

- 1 (a) Use words from the box to complete the sentences about curing disease.

<b>antibiotics</b>	<b>antibodies</b>	<b>antitoxins</b>	<b>painkillers</b>	<b>statins</b>
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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.

<b>Harmful effect</b>	<b>Risk of developing the harmful effect from the disease if not given the MMR vaccine</b>	<b>Risk of developing the harmful effect if given the MMR vaccine</b>
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)  
(Total 7 marks)

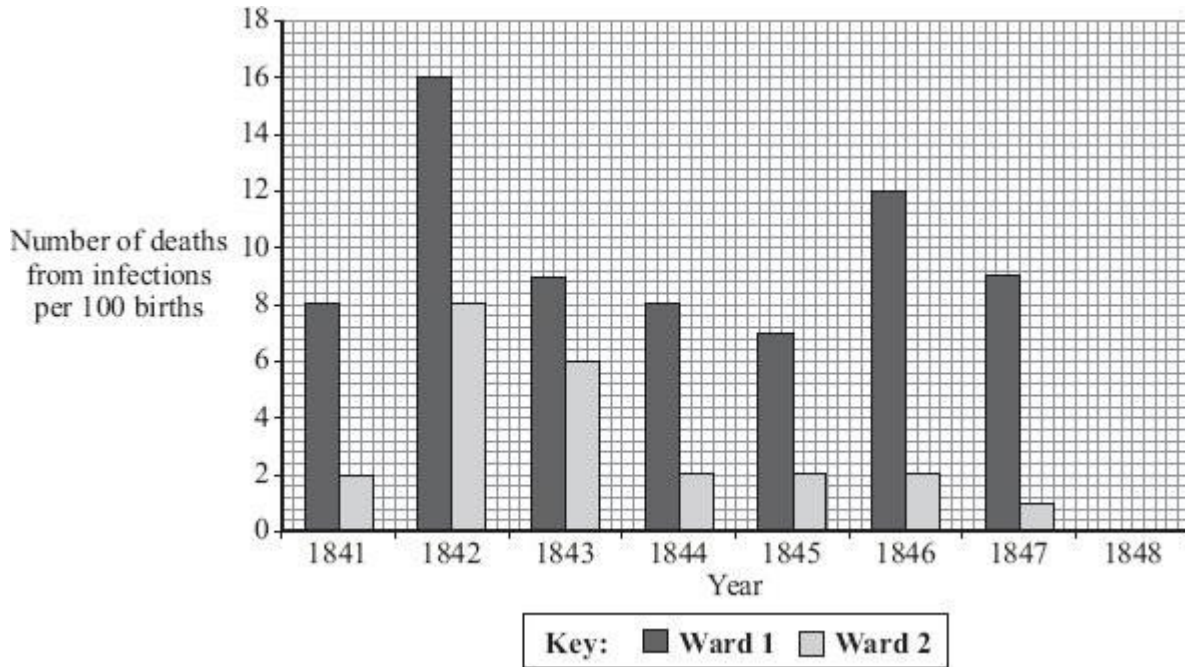
2

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.

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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.

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(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?

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(1)

- (iii) Suggest an explanation for this effect.

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(1)

(Total 6 marks)

3

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
infective
inactive

form of the polio virus.

(1)

(iii) The vaccine stimulates the white blood cells to

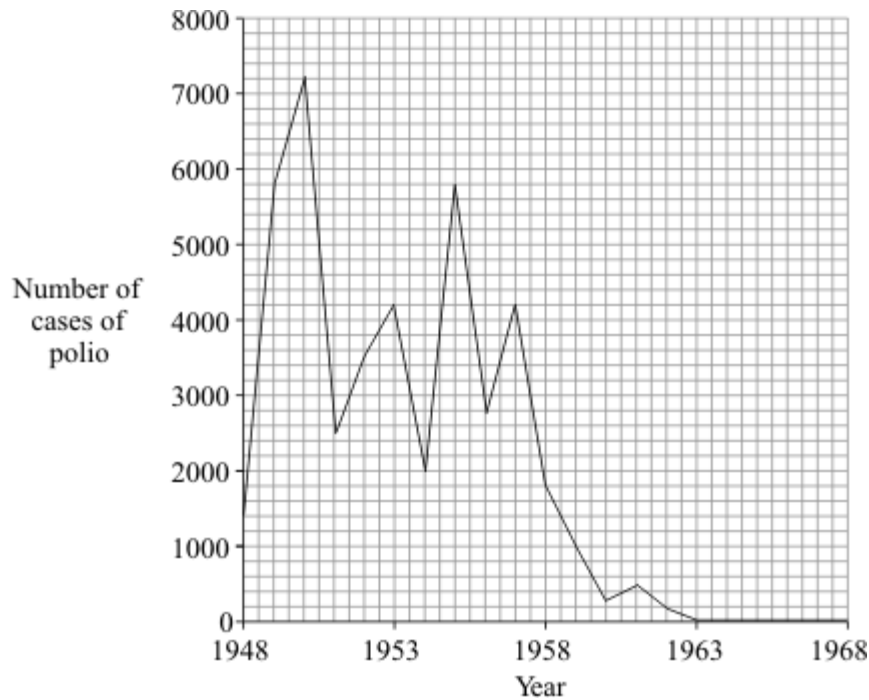
produce 

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?

\_\_\_\_\_

(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)

**4** Pathogens can enter the body and cause disease.

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

\_\_\_\_\_

(1)

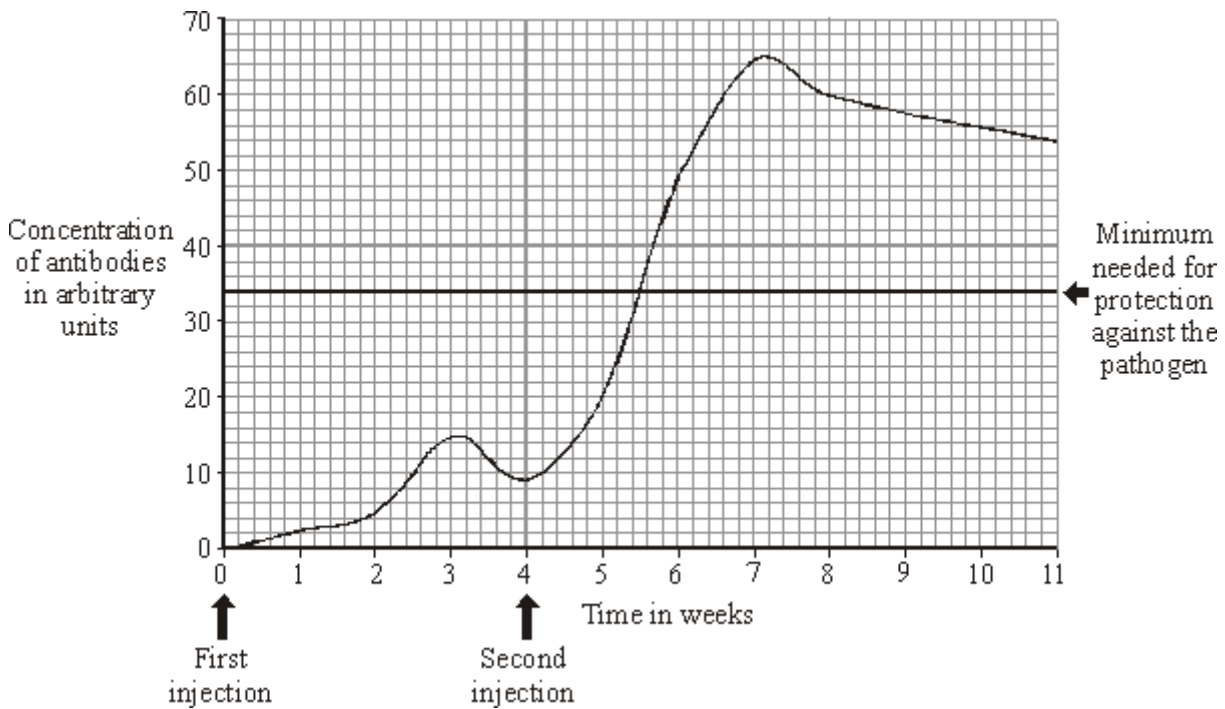
(ii) Name **one** type of medicine which helps to relieve the symptoms of infectious disease.

\_\_\_\_\_

(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.

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**(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.

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**(1)**

**(Total 7 marks)**

5

(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
Antibiotic	White blood cells produce this substance
Antitoxin	This substance is used to kill bacteria
Painkiller	This substance lowers blood cholesterol levels
	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)



6

Viruses and bacteria cause diseases in humans.

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

Organisms that cause disease are called

- algae.
- pathogens.
- vaccines.

(1)

(b) In August 2011 the United Nations gave a warning that there was a new strain of the bird flu virus in China.

Bird flu may kill humans. The new strain of the bird flu virus could cause a *pandemic* very quickly.

(i) What is a *pandemic*?

Tick (✓) **one** box.

A disease affecting the people all over one country.

A disease affecting hundreds of people

A disease affecting people in many countries.

(1)

(ii) The swine flu virus is carried by pigs.

The bird flu virus is likely to spread much more quickly than the swine flu virus.

Suggest **one** reason why.

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(1)

This notice is from a doctor's surgery.

**Unfortunately,  
antibiotics  
will NOT get  
rid of your flu.**

(c) (i) Why will antibiotics **not** get rid of flu?

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(1)

(ii) The symptoms of flu include a sore throat and aching muscles.

What would a doctor give to a patient to relieve the symptoms of flu?

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(1)

(iii) It is important that antibiotics are **not** overused.

Explain why.

Use words from the box to complete the sentence.

**antibody      bacteria      immune      resistant      viruses**

Overuse of antibiotics might speed up the development

of \_\_\_\_\_ strains of \_\_\_\_\_.

(2)

(Total 7 marks)

**7**

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)**

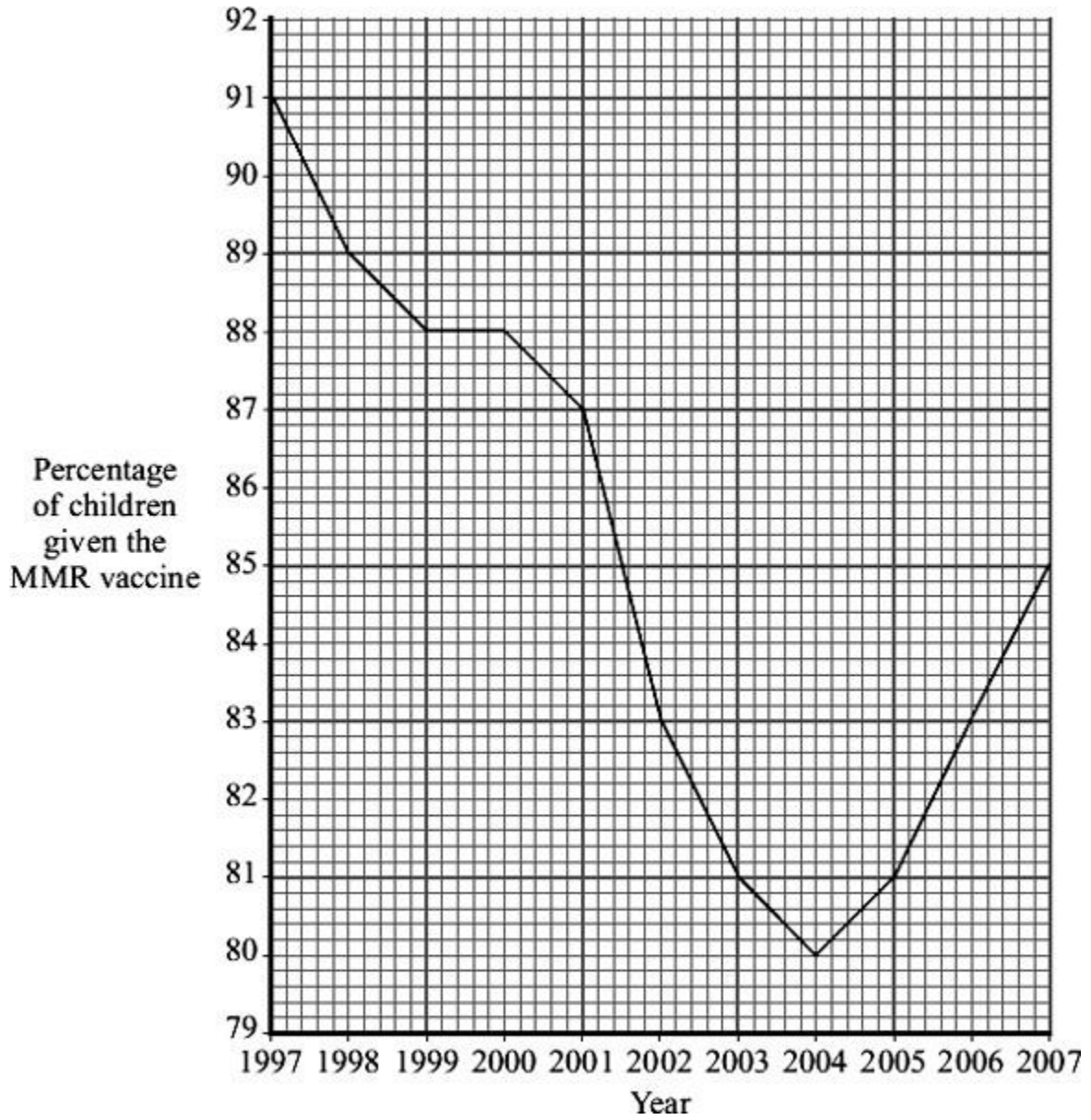
(b) Draw a ring around the correct word to complete the sentence.

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.



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

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(2)

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

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(1)

(Total 7 marks)

**8**

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.

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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.

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(1)

(Total 5 marks)

**9**

Nicotine is a drug in tobacco smoke. Smoking tobacco is harmful.

- (a) (i) Many smokers find it difficult to stop smoking.

Complete the sentence.

It is difficult to stop smoking because nicotine is very\_\_\_\_\_.

(1)

- (ii) Nicotine affects synapses in the brain.

What is a synapse?

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(1)

- (b) A drug company has developed a new drug, Drug **A**, to help people stop smoking.

Doctors tested the drug in a double-blind trial with over 2000 volunteers who were smokers.

The volunteers wanted to stop smoking.

The volunteers were divided into three groups. Each volunteer took a tablet once a day for 12 weeks:

- group 1 took Drug **A**
- group 2 took Drug **B** (a drug already in use to stop people smoking)
- group 3 took a placebo.

The smoking habits of each group were recorded for a year.

- (i) What is a placebo?

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(1)

(ii) Why is a placebo group used in drug trials?

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(1)

(iii) Which people knew what was in each tablet, in this trial?

Tick (✓) **one** box.

Both doctors and volunteers

Doctors but not volunteers

Neither doctors nor volunteers

(1)

(iv) It is important that the three groups of volunteers should be similar.

Give **two** factors that should be similar in the groups of volunteers.

1. \_\_\_\_\_

2. \_\_\_\_\_

(2)

(c) The table shows the results of the trials.

Tablet	Percentage of volunteers who had stopped smoking	
	After 12 weeks	After 1 year
Drug A	44	23
Drug B	30	15
Placebo	18	10

A doctor looked at the results of the tests.

The doctor suggested that a smoker who wanted to give up smoking should use Drug A.

Why?

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**(1)**  
**(Total 8 marks)**



## Mark schemes

- 1** (a) antibodies 1
- antitoxins 1
- antibiotics 1
- (b) any **two** from:
- measles
  - mumps
  - rubella / German measles
- 2
- (c) less / low / no chance of getting named or all condition(s) if vaccinated 1
- quantitative figure(s) eg 5 times less likely to get convulsions 1
- [7]**
- 2** (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 passed on*
- 1
- [6]**

<b>3</b>	(a)	(i)	lives inside cells	1
		(ii)	inactive	1
		(iii)	antibodies	1
	(b)	(i)	1950	1
		(ii)	8 (years)	1
		(iii)	any <b>one</b> from: eg	
			•	disease could be reintroduced (from abroad) <i>disease might come back insufficient</i>
	•		disease would spread if it came back	
		•	protection on holiday abroad	
		•	high proportion of immune people needed to prevent epidemic	1

[6]

<b>4</b>	(a)	(i)	antibiotic or named antibiotic		
			<i>ignore antibodies</i>		
				<i>accept antiseptic</i>	
				<i>do <b>not</b> accept disinfectant</i>	1
		(ii)	painkillers		
			<i>accept named painkillers eg aspirin</i>		
					1
	(b)	(i)	5.5 / 5 ½ weeks		
		(ii)	rose gains 1 mark		
rose, then fell then rose again gains 2 marks					
		a further 1 mark for <b>one</b> 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	

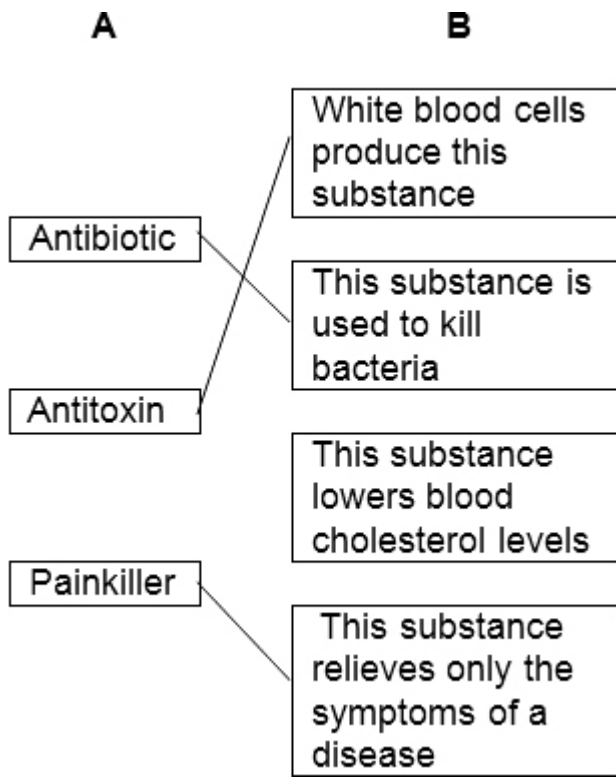
(iii) (no)

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

1

[7]

5 (a)



*1 mark for each correct line  
mark each line from left hand box  
two lines from left hand box cancels mark for that box*

3

(b) inactive

*allow weak / dead / un-living / safe*

1

rubella

*apply list principle, but ignore measles and mumps*

1

[5]

6 (a) pathogens

1

(b) (i) A disease affecting people in many countries

1

(ii) birds fly / migrate  
*accept converse*

OR

human contact with birds more likely  
*birds not contained / difficult to control movement*

OR

there are more birds (than pigs)

1

(c) (i) antibiotics (only) kill bacteria  
*ignore flu is caused by a virus unqualified*

OR

antibiotics don't kill viruses  
*ignore virus resistant / immune*

1

(ii) painkillers  
*accept any correct named painkiller, eg aspirin or paracetamol*  
*allow antivirals / Tamiflu*  
*ignore medicine / tablets*

1

(iii) resistant

1

bacteria

1

*in this order*

[7]

**7** (a) measles

1

mumps

1

rubella

1

(b) antibodies

1

- (c) (i) any **two** from:
- fell
  - then rose
  - any reasonable amplification eg until 2004 / to 80%
  - flattens off (between 1999–2000)

2

(ii) eg fear of side effects

**or**

cost of vaccine

**or**

lack of vaccine

**or**

complacency / disease less common

1

[7]

**8**

(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  $1500 \div 6000$  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]

9

(a) (i) addictive  
*allow addicting / addict / addicted / addiction or similar*  
*allow phonetic spelling*  
*do **not** accept / additive / addition*

1

(ii) junction / gap / space between neurones  
*allow nerve cells / nerves for neurones*  
*allow idea where neurones /*  
*nerve cells / nerves meet / join*

1

(b) (i) tablet with no drug  
*accept answers that convey this idea eg fake / dummy / sugar pill*  
*allow injection with no drug*  
*ignore drugs that don't work.*

1

(ii) for comparison  
*accept to see if drug / it works*  
*allow to see psychological effect **or** make sure, it is not all in the*  
*mind*  
*allow as a control*  
*ignore 'to make test fair / unbiased'*

1

(iii) Neither doctors nor volunteers

1

(iv) any **two** from:

- age (range)
- sex / gender (mix)
- previous smoking habits **or** eg number smoked (before trial)  
**or** length of time smoked
- number in the group
- other drugs being taken **or** general health **or** height / weight /  
BMI / lifestyle / fitness  
*ignore factors already controlled*  
*ignore reference to all smokers **or** all want to give up*

2

(c) higher percentage / number of smokers who had stopped smoking (than Drug B)

*answers must refer to data and be comparative*

*allow best results / most effective*

*ignore best drug unqualified*

*ignore references to 12 weeks / 1 year*

1

**[8]**