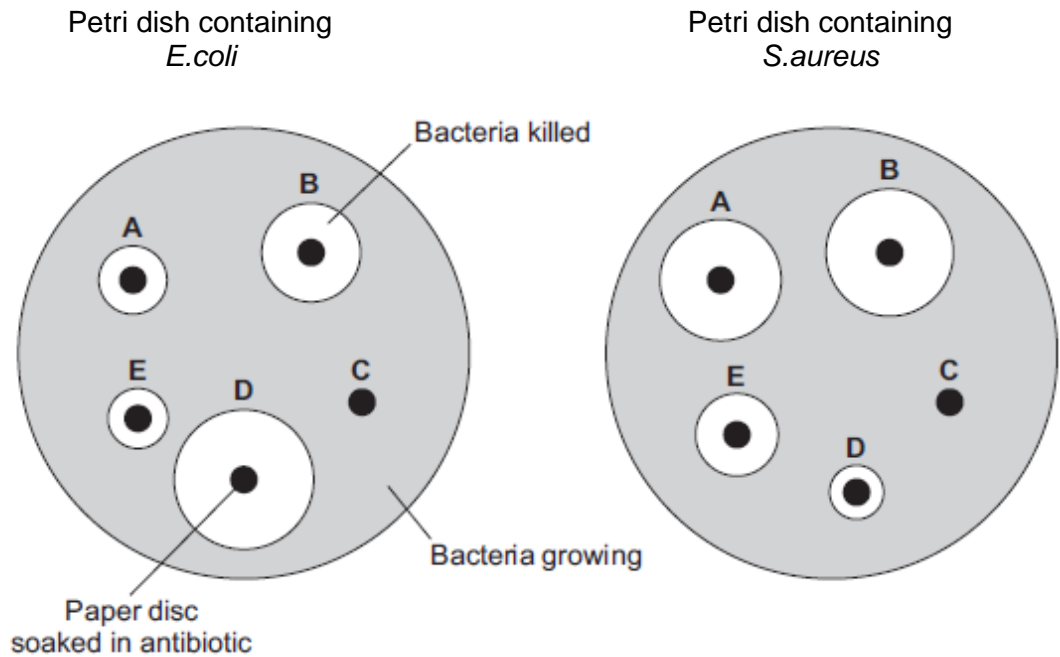
(a)   Give **one** variable the scientist controlled.

_____

(1)

(b)   Use the results shown in the diagram to help you to answer the following questions.

(i)   Which antibiotic, **A**, **B**, **C**, **D** or **E**, was the most effective at killing *E.coli*?

Write the correct answer in the box.

(1)

(ii)   Which antibiotic, **A**, **B**, **C**, **D** or **E**, did not kill either *E.coli* or *S.aureus*?

Write the correct answer in the box.

(1)

(iii)   Which antibiotic, **A**, **B**, **C**, **D** or **E**, would be the best to use to kill both *E.coli* and *S.aureus*?

Antibiotic: _____

Give a reason for your answer.

_____

_____

_____

(2)

(c)   MRSA is a strain of *S.aureus.* MRSA cannot be killed by most antibiotics.

Draw a ring around the correct answer to complete the sentence.

Bacteria that cannot be killed by antibiotics are

| immune. |
| powerful. |
| resistant. |

(1)
(Total 6 marks)

Q7.

The body defends itself against pathogens.

(a)   Give **three** ways that white blood cells defend the body against pathogens.

Tick (✓) **three** boxes.

Ingest pathogens ☐

Produce antibiotics ☐

Produce antibodies ☐

Produce antibodies ☐

Produce antitoxins ☐

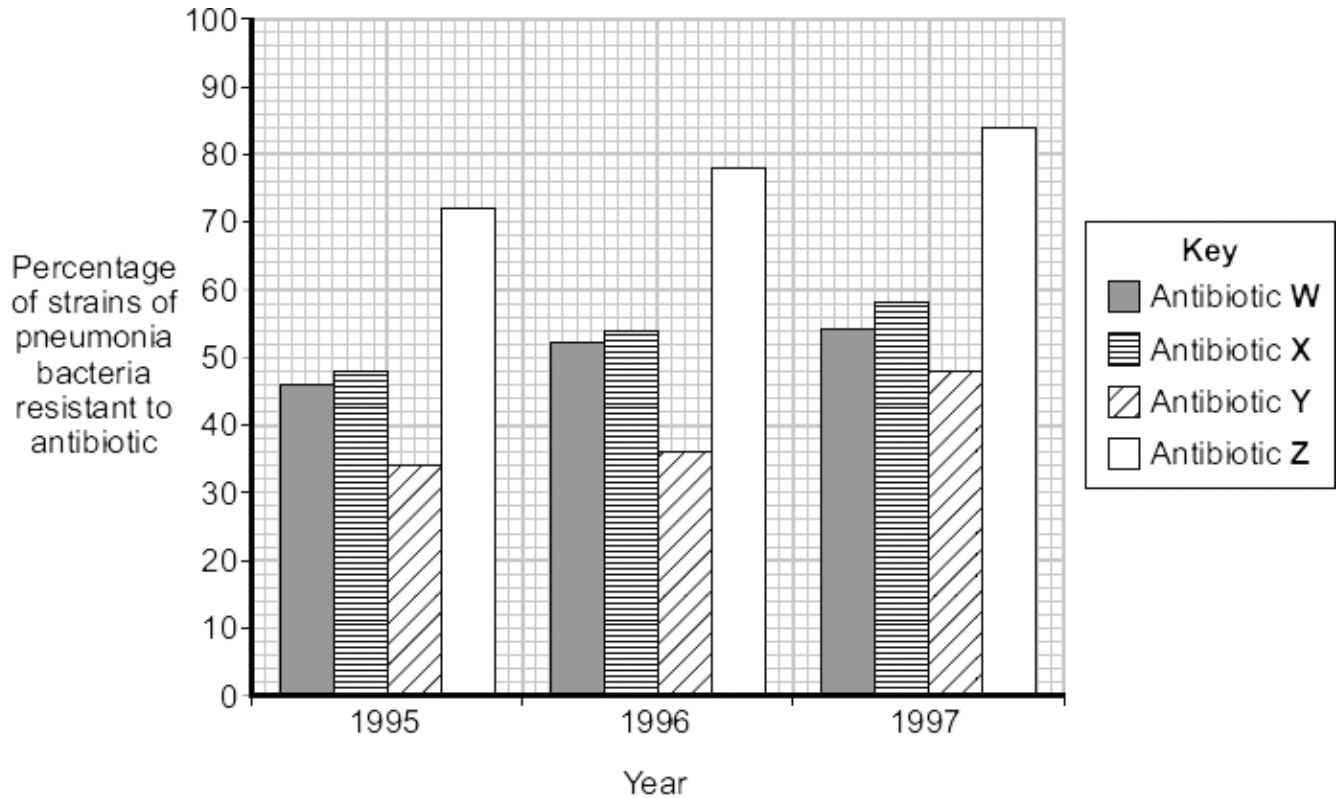Produce vaccines ☐

Stop pathogens entering the body ☐

(3)

(b)   Bacterial infections can be treated with antibiotics.

Sometimes bacteria are resistant to antibiotics.

What does *resistant to antibiotics* mean?

_____

_____

(1)

(c)   The bar chart shows how the percentage of strains of pneumonia bacteria that are resistant to four different antibiotics changed between 1995 and 1997.

(i)   Which would have been the best antibiotic to use against pneumonia bacteria in 1995?

Write the correct answer in the box.   Antibiotic

(1)

(ii)   Calculate the change in the percentage of strains of pneumonia bacteria resistant to antibiotic **W** between 1995 and 1997.

Show clearly how you work out your answer.

_____

_____

Answer = _____ %

(2)

(iii)   Suggest **two** possible reasons for this change in the number of strains of pneumonia bacteria resistant to antibiotic **W**.

1. _____

2. _____

Q8.

Two common medicines are paracetamol and ibuprofen. These medicines help to reduce high body temperature.

(a)   Children who were ill with high body temperatures were identified at doctors' surgeries.

These children were put into two groups.
The children in each group were matched for age, gender and body mass.

Group 1:   50 children were given paracetamol.

Group 2:   50 children were given ibuprofen.

(i)   Give **one** control variable in this investigation.

_____

_____

(1)

(ii)   In some investigations when medicines are tested, a placebo is given to one group.
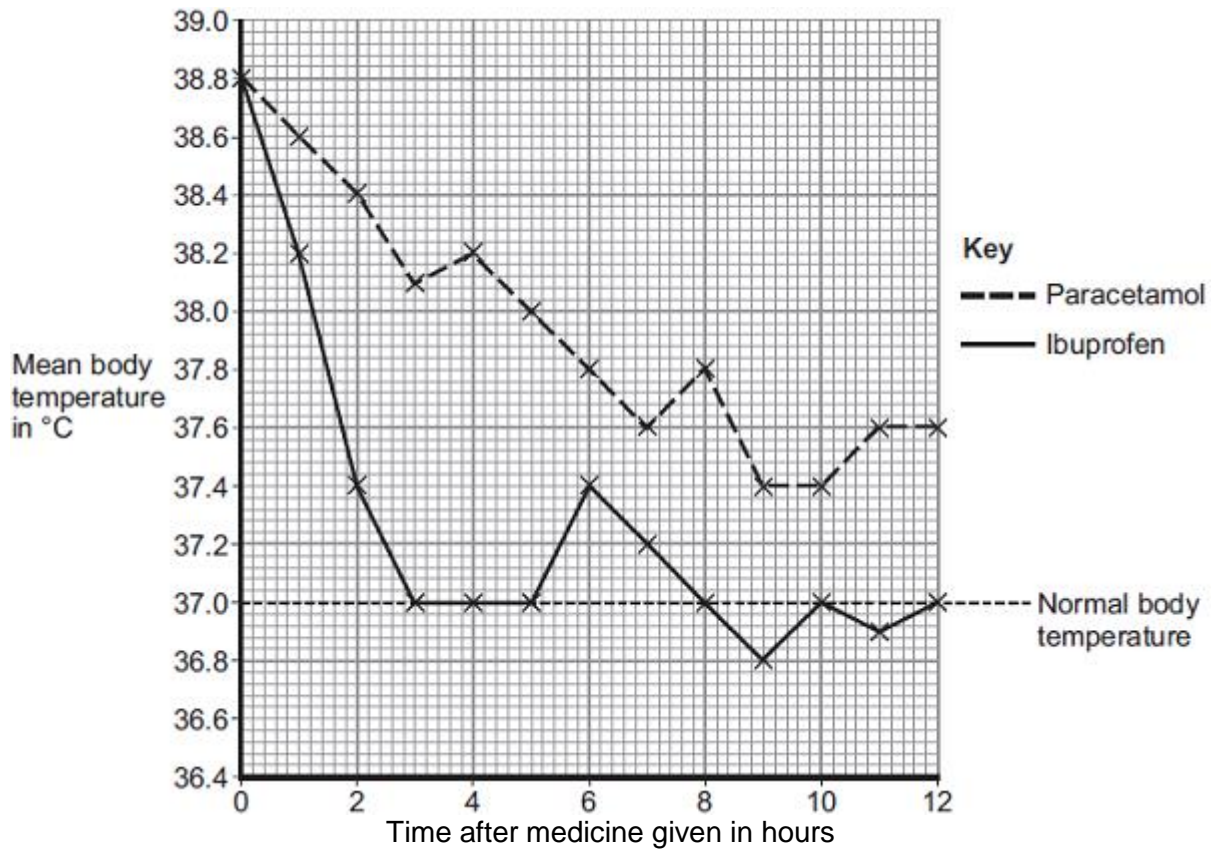
What is a placebo?

_____

_____

(1)

(b)   The children's body temperatures were measured before any medicine was given and every hour after treatment started.

Paracetamol was given every 4 hours. Ibuprofen was given every 6 hours.

The results for the two groups are shown in the figure below.

(i) What was the mean body temperature 4 hours after paracetamol was given?

_____ °C

(1)

(ii) Suggest which medicine a parent should give to their child to reduce a high body temperature to normal.

Use information from the graph.

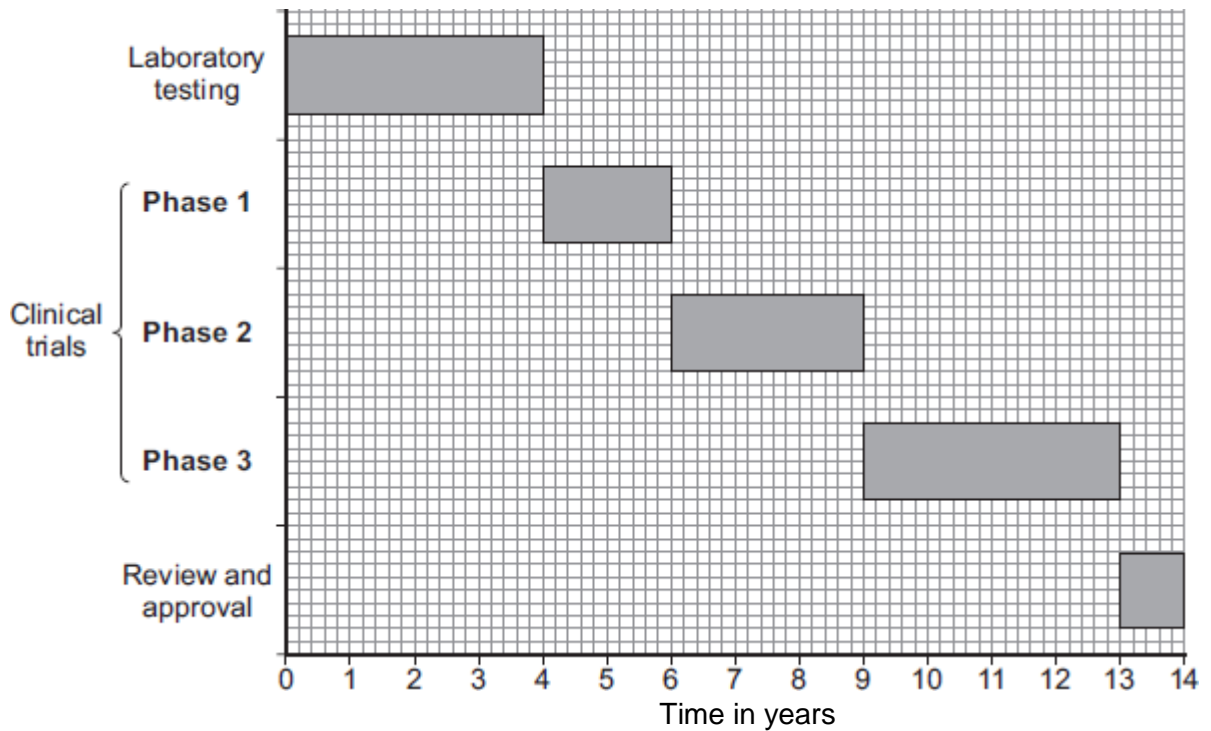Medicine: _____

Give **two** reasons for your answer.

_____

_____

_____

_____

(2)
(Total 5 marks)

Q9.

New drugs have to be tested before they can be sold.

The graph shows how much time the different stages of testing took for a new drug.

(a) (i) How much time did the laboratory testing of the drug take?

_____ years

(1)

(ii) Suggest what the drug was tested on during laboratory testing.

_____

(1)

(b) Clinical trials are carried out on human volunteers and patients.

(i) How much time did the clinical trials take for this drug?

_____

_____ years

(2)

(ii) During **Phase 1** clinical trials, the drug is tested on healthy volunteers using low doses.

Draw a ring around the correct answer to complete the sentence.

find the best dose.
see if the drug works.
see if the drug has side effects.

The reason for **Phase 1** testing is to

(1)

(iii) During **Phase 2** and **Phase 3** clinical trials, half of the volunteers are given a fake drug called a placebo in a double blind trial.

In a double blind trial, who knows which volunteers are given the drug and which volunteers are given the placebo?

Tick (✓) **one** box.

	Tick (✓)
The doctors but not the volunteers	
The doctors and the volunteers	
The volunteers but not the doctors	
Neither the volunteers nor the doctors	

(1)
(Total 6 marks)

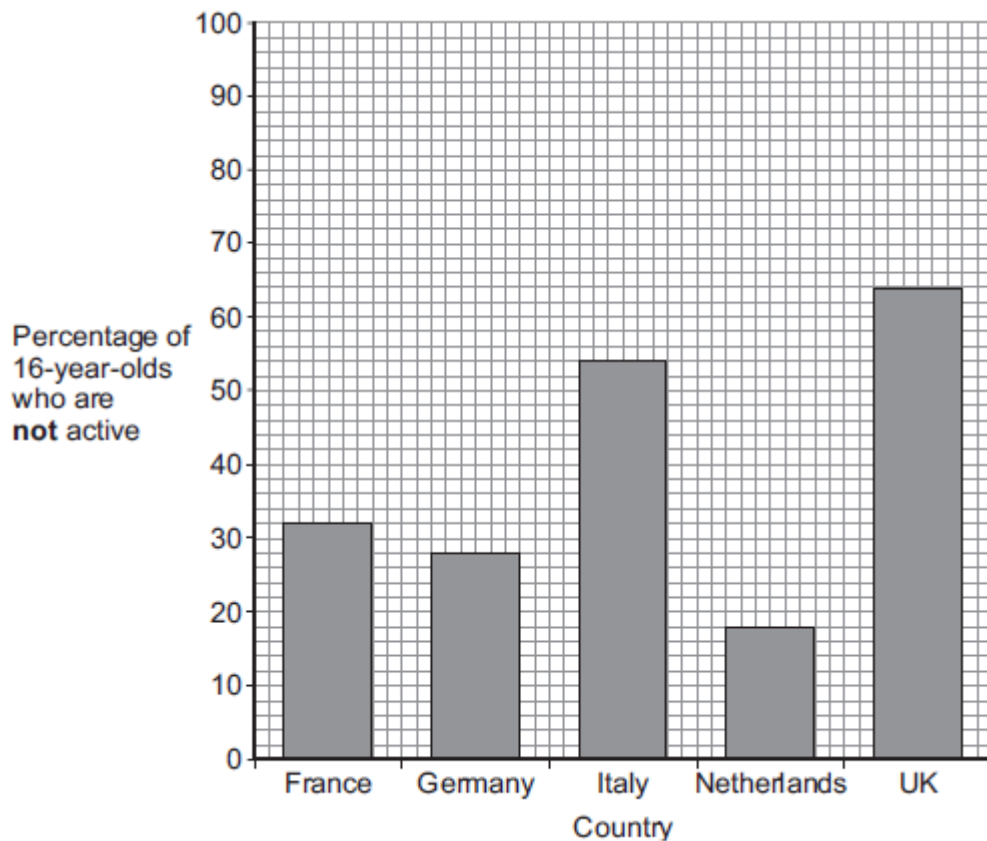## Q10.

Scientists investigated the effect of different factors on health.

(a)   People who are **not** active may have health problems.

The graph shows the percentage of 16-year-olds in some countries who are **not** active.

(i)   What percentage of 16-year-olds in the UK are **not** active?

_____ %

(1)

(ii)   What percentage of 16-year-olds in the UK are **active**?

_____ %

(iii) A newspaper headline states:

> People in the UK are the laziest in the world.

Information in **Figure 1** does **not** support the newspaper headline.

Suggest **one** reason why the newspaper headline may be wrong.

_____

_____

(1)

(b) Doctors gave a percentage rating to the health of 16-year-olds.
100% is perfect health.

The table shows the amount of exercise 16-year-olds do and their health rating.

Amount of exercise done in minutes every week	Health rating as %
Less than 30	72
90	76
180	82
300	92

What conclusion can be made about the effect of exercise on health?

Use information from the table.

_____

_____

(1)

(c) Inherited factors can also affect health.

Give **one** health problem that may be affected by the genes someone inherits.

Draw a ring around the correct answer.

being malnourished	having a high cholesterol level	having a deficiency disease

(1)

(d) White blood cells are part of the immune system.

Use the correct answer from the box to complete each sentence.

antibiotics	antibodies	pathogens	vaccines

(i)   When we are ill, white blood cells produce _____ to kill microorganisms.

(1)

(ii)   Many strains of bacteria, including MRSA, have developed resistance to drugs called

_____

(1)
(Total 7 marks)

Q11.

Bacteria and viruses can reproduce quickly inside the body and make people feel ill.

(a)   Use the correct answer from the box to complete the sentence.

antibodies	antitoxins	toxins

Bacteria and viruses make us feel ill because they produce _____ .

(1)

(b)   (i)   Antibiotics can be used to treat some infections.

Use the correct answer from the box to complete the sentence.

bacteria	bacteria and viruses	viruses

Antibiotics are medicines that kill _____ .

(1)

(ii)   New strains of pathogens have developed which are resistant to antibiotics.

Use the correct answer from the box to complete the sentence.

are short of food	invade body cells	mutate

New strains are produced when pathogens _____ .

(1)

(iii)   What will scientists have to develop to kill these new resistant strains?

_____

_____

(1)
(Total 4 marks)

Q12.

Flu is an infectious disease caused by a virus.

Many people in England become infected with the flu virus in winter.

(a) Doctors do not prescribe antibiotics to patients with flu.Doctors do not prescribe antibiotics to patients with flu.

State why.

_____

_____

(1)

(b) A flu vaccine is offered to people with a high risk of having a severe illness if they are infected by the flu virus.

What does a flu vaccine contain?

Tick (✓) **one** box.

Inactive antibodies ☐

Inactive viruses ☐

White blood cells ☐

(1)

(c) The table shows the percentage of people in high-risk groups who had been vaccinated against flu by November in 2013. The data is for England.

Group at risk of a severe illness	Percentage (%) of group vaccinated by November in 2013
2-year-old children	31.1
3-year-old children	27.9
People 65 years and older	64.4

Give **one** conclusion from the data in the table above.

Suggest a reason for this.

Conclusion: _____

_____

_____

Reason: _____

_____

_____

(2)

Q13.

The photograph below shows human skin highly magnified. Groups of microbes can be seen on the skin.
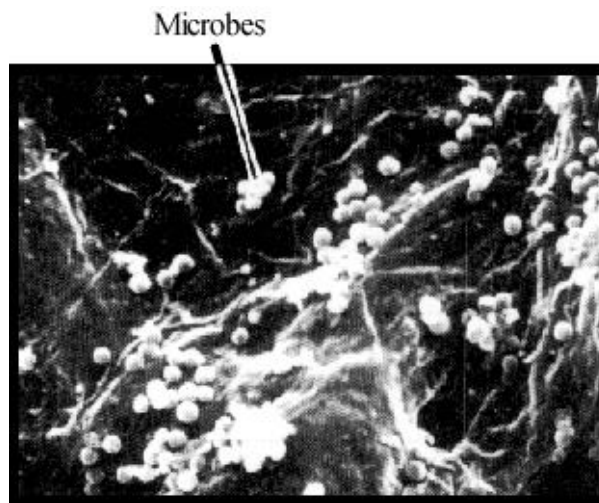
Microbes

Give **two** ways in which the body protects itself from these microbes.

1. _____

_____

2. _____

_____

(Total 2 marks)

Q14.

The mould *Penicillium* can be grown in a fermenter. *Penicillium* produces the antibiotic penicillin.

The graph shows changes that occurred in a fermenter during the production of penicillin.

Time in hours
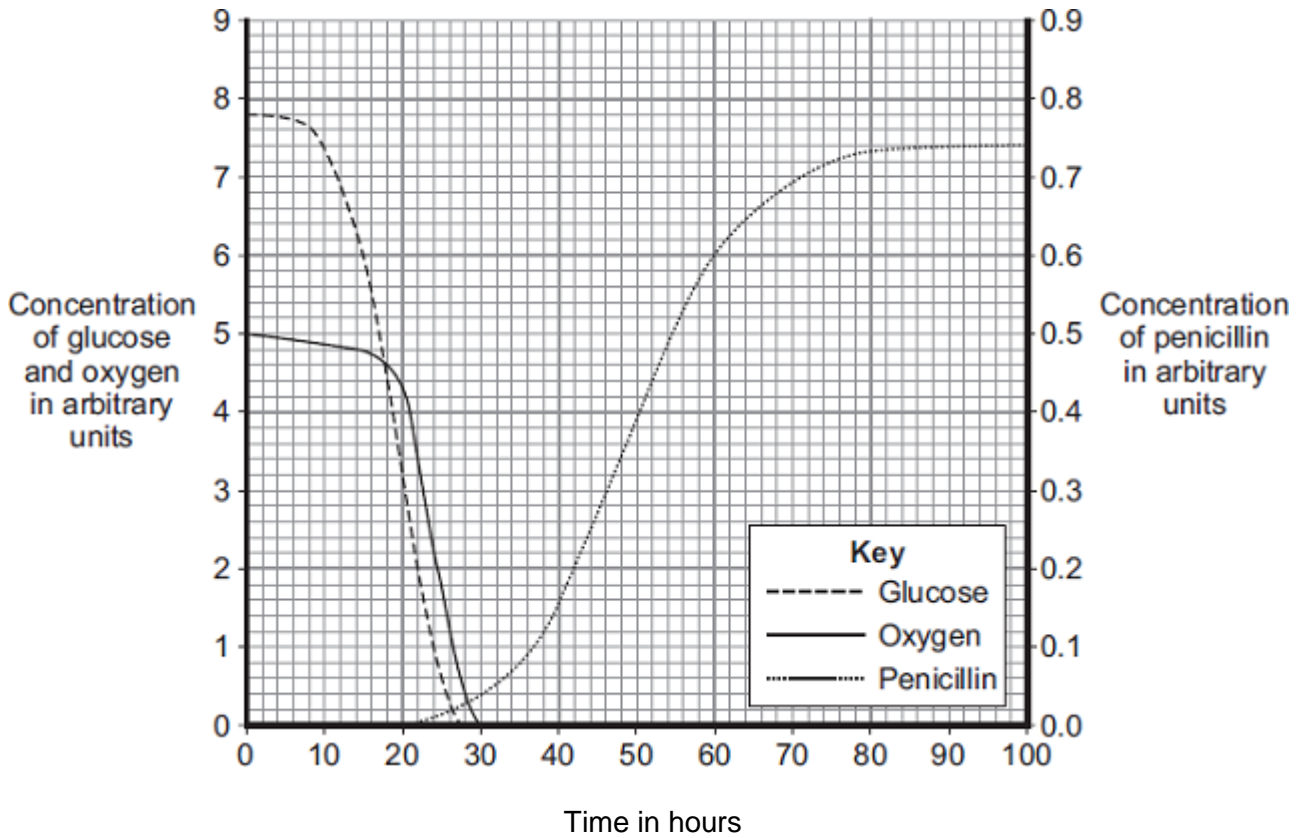
(a)   During which time period was penicillin produced most quickly?

Draw a ring around **one** answer.

0 – 20 hours   **40 – 60 hours**   **80 – 100 hours**

(1)

(b)   (i)   Describe how the concentration of glucose in the fermenter changes between 0 and 30 hours.

_____

_____

_____

_____

(2)

(ii)   How does the change in the concentration of oxygen in the fermenter compare with the change in concentration of glucose between 0 and 30 hours?

Tick (✓) **two** boxes.

The oxygen concentration changes after the glucose concentration.   ☐

The oxygen concentration changes before the glucose concentration.   ☐

The oxygen concentration changes less than the glucose concentration. ☐

The oxygen concentration changes more than the glucose concentration. ☐

(2)

(iii) What is the name of the process that uses glucose?

Draw a ring around **one** answer.

distillation   **filtration**   **respiration**

(1)
(Total 6 marks)

Q15.

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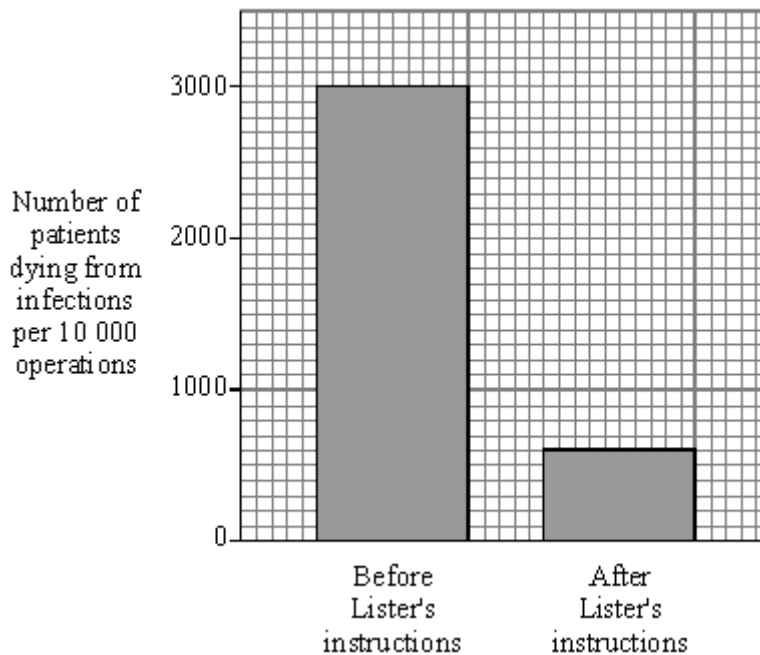
Describe how Lister's instructions affected the number of patients dying from infections after surgery.

_____

Q16.

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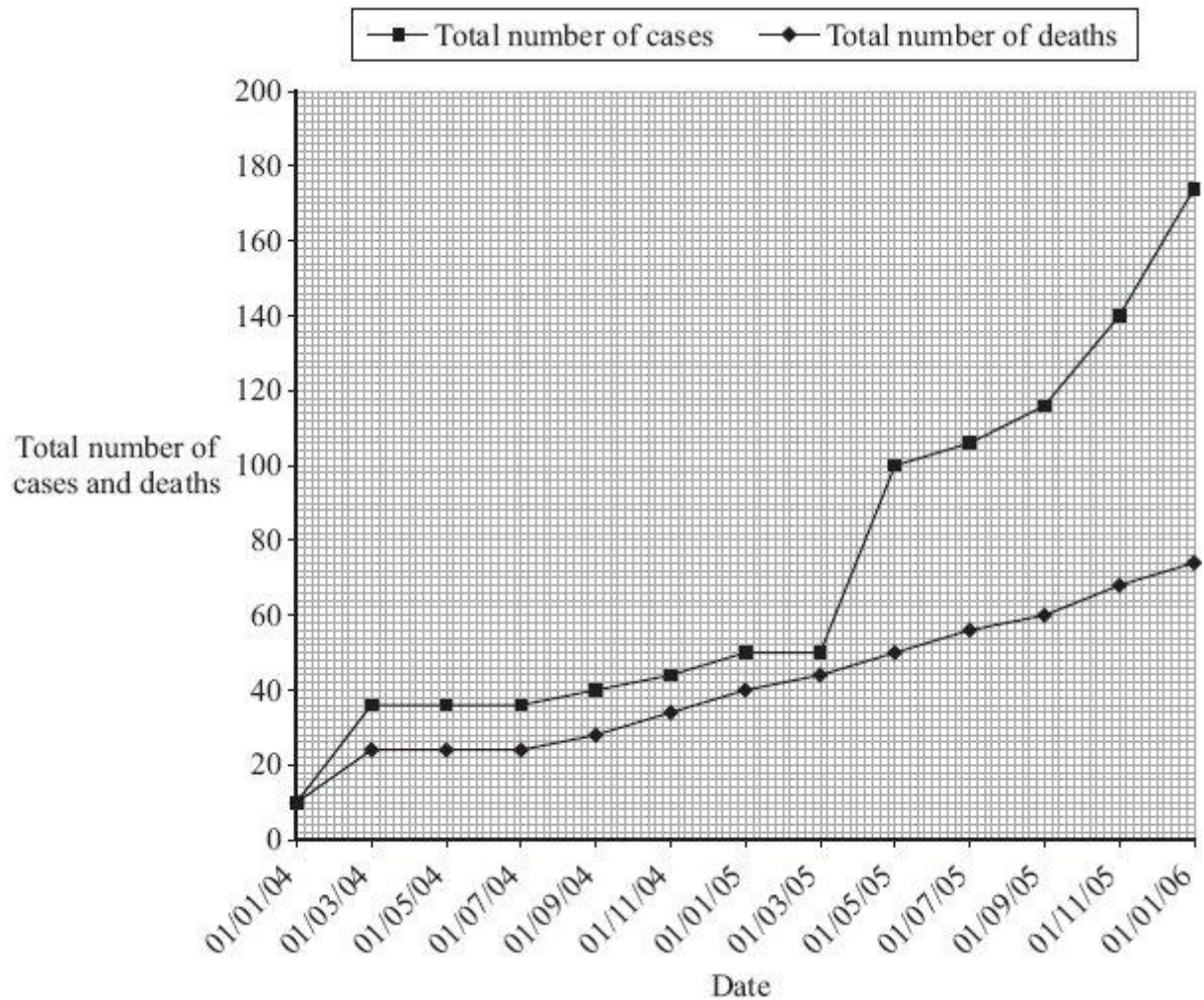
(a)   (i)   How many people had died from bird flu up to 01/07/05?

_____

(1)

(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.

_____

_____

_____

_____

(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)

Q17.

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

because the virus
| is not affected by drugs |
| lives inside cells |
| produces antitoxins |

(1)

(ii)   The vaccine contains an
active	form of the polio virus.
infective	
inactive	

(1)

(iii)   The vaccine stimulates the white blood cells to

produce
antibiotics	which destroy the virus.
antibodies	
drugs	

(1)

(b)   The graph shows the number of cases of polio in the UK between 1948 and 1968.
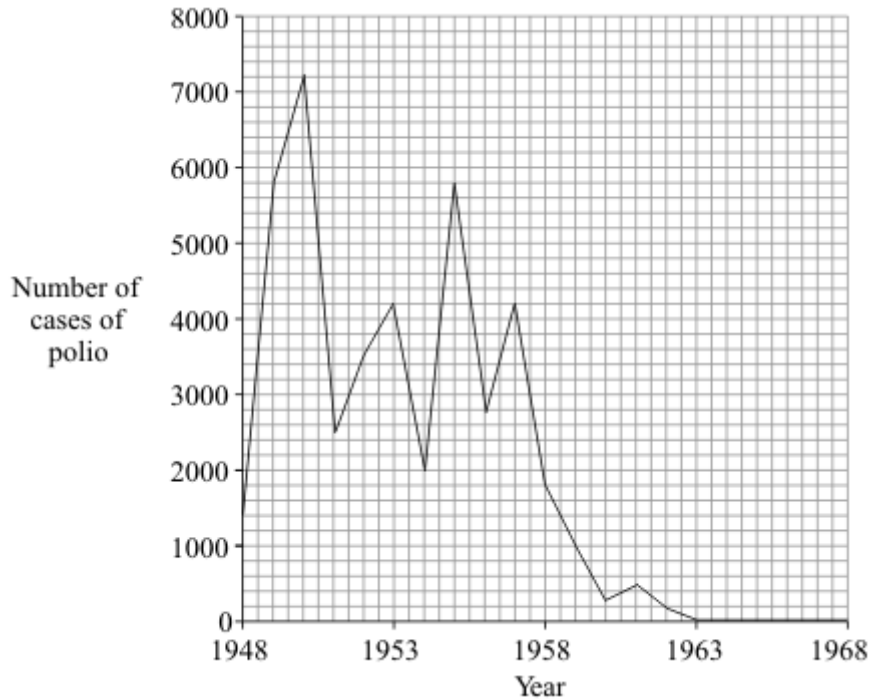
(i)   In which year was the number of cases of polio highest?

_____

(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?

_____

(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)

Q18.

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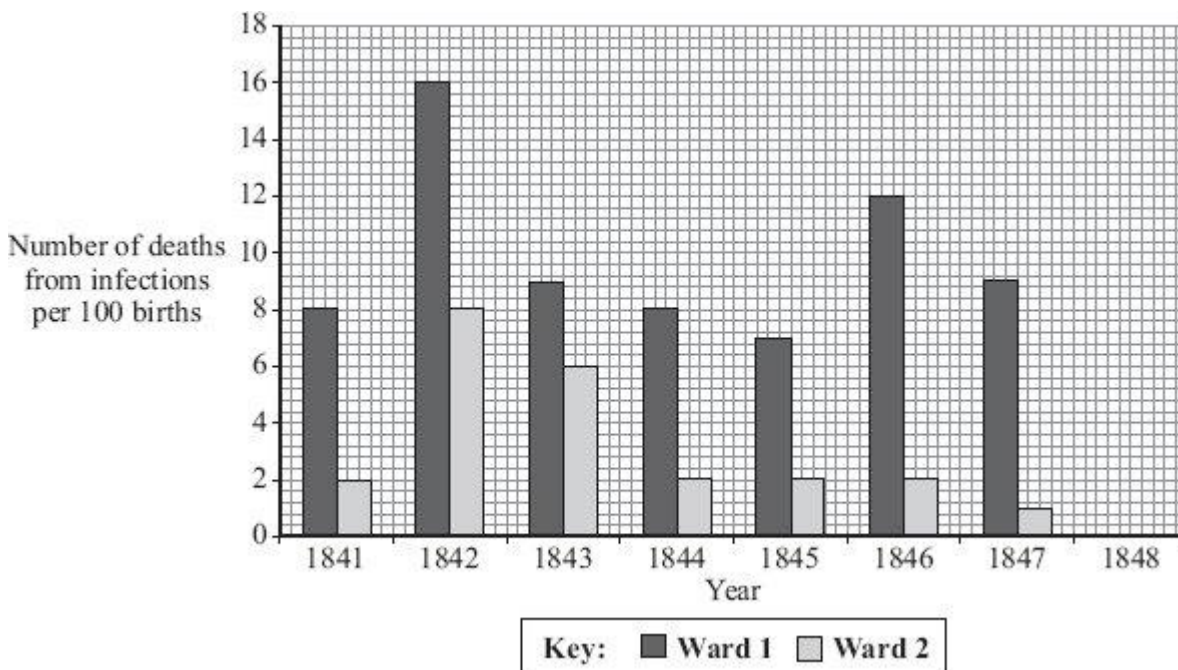
(a) (i)   600 mothers gave birth on **Ward 2** in 1845.

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)

Q19.

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.
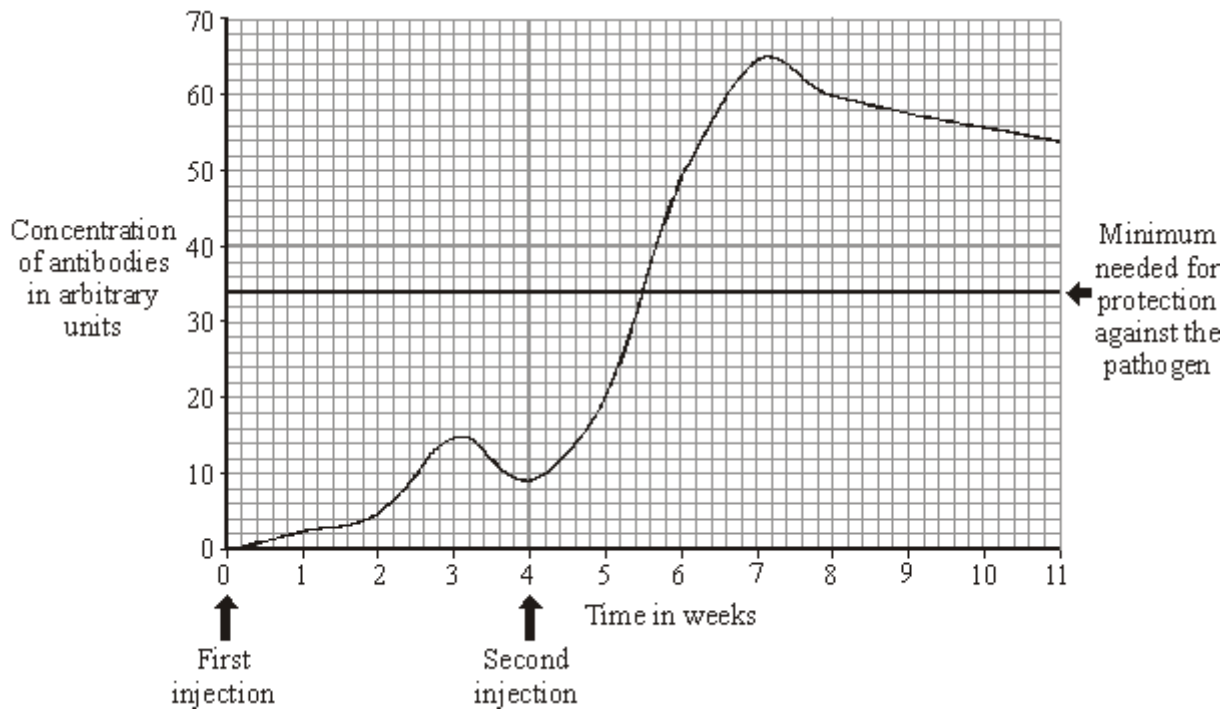
(i)   How long after the first injection did it take for the concentration of antibodies to reach the minimum level for protection against the pathogen?

_____ 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)

(Total 7 marks)

Q20.

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)

Mark schemes

Q1.

(a)   8 (micrometres)

1

(b)   red blood cell(s)

1

white blood cell(s)
            accept named cell
            eg phagocyte / lymphocyte

1

(plasma)
transports proteins / dissolved substances / food (molecules) / urea / hormones / blood
cells

1

(c)   any **one** from:

•   you could lose a lot of blood
•   bleed internally
            allow bleeding would not stop
            allow could bleed to death

1

[5]

Q2.

(a)
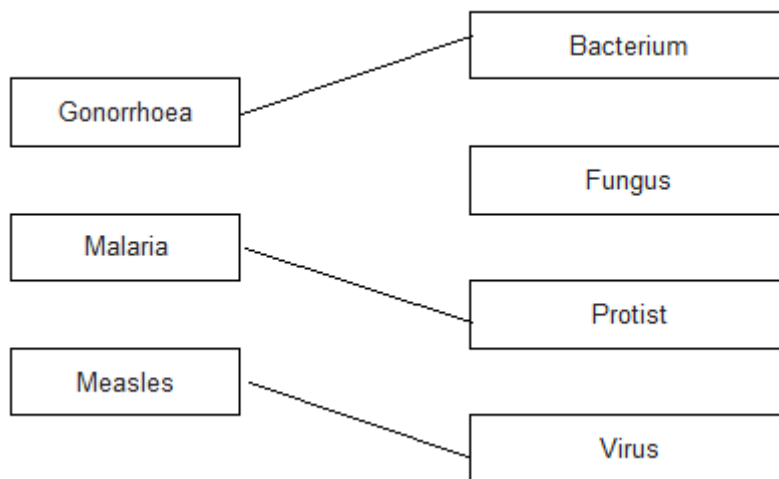
3

(b)   (trachea) has mucus

1

to <u>trap</u> pathogens

1

(trachea) has cilia

1

to <u>move</u> mucus out of trachea

1

(c) **dependent variable:**
number of times mosquitoes landed on socks

1

control variable:
any **one** from:

- number of mosquitoes in each container
- length of time socks worn
- dampness of socks
- same type of socks
- size of container
- time
- temperature
- species of mosquito
- age of mosquito

1

(d) use worn socks
or
use chemical from worn socks

1

to attract / trap infected mosquitoes

1

or accept:
wear clean socks / change socks regularly (1)
to reduce the chance of attracting mosquitoes (1)

(e) less chlorophyll present

1

(so) less light absorbed

1

(so) reduced photosynthesis
or
(so) less sugar / food made

1

[14]

Q3.

(a) **Disease**   **Way the disease is spread**
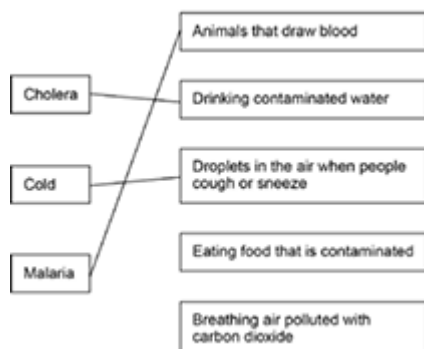
extra lines from left cancel the mark

(b)   any **two** from:

- skin acts as a barrier
- blood clots (over cuts)
- nose (hairs) catch particles (breathed in)
- mucus (in trachea / bronchi) traps microorganisms
- acid in stomach kills microorganisms

2

(c)   because measles is a virus

1

(d)   28 / twenty eight

± 0.5 small square tolerance

1

(e)   2.5

1

(f)   number will decrease

1

less likely to come into contact with someone with measles / the disease

1

[10]

Q4.

(a)   decrease in number of deaths (after vaccination started)

1

(b)   <u>in correct sequence</u>:

bacteria

1

white blood cells

1

antibodies

1

[4]

Q5.

(a)
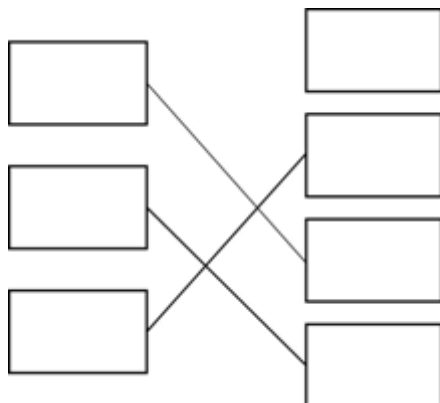
one mark for each correct line

extra line from drug negates mark

3

(b)   stop the trial

1

second mark scores only if first mark correct

side effects too severe
allow people might die / get ill / harmed
or
(too) many people had side effects
allow use of numbers from table
ignore itchy skin

1

[5]

Q6.

(a)   any **one** from:

* amount / concentration of antibiotic
  *do **not** allow type of antibiotic ignore number of antibiotics*
  allow type of paper

* size of discs
  ignore number / position of discs

* (incubation) temperature

* incubated for same time / 3 days
  allow left / kept for same time

* type of agar
  ignore references to bacteria or petri dishes

1

(b)   (i)   D

1

(ii)   C

1

(iii)   B
no marks if wrong antibiotic

1

both had a large clear area around the disc
allow a description of this, eg B had the 2nd largest clear area with E.coli and the largest clear area on S.aureus

or

killed a lot of both bacteria

1

(c)   resistant

1

[6]

Q7.

(a)   ingest pathogens

1

produce antibodies

1

produce antitoxins

1

*deduct **1** mark for each extra box ticked*

(b)   are not killed / affected (by antibiotic)

allow antibiotic does not work / does not cure
allow bacteria immune (to antibiotic)
allow infection not killed
ignore bacteria mutated

1

(c)   (i)   (antibiotic) Y

1

(ii)   8

*allow 54 − 46 for **1** mark*

2

(iii)   any **two** from:

- overuse / widespread use/ over prescription
   OWTTE

- inappropriate use / use for eg sore throats / viral infections

- mutation / change to DNA (in bacteria)

- natural selection /description
   ignore people not finishing course of antibiotics
   ignore wrong antibiotic given

2

[9]

Q8.

(a)   (i)   any **one** from:

- age
- gender
- body mass
- number in group / 50
   allow number of children
- high body temperature
   allow starting temperature
   allow dose / amount of drug given

1

(ii)   any **one** from:

- tablet that does not contain a drug / anything
   allow sugar pill

*do **not** allow a different drug*
- fake drug

1

(b)   (i)   38.2 (°C)

1

      (ii)   ibuprofen

no mark for drug
no marks if wrong drug selected

any **two** from:

- reduced body temperature fast(er)
  allow acts fast(er)
- maintained temperature in normal range / around 37 °C (longer / for several hours)
- paracetamol did not reduce temperature to normal / 37 °C
  accept ibuprofen did reduce temperature to normal / 37 °C
- ibuprofen given less frequently
  allow less drug needed
  ignore cheaper unless qualified

2

[5]

Q9.

(a)   (i)   4 / four (years)

1

      (ii)   any **one** from:

- animals
  allow suitable examples eg rats
  *do **not** allow humans / plants*

- (living) cells
  allow human cells
  *do **not** allow plant cells*

- (living) tissues
  allow human tissues
  *do **not** allow plant tissues*

1

(b)   (i)   9 (years)
*allow **1** mark for 13 – 4*
or
2 + 3 + 4

2

      (ii)   see if the drug has side effects

1

      (iii)   neither the volunteers nor the doctors

1

[6]

Q10.

    (a)   (i)   64

                                    1

            (ii)   36

                      allow e.c.f from (i) i.e. 100 − answer given in (a)(i)

                                    1

            (iii) any **one** from:
- only considers 16-year-olds
  ignore lack of evidence
  allow does not refer to all ages
- only about some / 5 countries
  allow does not refer to all countries.

                                    1

    (b)   the more exercise done the healthier a person is

                      allow the more exercise done the higher the health rating
                      allow the less exercise done the lower the health rating

                                    1

    (c)   having a high cholesterol level

                                    1

    (d)   (i)   antibodies

                                    1

            (ii)   antibiotics

                                    1

                                    [7]

Q11.

    (a)   toxins

                                    1

    (b)   (i)   bacteria

                                    1

            (ii)   mutate

                                    1

            (iii) new / different antibiotic
                      allow new / different drug
                      *do **not** allow vaccine*

                                    1

                                    [4]

Q12.

    (a)   antibiotics do not kill viruses
                      allow antibiotics only kill bacteria
                      allow flu is not caused by a bacterium

        or
        antibiotics are not effective against viruses
                      allow antibiotics cannot reach viruses inside cells

                                    1

(b)   Inactive viruses

1

(c)   Conclusion:
people 65 years and older had the highest percentage vaccinated.
ignore references to figures unless qualified

1

Reason:
more worried about becoming ill
or
had more time to go to the doctor.
OR
Conclusion:
children aged 3-years had the lowest percentage vaccinated.

Reason:
parents didn't have time to take them to the doctor
or
they had been vaccinated when 2-years old.

1

[4]

Q14.

blood clots to seal cuts;
kills microbes which enter
each for 1 mark
(allow higher level answers)

[2]

Q14.

(a)   40 – 60 hours

1

(b)   (i)   decrease

1

1st slowly then faster / appropriate detail from the graph – e.g. from 7.8 to
0 / faster after 4 – 10h

1

(ii)   oxygen after glucose
extra box ticked cancels 1 mark

1

oxygen less than glucose

1

(iii) respiration

1

[6]

Q15.

(a)   dirty clothes/equipment/hands passed <u>bacteria</u>
allow bacteria from any sensible source e.g. surgeon, floor

OR

ease of entry of <u>bacteria</u> (during operations)

        *do **not** accept germs*

                                                      1

(b)   fewer died

                                                      1

    indication of reduced number **or** proportion

        e.g. 3000→ 600

        down by 2400

        20% of previous deaths

                                                      1

                                                                    [3]

Q16.

(a)   (i)   56

                    accept 54 – 58

                                                        1

        (ii)   increased

                                                           1

             reasonable qualification eg slowly then more quickly

                    or

                    to 174 / 176

                    or

                    by 138 / 140

                                                         1

(b)   any **two** from:

    •   no immunity **or** antibodies ineffective

              accept no resistance

    •   no vaccines **or** humans not immunised

    •   idea of large scale contact **or** large scale travel

              *do **not** accept passed on*

              ignore no cure

                                                        2

                                                                     [5]

Q17.

(a)   (i)   lives inside cells

                                                           1

        (ii)   inactive

                                                           1

        (iii)   antibodies

                                                           1

(b)   (i)   1950

                                                           1

        (ii)   8 (years)

                                                          1

(iii)   any **one** from: eg

- • disease could be reintroduced (from abroad)
    disease might come back insufficient

- • disease would spread if it came back

- • protection on holiday abroad

- • high proportion of immune people needed to prevent epidemic

1

[6]

Q18.

(a)   (i)   12

   *correct answer with **or** without working*
   *if answer incorrect evidence of (number of deaths) × 6 **or** 2*
   *seen gains **1** mark*

2

(ii)   (ward 2)

   more deaths / infections on ward 1

   or

   less deaths / infections on ward 2

1

(b)   (i)   **both** bars correctly plotted
   *ie plots in spaces between 2.8 and 3.2 **and** 0.8 and 1.2*
   ignore width and shading

1

(ii)   less deaths / infections

1

(iii)   bacteria / germs / microbes / infection killed / washed off
   accept less infections <u>passed on</u>

1

[6]

Q19.

(a)   (i)   antibiotic or named antibiotic
   ignore antibodies
   accept antiseptic
   *do **not** accept disinfectant*

1

(ii)   painkillers
   accept named painkillers eg aspirin

1

(b)   (i)   5.5 / 5 ½ weeks

1

(ii)   rose gains **1** mark

rose, then fell then rose again gains **2** marks

a further **1** mark for **one** quantitative statement eg

- rose for 3 weeks / to 14–15 units

- dropped to 4 weeks / 9 units

- rose to 7 weeks / 64–65 units

3

(iii) (no)

level begins to fall / is falling (after 7 weeks)

1

[7]

Q20.

(a) any **two** from:

ignore eating disorder
ignore cancer

- arthritis
  accept worn joints

- diabetes
  accept high blood sugar

- high blood pressure
  ignore cholesterol

- heart disease / heart condition / heart attack / blood vessel disease
  allow blood clots / strokes

2

(b) (i) $\frac{1}{4}$ **or** 0.25 **or** 25%
  correct answer gains 2 marks
  if answer incorrect, evidence of 1500 ÷ 6000 gains 1 mark
  25 without % gains 1 mark

2

(ii) majority / most / high proportion of people in trial lost mass / weight
  ignore good results / it worked

1

[5]