

# Communicable Diseases

## Question Paper 1

Level	GCSE (9-1)
Subject	Combined Science: Trilogy - Biology
Exam Board	AQA
Topic	4.3 Infection and Response
Sub-Topic	Communicable Diseases
Difficulty Level	Gold Level
Booklet	Question Paper 1

**Time Allowed:** 54 minutes

**Score:** /53

**Percentage:** /100

**Grade Boundaries:**

**Q1.** In 2014 there was an outbreak of Ebola virus disease (EVD) in Africa.

At the time of the outbreak there were:

- no drugs to treat the disease
- no vaccines to prevent infection.

(a) By March 2015 there were an estimated 9 850 deaths worldwide from EVD.

The number of deaths is an estimate.

Suggest why it is an estimate rather than an exact number.

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(1)

(b) Why were antibiotics **not** used to treat EVD?

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(1)

(c) After the outbreak began, drug companies started to develop drugs and vaccines for EVD.

A drug has to be thoroughly tested and trialled before it is licensed for use.

Testing, trialling and licensing new drugs usually takes several years.

Draw **one** line from each word about drug testing to the definition of the word.

**Word about drug  
testing**

**Definition**

Dose

Side effects making the person ill

Efficacy

The concentration of the drug to be used

	and how often the drug should be given
Toxicity	Whether the drug works to treat the illness

(2)

- (d) The results of drug testing and drug trials are studied in detail by other scientists. Only then can the results be published by the drug company.
- Suggest **one** reason why the results are studied by other scientists.

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(1)

- (e) The number of deaths from EVD continued to increase.
- The World Health Organization (WHO) decided it was ethical to use unlicensed drugs.
- The WHO said unlicensed drugs could only be given to people who gave their permission.
- Also, any results had to be shared with other researchers and drug companies.
- Some vaccines had shown positive results in animal testing, but the vaccines had not been tested and trialled in humans.
- The supplies of the vaccine were low.
- At first the vaccines were only used for health workers.
- How would the use of a vaccine **reduce the spread** of EVD?

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(2)

- (f) Evaluate the use of unlicensed drugs and vaccines during the EVD outbreak.

Give a conclusion.

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(6)  
(Total 13 marks)

**Q2.** White blood cells protect the body against pathogens such as bacteria and viruses.

- (a) (i) Pathogens make us feel ill.

Give **one** reason why.

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(1)

- (ii) White blood cells produce antibodies. This is one way white blood cells protect us against pathogens.

Give **two** other ways that white blood cells protect us against pathogens.

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(2)

(b) Vaccination can protect us from the diseases pathogens cause.

(i) One type of virus causes measles.

A doctor vaccinates a child against measles.

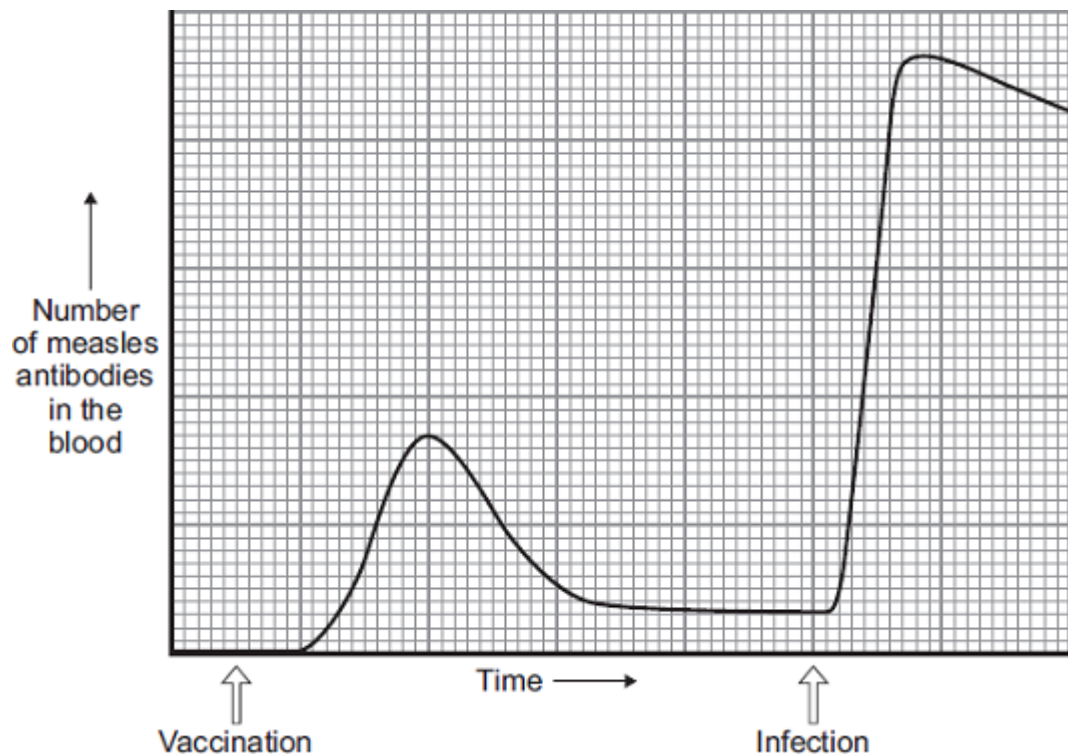
What does the doctor inject into the child to make the child immune to measles?

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(2)

(ii) A few weeks after the vaccination, the child becomes infected with measles viruses from another person.

The graph shows the number of measles antibodies in the child's blood from before the vaccination until after the infection.



More measles antibodies are produced after the infection than after the vaccination.

Describe other differences in antibody production after infection compared with after vaccination.

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(3)

- (iii) Vaccination against the measles virus will **not** protect the child against the rubella virus.

Why?

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(1)

- (c) What is the advantage of vaccinating a large proportion of the population against measles?

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(1)

(Total 10 marks)

**Q3.** Some diseases can be cured by using antibiotics or prevented by vaccination.

- (a) (i) Explain fully why antibiotics cannot be used to cure viral diseases.

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(2)

- (ii) There has been a large increase in the populations of many antibiotic-resistant strains of bacteria in recent years.

Explain why.

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(2)

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

Explain how this makes the person immune to the disease.

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(3)  
(Total 7 marks)

**Q4.** Drugs must be trialled before the drugs can be used on patients.

- (a) (i) Before the clinical trials, drugs are tested in the laboratory.  
The laboratory trials are **not** trials on people.

What is the drug tested on in these laboratory trials?

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(1)

- (ii) Drugs must be trialled before the drugs can be used on patients.

Give **three** reasons why.

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(3)

- (b) Read the information about cholesterol and ways of treating high cholesterol levels.

Diet and inherited factors affect the level of cholesterol in a person's blood.  
Too much cholesterol may cause deposits of fat to build up in blood vessels and reduce the flow of blood. This may cause the person to have a heart attack.  
Some drugs can lower the amount of cholesterol in the blood.

The body needs cholesterol. Cells use cholesterol to make new cell membranes and some hormones. The liver makes cholesterol for the body.



Some drugs can help people with high cholesterol levels.

**Statins** block the enzyme in the liver that is used to produce cholesterol. People will normally have to take statins for the rest of their lives. Statins can lead to muscle damage and kidney problems. Using some statins for a long time has caused high numbers of deaths.

**Cholesterol blockers** reduce the absorption of cholesterol from the intestine into the blood. Cholesterol blockers can sometimes cause problems if the person is using other drugs.

Evaluate the use of the two types of drug for a person with high cholesterol levels.

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(6)  
(Total 10 marks)

**Q5.** Scientists have discovered that curry spices affect sheep and cattle. Curry spices can reduce the amount of methane that grazing animals give off.

'Bad' bacteria in the animal's stomach produce methane. About 12% of the animal's food is changed into methane.

The curry spice coriander works like an antibiotic. Adding coriander to animal food reduces methane production by about 40%.

(a) (i) Why does adding coriander to an animal's food reduce methane production?

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(1)

(ii) Explain **one** advantage to a farmer of adding coriander to the animal's food.

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(2)

(b) Farm animals give off large amounts of methane.

Explain the effects of adding large amounts of methane to the atmosphere.

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(3)

(Total 6 marks)

- Q6.** (a) Explain how vaccination makes a person immune to a disease.

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**(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?

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**(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.

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(2)  
(Total 7 marks)