

1 Many diseases can be treated using drugs.

(a) Which type of pathogen can be killed by antibiotics?

Tick **one** box.

Bacteria	<input type="checkbox"/>
Fungi	<input type="checkbox"/>
Protists	<input type="checkbox"/>
Viruses	<input type="checkbox"/>

(1)

(b) Some drugs were originally extracted from living organisms.

Draw **one** line from each drug to the organism it was originally extracted from.

Drug	Organism the drug was originally extracted from
<input type="text"/>	<input type="text" value="A mould"/>
<input type="text" value="Aspirin"/>	<input type="text" value="A virus"/>
<input type="text" value="Digitalis"/>	<input type="text" value="Foxglove"/>
<input type="text"/>	<input type="text" value="Rose"/>
<input type="text"/>	<input type="text" value="Willow Tree"/>

(2)

(c) New drugs must be tested before they can be used.

Give **one** reason why drugs should be tested.

(1)

(d) Doctors have developed a new drug.
The new drug has been tested on live animals.
What is the next stage in testing the new drug?

Tick **one** box.

Testing on animal tissues in a laboratory

Testing on healthy volunteers

Testing on patients with the disease

Testing on the whole human population

(1)

(e) Vaccination can be used to prevent an illness in a person.

Explain how a vaccination can prevent an illness.

(4)

(Total 9 marks)

2 Many people in the UK take sleeping pills.

(a) The drug thalidomide was developed as a sleeping pill in the 1950s. In the 1960s thalidomide was banned. Recently thalidomide has been used to treat other diseases.

Name **one** disease thalidomide is used to treat now.

(1)

(b) The table shows information about the development of a new sleeping pill.

Type of test or trial	Preclinical	Clinical phase 1	Clinical phase 2	Clinical phase 3
Tested or trialled on	Cells, tissues or animals	20 – 100 healthy volunteers	100 – 500 volunteer patients	1000 – 5000 volunteer patients
Number of compounds tested	>10 000	5 – 10	2 – 3	1 (new sleeping pill)
Time taken for test or trial in years	1 – 4	2 – 4	1 – 3	2 – 4

(i) What is the shortest time taken to develop a new sleeping pill?

_____ years

(1)

(ii) What is the **range** for the number of volunteers needed to complete all the clinical trials for the new sleeping pill?

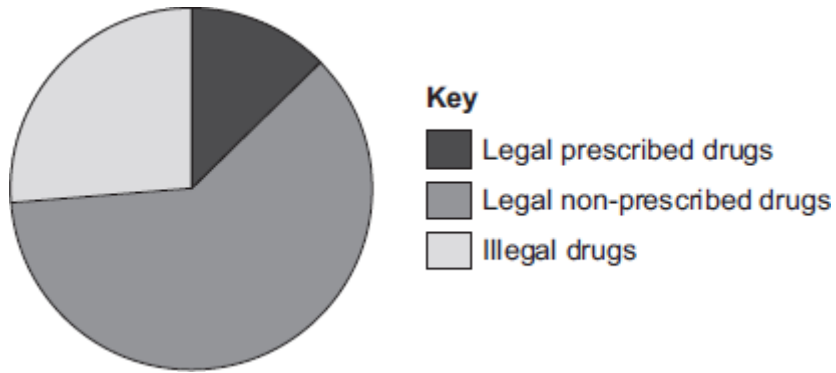
(1)

(c) Drugs are trialled to check for side effects on people.

Give **one** other reason why drugs are trialled.

(1)

- (d) The pie chart shows the impact on the health of the population caused by drugs from different sources.



- (i) Legal non-prescribed drugs have a greater impact on the health of the population than illegal drugs.

Suggest **two** reasons why.

(2)

- (ii) Drugs change chemical processes in a person's body.

Why is it difficult for a person to stop taking certain drugs?

(1)

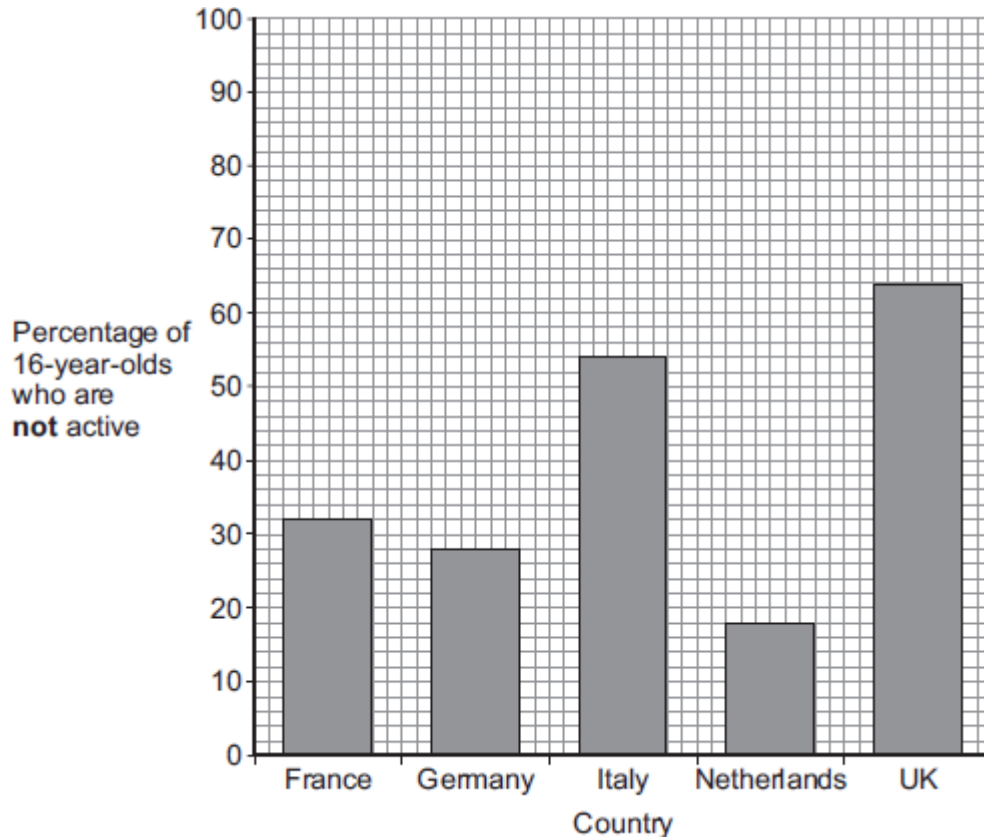
(Total 7 marks)



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**?

_____ %

(1)

(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
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- (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

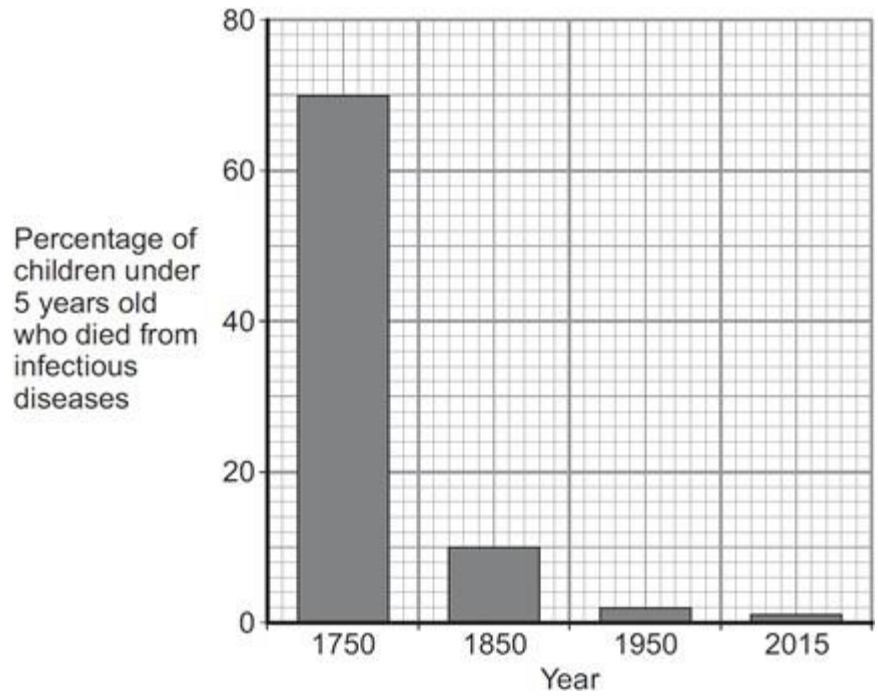
(1)

(Total 7 marks)

4

Pathogens are microorganisms that cause infectious diseases.

- (a) The graph shows the percentage of children under 5 years old who died from infectious diseases, in the UK, in four different years.



- (i) Between 1750 and 1850 vaccinations were also developed. What is in a vaccine?

Tick (✓) **one** box.

large amounts of dead pathogens

large amounts of live pathogens

small amounts of dead pathogens

(1)

(ii) The advances in medicine had an effect on death rate.

Describe the effect these advances had between 1750 and 1850.

To gain full marks you should include data from the graph above.

(2)

(b) Antibiotics were developed in the 1940s. Antibiotics kill bacteria.

(i) Which **one** of the following is an antibiotic?

Draw a ring around the correct answer.

cholesterol

penicillin

thalidomide

(1)

(ii) The use of antibiotics has **not** reduced the death rate due to all diseases to zero.

Suggest **two** reasons why.

1. _____

2. _____

(2)

(c) In school laboratories, bacteria should be grown at a maximum temperature of 25 °C.

Give **one** reason why companies testing new antibiotics grow bacteria at 37 °C.

(1)

(Total 7 marks)

5

Drugs affect the human body.

(a) Draw **one** line from each drug to the correct information about the drug.

Drug	Information
Cannabis	Used to boost heart rate
Steroid	Used to treat leprosy
Stimulant	May cause mental illness in some people
Thalidomide	Used to increase muscle growth
	Used to treat measles

(4)

(b) New drugs must be tested and trialled before being used.

(i) New drugs are tested in a laboratory before they are trialled on people.

What are new drugs tested on in a laboratory?

(1)

(ii) Why is it important that drugs are trialled before doctors give them to patients?

Tick (✓) **two** boxes.

- To check that the drug works
- To check the cost of the drug
- To find out if the drug is legal
- To find the best dose to use

(2)

- (iii) In a double blind drug trial, only some people know which patients have been given the drug.

Who knows which patients have been given the drug?

Tick (✓) **one** box.

The patient and the doctor

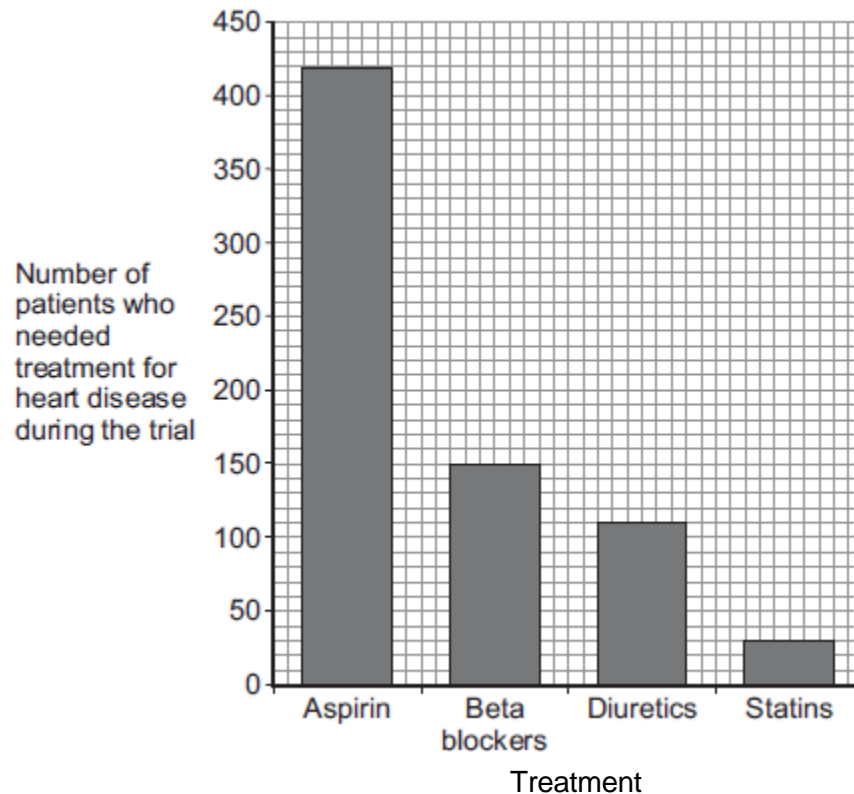
Only the doctor

Only scientists at the drug company

(1)

- (c) Doctors trialled four different treatments for reducing the risk of heart disease. Each treatment was trialled on the same number of patients for 5 years. The patients did **not** have heart disease at the start of the trial.

The graph below shows the results.



- (i) How many patients who took aspirin needed treatment for heart disease during the trial?

Number of patients = _____

(1)

- (ii) Based **only** on the evidence in the graph, which would be the best treatment to reduce the risk of developing heart disease?

(1)

- (iii) Suggest **one** other factor that a doctor might consider before deciding which treatment to use for a patient.

(1)

(Total 11 marks)

6

Microorganisms can cause disease.

- (a) Draw **one** line from each disease to the correct description.

HIV

Can be spread by not washing hands thoroughly.

Can increase the chance of infection such as pneumonia.

Malaria

Part of the life cycle includes an insect.

spread by cough and sneezes.

Salmonella

Treated with stem cell.

Treated with fungicides.

(3)

(b) Gonorrhoea is a sexually transmitted disease.

A bacterium causes gonorrhoea.

What are the symptoms of gonorrhoea?

Tick **two** boxes.

Headache

Pain when urinating

Rash

Vomiting

Yellow discharge

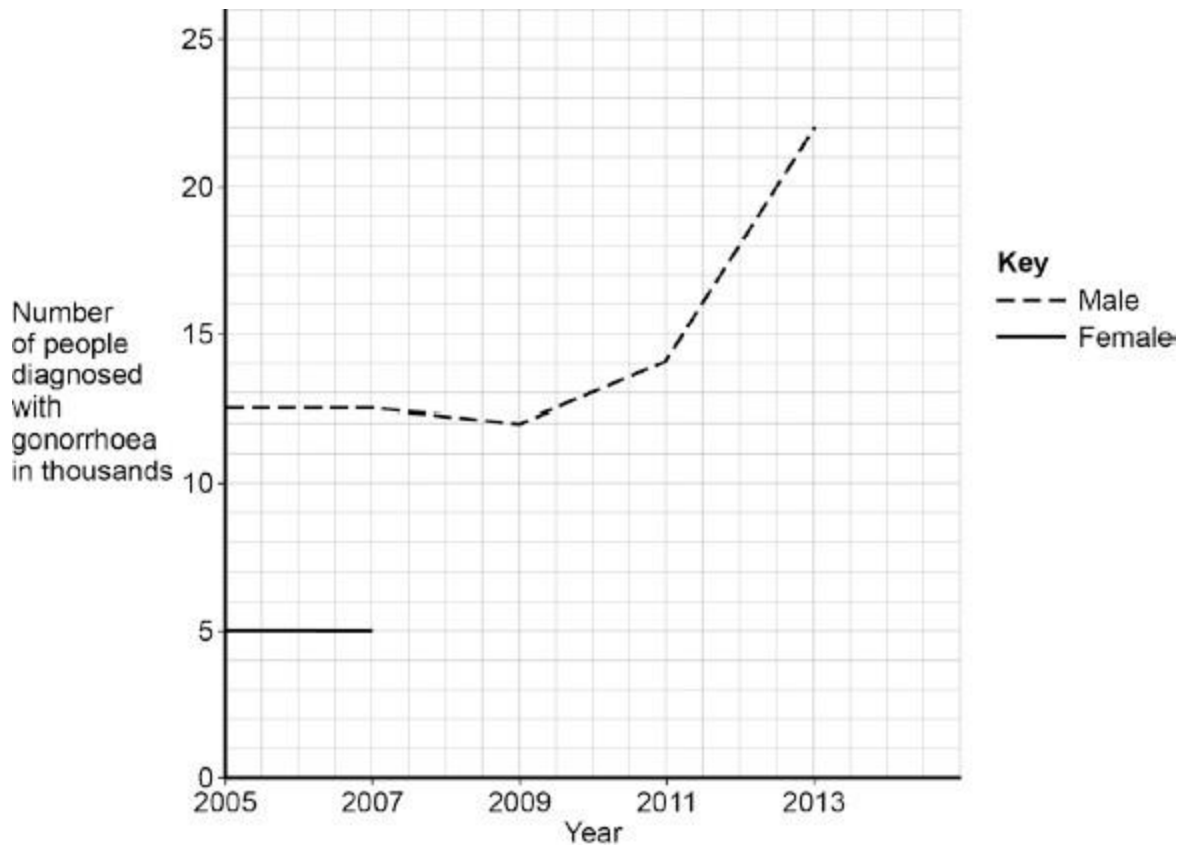
(2)

- (c) The table below shows the number of people in the UK diagnosed with gonorrhoea in different years.

Number of people diagnosed with gonorrhoea in thousands		
Year	Female	Male
2005	5.0	12.5
2007	5.0	12.5
2009	5.5	12.0
2011	6.0	14.0
2013	7.5	22.0

Use the data in the table to complete the graph below.

- The numbers for males have already been plotted.
- Only some of the numbers for females have been plotted.



(3)

- (d) Describe the patterns in the numbers of males and females with gonorrhoea from 2005 to 2013.

Use the data in the graph.

(3)

- (e) Gonorrhoea is treated with an antibiotic.

HIV is another sexually transmitted disease.

Explain why prescribing an antibiotic will **not** cure HIV.

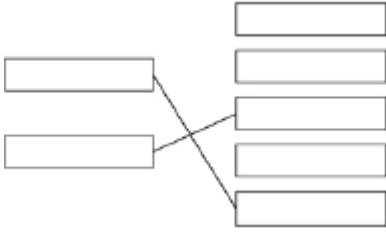
(2)

(Total 13 marks)

Mark schemes

1 (a) bacteria 1

(b)



extra line from a drug negates the mark for that drug

2

(c) any **one** from:

- to check they are safe
- to check they are effective

allow to check they work or to check for the (right) dose

- to check for side effects

allow to check for toxicity

1

(d) testing on healthy volunteers

1

(e) **Level 2 (3-4 marks):**

Relevant points (reasons / causes) are identified, and there are attempts at logical linking.

Level 1 (1-2 marks):

Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

0 marks:

No relevant content

Indicative content

- dead / inactive pathogen
- introduced to the body
- white blood cells respond
- produce antibodies
- antibodies are specific to pathogen
- antibodies produced quickly (on reinfection) / rapid response
- in larger quantities
- killing the pathogen

[9]

2 (a) leprosy

allow bone / blood cancer

ignore cancer

1

(b) (i) 6 / six 1

(ii) from 1120 to 5600
allow from 5600 to 1120
allow 4480 (alone) 1

(c) any **one** from:
ignore side effects, eg allergies
ignore safety / harm unqualified

- (test for) toxicity
allow poisonous
- (test for) dosage
allow idea of amount
- (test for) efficacy.
allow to see if it works
allow to check for interaction with other drugs

1

(d) (i) any **two** from:
ignore reference to cost / addiction

- more people take / use legal / non-prescribed drugs
- legal / non-prescribed drugs are (more) readily available
- alcohol causes liver / brain damage

or

tobacco causes cancer.
allow harmful effects of other named legal non-prescribed drugs

2

(ii) addiction / dependency
allow withdrawal or examples of symptoms of withdrawal (if attempting to stop)

1

[7]

3 (a) (i) 64 1

(ii) 36
allow e.c.f from (i) i.e. 100 – answer given in (a)(i)

1

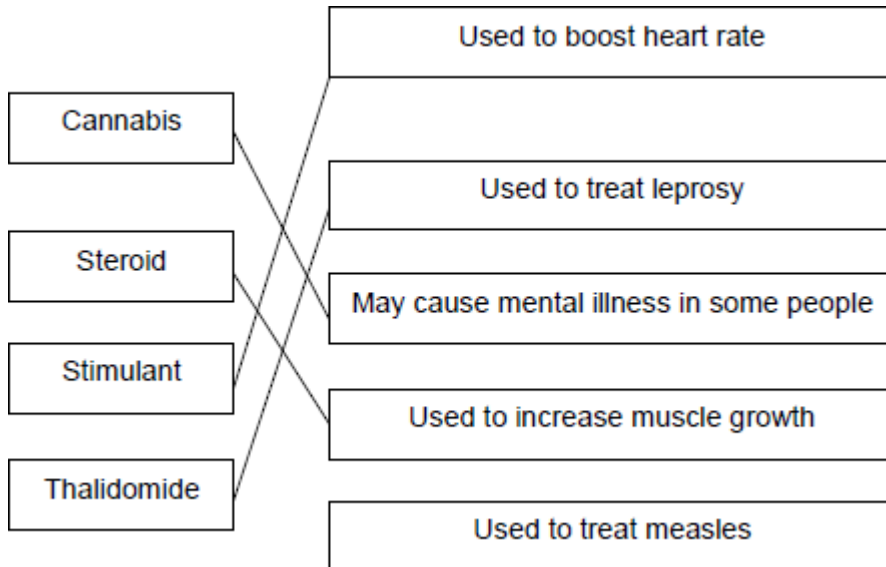
(iii) any **one** from:

- 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 <i>allow the more exercise done the higher the health rating</i> <i>allow the less exercise done the lower the health rating</i>	1
	(c)	having a high cholesterol level	1
	(d)	(i) antibodies	1
		(ii) antibiotics	1
			[7]
4	(a)	(i) small amounts of dead pathogens	1
		(ii) decrease	1
		by 60 (%) <i>allow from 70(%) to 10(%)</i> <i>allow other correct data treatment</i>	1
	(b)	(i) penicillin	1
		(ii) any two from: <ul style="list-style-type: none"> • antibiotics only kill bacteria <i>allow antibiotics do not kill viruses</i> • some bacteria are resistant (to antibiotics) <i>allow MRSA not killed by antibiotics</i> • (correct) antibiotics not always used <i>allow course not completed</i> • deficiency disease(s) not caused by bacteria or cannot be treated by antibiotics • inherited disease(s) not caused by bacteria or cannot be treated by antibiotics • 'lifestyle' diseases not caused by bacteria or cannot be treated by antibiotics <i>eg heart disease / cancer</i> <i>if no other mark given allow 1 mark for not all diseases are caused by bacteria or some diseases are caused by viruses</i> 	2
	(c)	bacteria grow faster <i>allow this is body temp (at which pathogens grow)</i>	1
			[7]

5 (a)



extra line from any drug cancels that mark

4

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

- (live) animals
accept named examples, eg mice
ignore people / volunteers
- cells
- tissues
*do **not** allow plants*

1

(ii) to check that the drug works

1

to find the best dose to use

1

(iii) only scientists at the drug company

1

(c) (i) 420

1

(ii) statin(s)

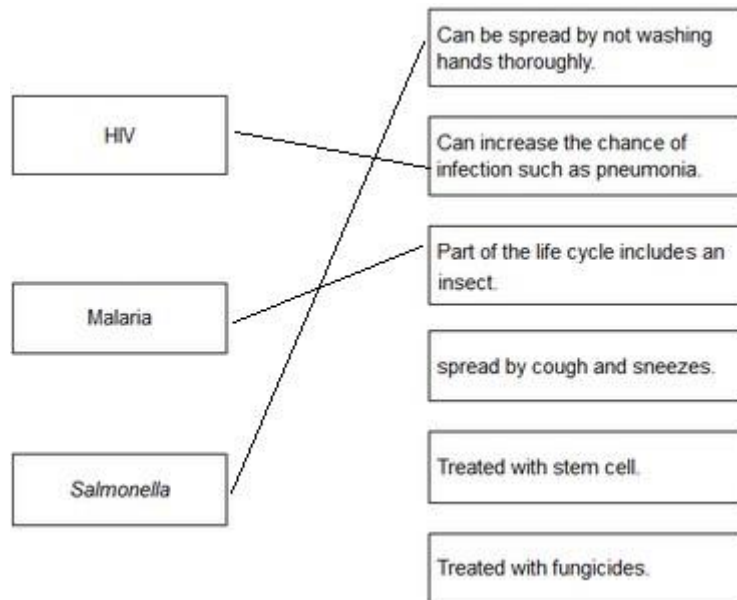
1

(iii) any **one** from:

- side effects
allow cost
- other medication
allow patient choice
- other (medical) conditions
*allow family history **or** age*

1
[11]

6 (a)



each extra line negates a mark

4

(b) pain when urinating

1

yellow discharge

1

(c) three correct plots

allow 1 mark for two correct plots

2

correctly drawn line

1

(d) any **three** from:

- (fairly) level / steady up to 2009

*allow numbers of males fall (slightly) **and** females rise (slightly) up to 2009*

- (there is a) rise after 2009
- males are (always) higher than females
- males rising faster than females

allow overall increase (from 2005 to 2013)

3

(e) HIV is a virus

1

(and) antibiotics are only effective against bacteria

or

antibiotics do not kill viruses

allow viruses live inside cells

1

[13]