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	Silver Level
Booklet	Question Paper 1

Time Allowed: **60 minutes**

Score: **/60**

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 9850 deaths worldwide from EVD.

The number of deaths is an estimate.

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

.....

.....

(1)

(b) Why were no antibiotics used to treat EVD?

.....

.....

.....

(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.

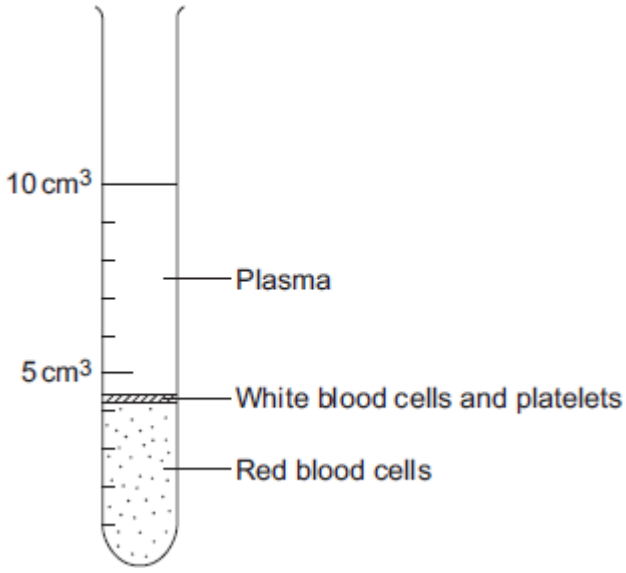
.....

.....

(1)
(Total 5 marks)

Q2. The parts of the blood can be separated from each other by spinning the blood in a centrifuge.

The image below below shows the separated parts of a 10 cm^3 blood sample.



(a) Calculate the percentage of the blood that is made up of plasma.

.....

.....

Answer = ... %

(2)

(b) Name **three** chemical substances transported by the plasma.

1.....

2.....

3.....

(3)

(c) **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

White blood cells are part of the immune system. White blood cells help the body to defend itself against pathogens.

Describe how pathogens cause infections **and** describe how the immune system defends the body against these pathogens.

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(6)

(Total 11 marks)

Q3. Some infections are caused by bacteria.

(a) The genetic material is arranged differently in the cells of bacteria compared with animal and plant cells.

Describe **two** differences.

.....

.....

.....

.....

(2)

(b) Tuberculosis (TB) is an infection caused by bacteria.

The table below shows the number of cases of TB in different regions of southern England from 2000–2011.

Number of cases of TB per 100 000 people

Year	London	South East	South West
2000	37	5	3
2001	36	6	4
2002	42	6	6
2003	42	7	4
2004	42	7	5
2005	49	8	5
2006	44	8	3
2007	43	8	5
2008	44	8	5
2009	44	9	6
2010	42	9	5
2011	45	10	5

(i) How does the number of cases of TB for London compare with the rest of southern England?

.....

.....

.....

(1)

(ii) Describe the pattern in the data for cases of TB in the South East.

.....

.....

(1)

(iii) Describe the pattern in the data for cases of TB in the South West.

.....

.....

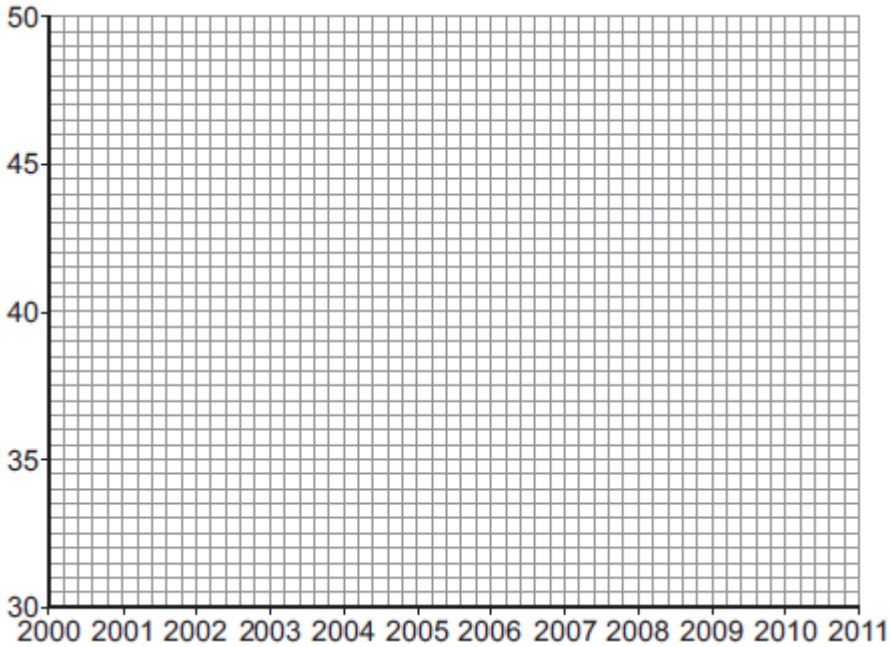
.....

.....

(2)

(c) (i) On the graph paper below:

- plot the number of cases of TB in **London**
- label both the axes on the graph
- draw a line of best fit.



(4)

(ii) Suggest why a student thought the value for 2005 in London was anomalous.

.....

.....

(1)

(d) People can be vaccinated against TB.

Suggest how a vaccination programme would reduce the number of people with TB.

Details of how a vaccine works are **not** required.

.....

.....

.....

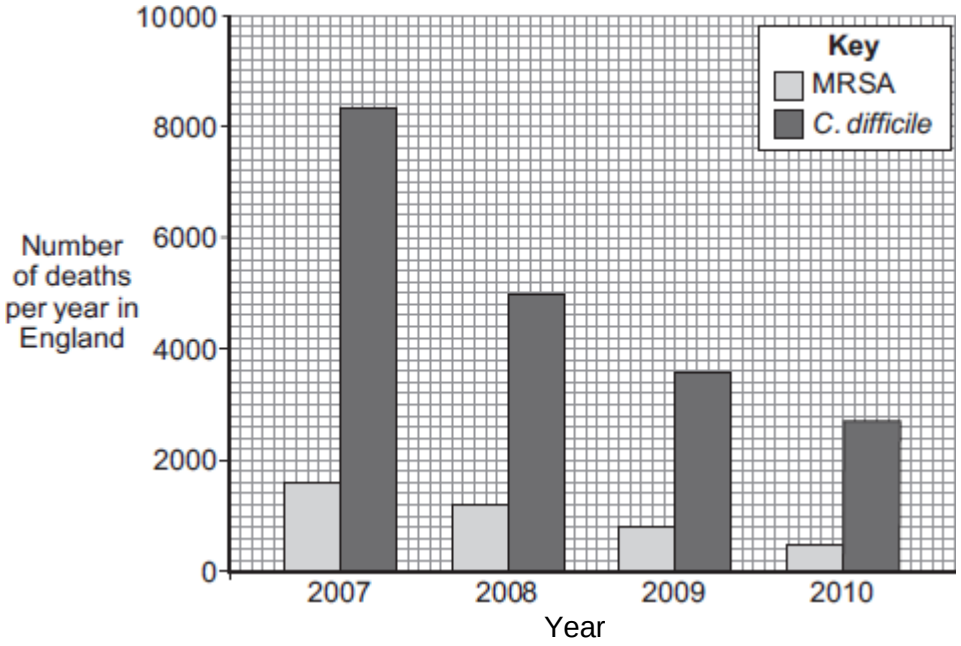
.....

(2)

(Total 13 marks)

Q4. Infections by antibiotic resistant bacteria cause many deaths.

The bar chart below shows information about the number of deaths per year in England from *Methicillin-resistant Staphylococcus aureus* (MRSA) and from *Clostridium difficile* (*C.difficile*) over 4 years.



(a) (i) Describe the trend for deaths caused by *C.difficile*.

.....

.....

.....

.....

(2)

(ii) Suggest a reason for the trend you have described in part **(a)(i)**.

Explain your answer.

.....

.....

.....

.....

(2)

(iii) Calculate the percentage change in deaths caused by MRSA from 2009 to 2010.

.....

.....

.....

Percentage change in deaths caused by MRSA = ... %

(2)

(iv) Numbers have not yet been published for 2011.

When the numbers are published, scientists do **not** expect to see such a large percentage change from 2010 to 2011 as the one you have calculated for 2009 to 2010.

Suggest **one** reason why.

.....

.....

(1)

(b) Before 2007 there was a rapid increase in the number of deaths caused by MRSA.

Describe how the overuse of the antibiotic methicillin led to this increase.

.....

.....

.....

.....

.....

.....

(3)
(Total 10 marks)

Q5. Read the article.

Parents all over the world advise children to 'wrap up warm or you'll catch a cold'.

Scientists at Cardiff University recruited 180 volunteers to take part in an investigation to find out if the advice was true. The investigation took place during the city's common cold season.

Half of the volunteers put their feet in bowls of ice cold water for 20 minutes. The other volunteers sat with their feet in empty bowls.

Over the next few days, almost a third of the volunteers who put their feet into cold water developed colds. Fewer than one in ten of the other volunteers developed colds.

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

The advice 'wrap up warm or you'll catch a cold' is an example of

hearsay.
a hypothesis.
a prediction.

(1)

(b) What was the experimental control in the investigation?

.....

(1)

(c) The scientists did **not** prove that the advice 'wrap up warm or you'll catch a cold' is true.

Explain why.

.....

.....

.....

.....

.....

.....

(3)
(Total 5 marks)

Q6. Scientists at a drug company developed a new pain-killing drug, drug **X**.

(a) Painkillers do **not** cure infectious diseases.

Why?

.....

(1)

(b) The scientists compared drug **X** with two other pain-killing drugs, drug **A** and drug **B**.
In their investigation the scientists: • chose 600 volunteers. The volunteers were all in pain • gave 200 of the volunteers a standard dose of drug **A** • gave 200 of the volunteers a standard dose of drug **B** • gave 200 of the volunteers a standard dose of drug **X**.

Over the next seven hours the volunteers recorded how much pain they felt.

To get valid results the three groups of volunteers should be matched for as many factors as possible.

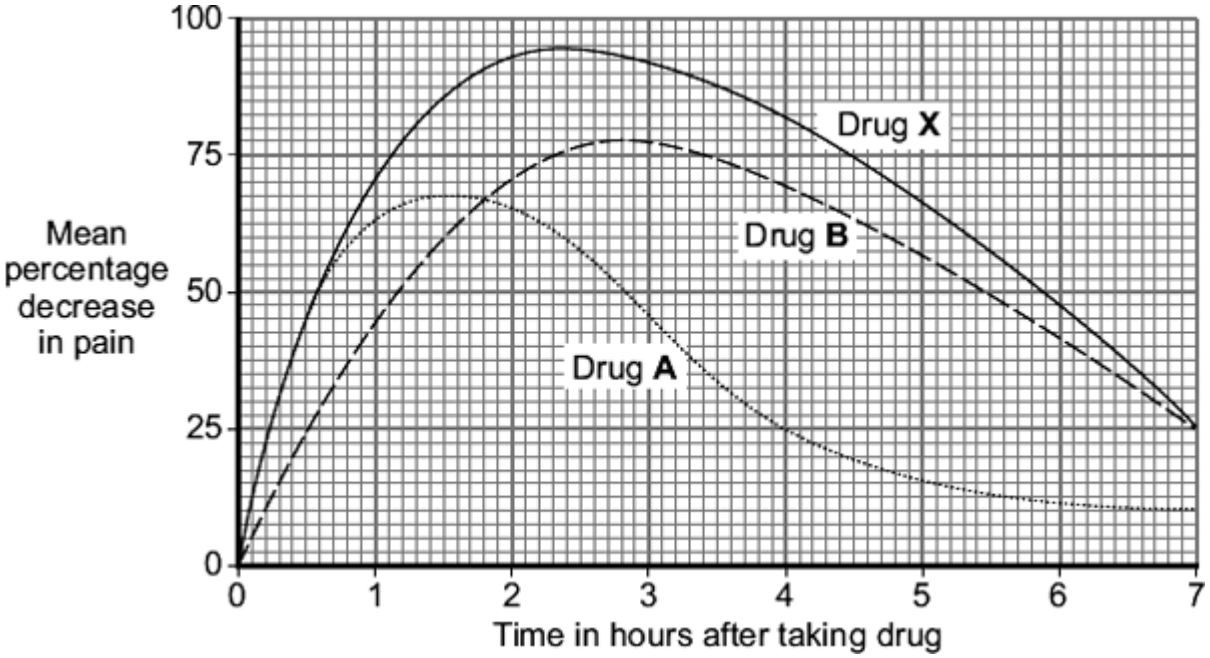
Suggest **two** of the factors that should be matched.

.....

.....

(2)

(c) The graph shows the results of the investigation.



(i) How much pain did the volunteers still feel, four hours after taking drug **A**?

..... percent

(1)

(ii) Give **one** advantage of taking drug **A** and **not** drug **B**.

.....

.....

(1)

(iii) Give **two** advantages of taking drug **B** and **not** drug **A**.

.....

.....

.....

.....

(2)

(d) Drug **X** is much more expensive than both drug **A** and drug **B**.

A pharmacist advised a customer that it would be just as good to take drug **A** and

drug **B** together instead of drug **X**.

Do you agree with the pharmacist's advice?

Give reasons for your answer.

.....

.....

.....

.....

.....

.....

.....

(3)
(Total 10 marks)

Q7. (a) **List A** gives the names of three stages in trialling a new drug.

List B gives information about the three stages.

Draw a line from each stage in **List A** to the correct information in **List B**.

List A **Stage**	**List B** **Information**
	Used to find if the drug is toxic
Tests on humans including a placebo	
	The first stage in the clinical trials of the drug
Tests on humans using very small quantities of the drug	
	Used to find the optimum dose of the drug

Tests on animals	Used to prove that the drug is effective on humans

(3)

(b) Read the passage.

Daily coffee dose delays development of Alzheimer's in humans.

Alzheimer's is a brain disease that causes memory loss in elderly people. Scientists studied 56 mice that had been genetically engineered to develop Alzheimer's.

Before treatment all the mice did badly in memory tests.

Half the mice were given a daily dose of caffeine in their drinking water. The dose was equivalent to the amount of caffeine in six cups of coffee for a human.

The other mice were given ordinary water.

After two months, the caffeine-drinking mice did better in memory tests than the mice drinking ordinary water.

The headline for the passage is not justified.

Explain why as fully as possible.

.....

.....

.....

.....

.....

.....

.....

.....

(3)
(Total 6 marks)