In this section, students learn about how diseases are caused by microorganisms and explore the body's defence mechanisms against disease. They explore the role of vaccinations and medicines in our lives and the adverse effects of misusing drugs. They also explore the causes of heart attacks, strokes and cancer along with some of the treatments for these diseases.

Name: _____

Date: _____

Score: _____ / 76   % _____

1. Diseases caused by microorganisms are spread and prevented in different ways.

   Draw lines to link each type of microorganism to **one** correct statement about it.

   Type of microorganism

Cold virus	Cause of rubella
Salmonella	Prevented by cooking food thoroughly
Fungus	Cause of athlete's foot
HIV	Spread by droplet infection
	Prevented by vaccination
	Spread by sharing dirty needles or sexual intercourse

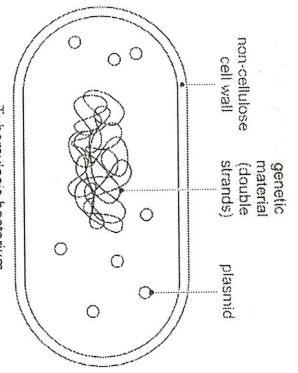   **Statement about microorganisms**

   [4]

2. The table gives information on some diseases caused by microorganisms.

   Complete the table.

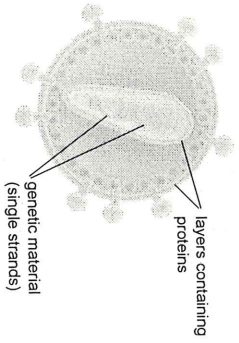 | Disease | Type of microorganism | How disease is spread | Prevention |
   |---|---|---|---|
   | Measles | | Droplet infection | |
   | Athlete's foot | | Contact | Wearing flip flops in a swimming pool area |
   | | Bacterium | Eating contaminated food | Cook food thoroughly |
   | Chlamydia | Bacterium | | Use a condom |

   [5]

3. The diagrams show a tuberculosis bacterium and a Human Immunodeficiency Virus (HIV).

Tuberculosis bacterium

non-cellulose cell wall
genetic material (double strands)
plasmid

genetic material (single strands)
layers containing proteins

Look at the diagrams.

(a) Give one similarity and one difference between the bacterium and the virus.

Similarity _____

_____ [1]

Difference _____

_____ [1]

(b) Tuberculosis is spread by droplet infection.

Explain what is meant by droplet infection.

_____

_____ [1]

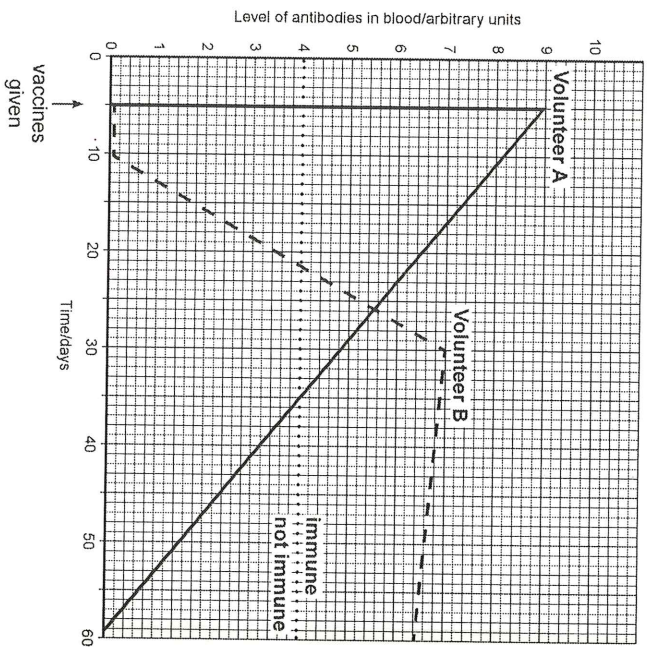**(c)** Give one way HIV can be spread and prevented.

Spread _____

_____ [1]

Prevented _____

_____ [1]

Examiner Only	
Marks	Remark

4. Two volunteers were going abroad to help the victims of a disaster.

Before leaving they had to be vaccinated against a serious disease found in the disaster area.

The graph shows the level of antibodies in their blood before and after the vaccinations.

Level of antibodies in blood/arbitrary units

vaccines given

Volunteer A

Volunteer B

immune
not immune

Time/days

(a) What is an antibody?

_____

_____ [2]

(b) What was the antibody concentration in the blood of each volunteer on day 40?
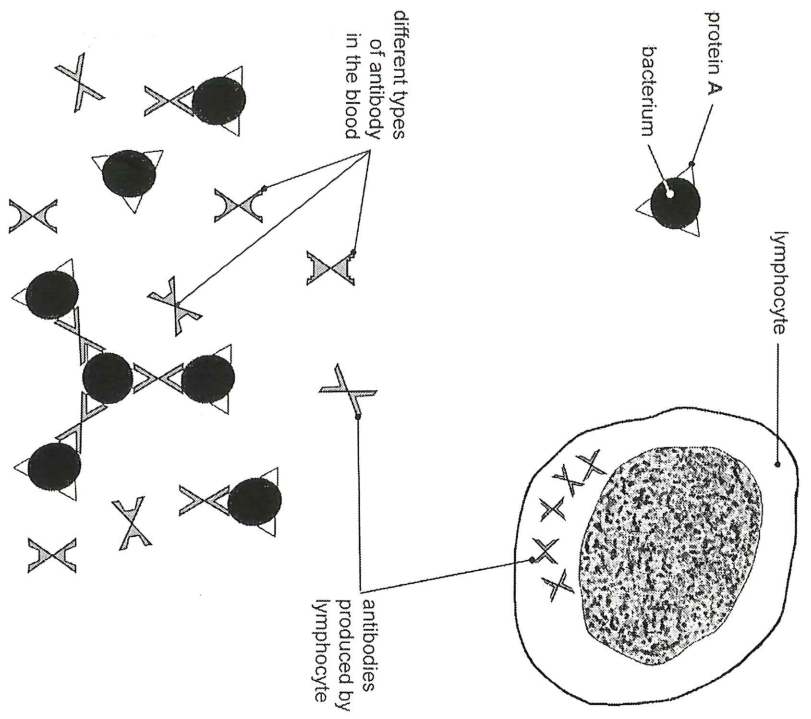
Volunteer **A** _____ arbitrary units.

Volunteer **B** _____ arbitrary units. [2]

(c) Volunteer **A** was advised to return home by day 35.

Explain why.

_____

_____

_____ [2]

5. The diagram shows a lymphocyte cell producing antibodies in response to bacteria entering the blood.

© Chief Examiner

(a) Name protein A.

_____ [1]

(b) Lymphocytes bring about immunity by producing antibodies.

Name this type of immunity.

_____ [1]

(c) Suggest why there are different types of antibodies already present in the blood.

_____ [1]

(d) Use the diagram to help describe and explain the action of the **antibodies** on the bacteria.

_____
_____
_____
_____ [3]

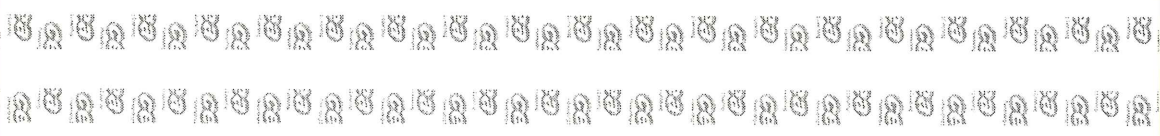After the action of the antibodies, another type of white blood cell destroys the bacteria.

(e) Name this type of white blood cell and describe how it destroys the bacteria.

_____
_____
_____ [3]

(f) Give **two** ways the body can prevent bacteria entering the blood.

1. _____
2. _____ [2]

[Turn over

6. (a) Penicillin is an antibiotic.

It was discovered by Alexander Fleming.

(i) **Choose** the **two** scientists who developed penicillin for large-scale production.

Draw a (circle) around the **two** correct answers.

(Florey)   Watson   Crick   (Chain)   Wilkins   Chargaff   [2]

(ii) Name the type of organism that produces penicillin.
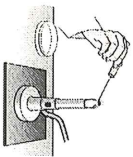
FUNGUS   [1]

(b) A patient suffering from a throat infection had a sample of bacteria taken from his throat by a nurse.

The bacteria in the sample were inoculated on to a Petri dish of sterile agar in the hospital laboratory.

The diagrams show some of the aseptic techniques used during inoculation.

Explain the reason for each aseptic technique.

Flame inoculating loop.
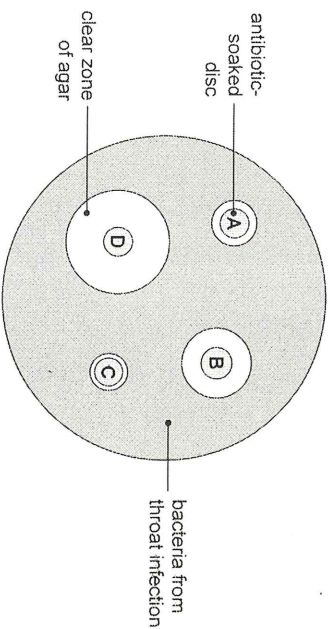
_____ [1]

Do not completely remove lid.

_____ [1]

Wash hands after inoculation.

_____ [1]

Filter paper discs were soaked in four different antibiotics, A, B, C and D.

These discs were then placed on the bacteria growing on the agar in the Petri dish.

The diagram shows the Petri dish after it was incubated for 48 hours.

antibiotic-soaked disc

clear zone of agar

A   D   B   C

bacteria from throat infection

The area of the clear zone around each antibiotic-soaked disc was measured.

The table shows the results.

Antibiotic disc	Area of clear zone /mm²
A	79
B	177
C	50
D	380

Look at the results.

(c) Suggest which antibiotic a doctor should prescribe for the patient suffering from this throat infection.

Give **data** from the table to help explain your answer.

Antibiotic _____

Explanation _____

_____

_____ [3]

[Turn over

7. Cigarette smoke contains nicotine.

The concentration of nicotine in the air is a measure of the total number of cigarettes being smoked.

The table shows the concentration of nicotine in 50 pubs before and after a smoking ban.

Concentration of nicotine in the air/ arbitrary units	Number of pubs	
	Before ban	After ban
0–100	0	44
101–200	1	6
201–300	3	0
301–400	20	0
401–500	26	0

© CCEA

(a) Describe the effect of the smoking ban on the concentration of nicotine in pubs.

Use data from the table to support your answer.

_____

_____

_____

_____

[3]

(b) Give **two** ways nicotine affects the body.

1. _____

_____

2. _____

_____

[2]

(c) Suggest **two other** substances in cigarette smoke that could be used to measure the impact of a smoking ban.

Explain the effect of each substance on the body.

1. Substance _____ [1]

Explanation _____ [1]

2. Substance _____ [1]

Explanation _____ [1]

(d) Suggest **one** reason why some people object to a smoking ban.

_____

_____

[1]

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8. Cigarette smoke contains chemicals which have harmful effects.

Some chemicals in cigarette smoke are shown in the boxes on the left.

Draw lines to link each chemical to its harmful effect.

Chemical in cigarette smoke   **Harmful effect**

| Nicotine | | Less oxygen carried in the blood |

| Carbon Monoxide | | Causes addiction |

| Tar | | Causes lung cancer |

[2]

(b) Governments are trying different ways to reduce the number of people smoking.

One way is to ban advertising.
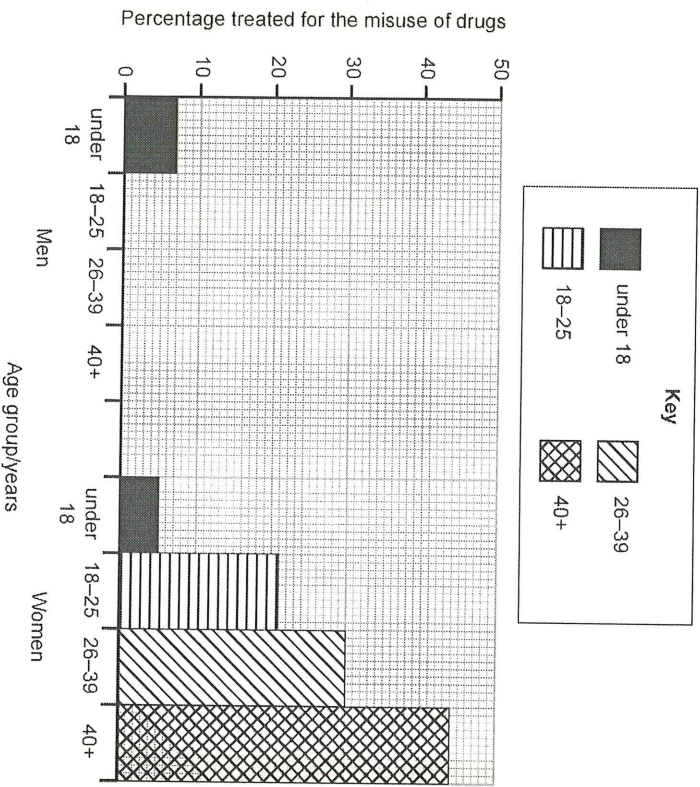
Give two **other** ways.

1. _____ [1]

2. _____ [1]

The number of men and women treated for the misuse of drugs was recorded in Northern Ireland between April 2013 and March 2014.

The table and the graph compare the age groups of those men and women treated for the misuse of drugs.

Age group/years	Percentage of men treated for the misuse of drugs	Percentage of women treated for the misuse of drugs
Under 18	7	5
18–25	36	21
26–39	39	30
40+	18	44

Statistics from Northern Ireland Drug Misuse Database 1 April 2013 – 31 March 2014. © Crown Copyright - Contains public sector information licensed under the Open Government Licence v3.0

Key

under 18

18–25

26–39

40+

Percentage treated for the misuse of drugs

Age group/years

Men

Women

(a) (i) **Complete the graph** for the percentage of **men** treated for the misuse of drugs.
The first bar has been drawn for you. [3]

Look at the graph.

(ii) Describe the trend in the age of men treated for the misuse of drugs.

_____

_____ [2]

Look at the results for people **under 40 years of age.**

(b) How does the **total** percentage of men under the age of 40 years treated for the misuse of drugs compare to the total percentage of women under the age of 40 years treated for the misuse of drugs?

Use data for the percentage of under 40 year olds to support your answer.

_____

_____

_____ [2]

10.

(a) The table shows the number of deaths from coronary heart disease in men and women in the UK during 2008.

Age/years	Deaths from coronary heart disease per 100000 of population	
	Men	Women
35–44	17	4
45–54	67	14
55–64	175	47
65–74	443	179

© Crown copyright / Office of National Statistics

Look at the table.

(i) Describe one similarity and one difference between the number of deaths from coronary heart disease in men and women.

Similarity _____

_____ [1]

Difference _____

_____ [1]

(ii) The number of deaths from coronary heart disease will affect the number of men and women surviving in the population.

Suggest how the number of 65–74 year old men and women surviving in the population will differ.
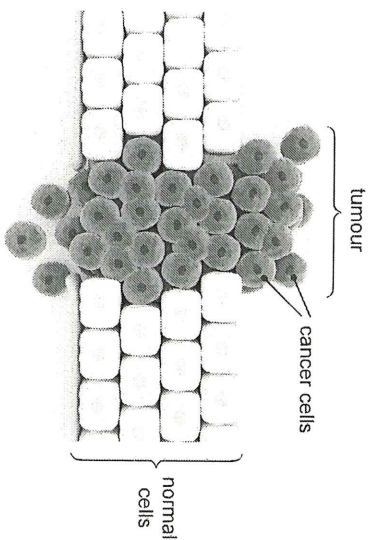
_____

_____ [1]

Bio H June 2014

(b) Describe **two** ways to reduce the risk of coronary heart disease.

_____

_____

_____ [2]

11.

(a) The diagram shows cancer cells in a tumour.

© Somersault18:24/iStock Thinkstock

(i) What is cancer?

_____

_____ [2]

Look at the diagram.

(ii) Give **one** piece of evidence, from the diagram, which suggests this tumour is malignant.

_____

_____ [1]

(b) The number of women in the UK diagnosed with cervical cancer was recorded over a three year period and the average number per year was calculated.

The table shows the average number of women in each age group with cervical cancer.

Age group/ years	Average number of women with cervical cancer per year
20–24	60
25–29	390
30–34	400
35–39	430
40–44	360
45–49	270
50–54	190

(i) Complete the **histogram** using the results in the table.

Shade the bars you have drawn.

[3]
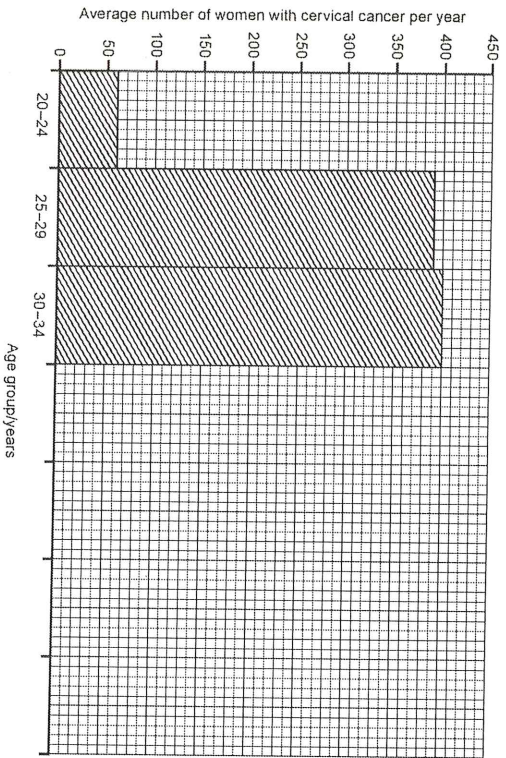
(ii) All women in the UK between the ages of 25 and 54 are screened for cervical cancer.

Suggest **one** reason why women below the age of 24 are **not** included in all screening programmes.

_____

[1]

(iii) Explain why screening programmes are important.

_____

_____

[2]

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12. Look at the words in the box.

surgery	container	uncontrolled	capsule
X-rays	uneven	malignant	controlled

Use words from the box to **complete the sentences**.

Cancer is _____ cell division.

Cancer can result in two types of tumour.

Tumours can be benign or _____ .

Benign tumours are surrounded by a _____ and can be easily removed by _____ .

[4]