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tutors**

Student number

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Name _____

Date _____

Attempt/Time taken _____

GCSE BIOLOGY

Topic Paper: 3.1 Communicable Diseases
Part 1

Time allowed: 45 minutes

Materials

For this paper you must have:

- the Periodic Table/Data Sheet, provided as an insert (enclosed)
- a ruler with millimetre measurements
- a calculator, which you are expected to use where appropriate.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- Do all rough work in this book. Cross through any work you do not want to be marked.

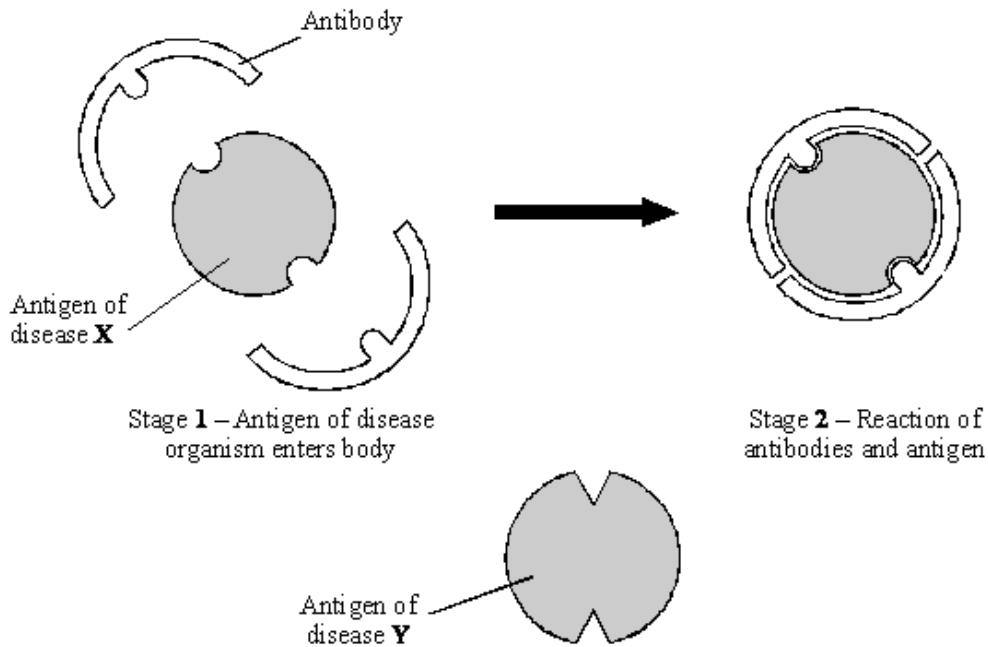
Information

- The Periodic Table/Data Sheet is provided as in insert.
- You are reminded of the need for good English and clear presentation in your answers.
- When answering questions you need to make sure that your answer:
 - is clear, logical, sensibly structured
 - fully meets the requirements of the question
 - shows that each separate point or step supports the overall answer.



39 Marks

- Q1.** (a) Antibodies help to defend the body against disease. The diagram represents the reaction of antibody and antigen for disease **X**.



Using the diagram to help you, suggest why the body's defence against disease **X** would not be effective against disease **Y**.

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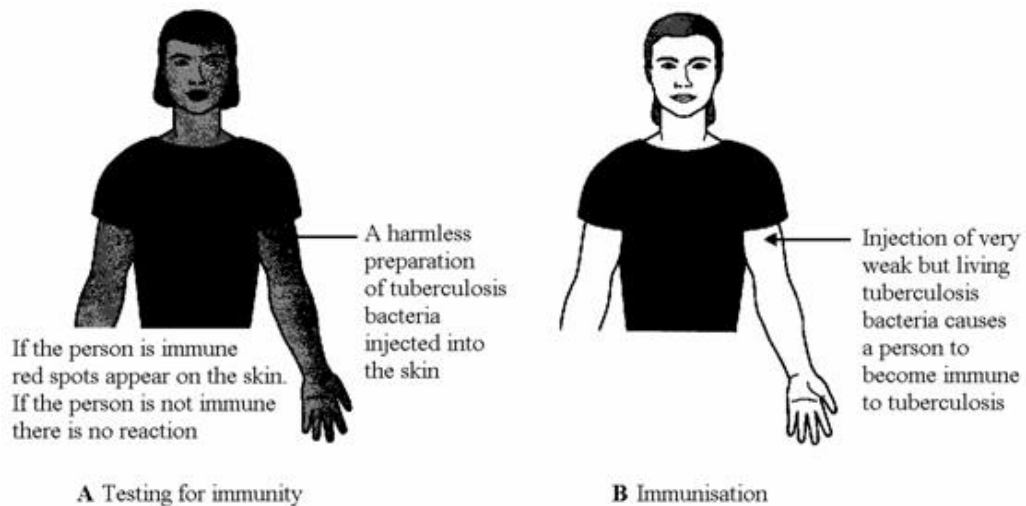
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(2)

- (b) Tuberculosis is a disease which is caused by a bacterium. The body is able to produce antibodies to destroy the bacteria which cause the disease. Some people are naturally immune. A person can be tested to find if they are immune.

Use information in the diagrams to help you answer the questions.





- (i) Suggest the possible cause of the reaction when a person who is already immune is tested, as shown in diagram **A**.

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(2)

- (ii) Explain why the injection of tuberculosis bacteria (diagram **B**) causes immunity but does not cause the disease.

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(3)

(Total 7 marks)

Q2. Penicillin is an antibiotic which stops bacteria from reproducing. It was used a lot in the past to treat bacterial infections in humans and other animals. In many hospitals there are now strains of penicillin resistant bacteria.

Explain how natural selection could have produced these strains of penicillin resistant bacteria.

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(Total 5 marks)



Q3. The influenza virus damages the cells lining the respiratory tract causing sore throats.

Coughing and sneezing spread the virus.

(a) Give the correct term for this method of spreading an infection.

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(1)

(b) In an immunisation programme such as that for MMR (Measles, Mumps and Rubella), suggest why it is essential for a large proportion of the child population to be vaccinated in order to protect the few individuals who are unable to be vaccinated.

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(1)

(c) In some modern influenza vaccines the protein surface sub-units are separated from the virus coat and used for the vaccine. This stimulates an effective immune response in the same way as inactive pathogens.

(i) Explain how this immunity is produced in the body following vaccination, and how further illness from the same virus is prevented.

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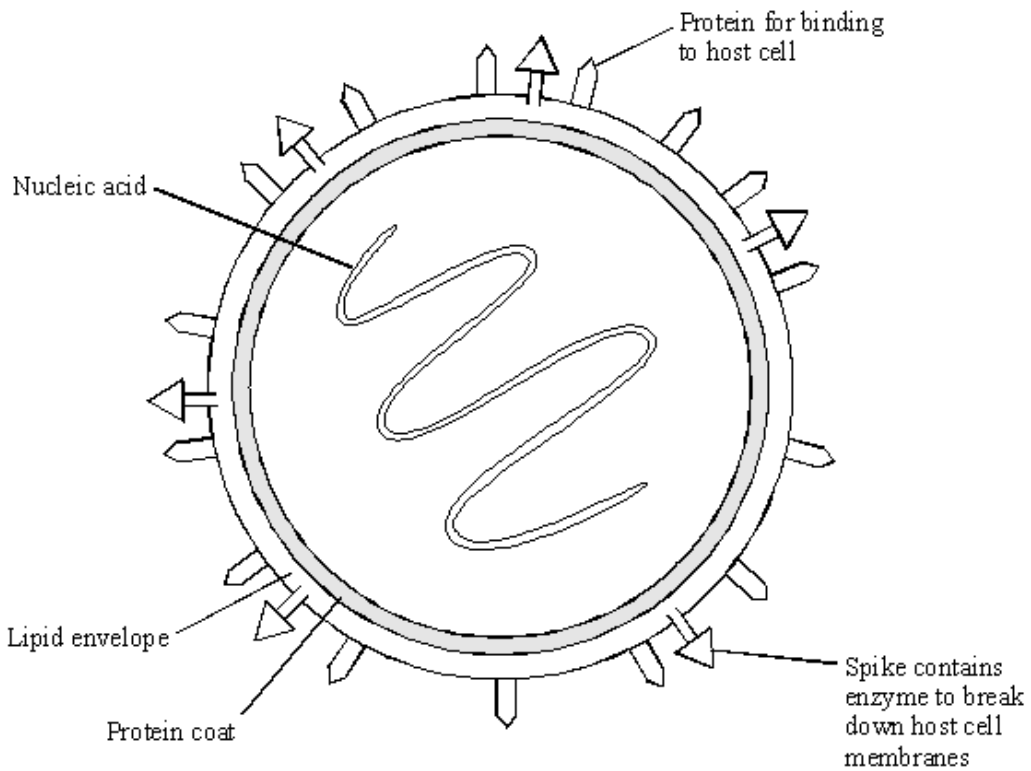
(4)

(ii) This type of immunity resulting from an influenza injection is described as immunity.

(1)

Question continues on the next page

(d) The diagram shows the structure of an influenza virus.



Influenza epidemics can arise because the nucleic acid of the virus frequently changes. This results in changes in the virus structure and so a new strain of the virus is formed. A person who has had influenza or who has been vaccinated may not be immune to the new strain.

Explain why this is so, using the diagram of the influenza virus structure and your knowledge of immunity.

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(3)
(Total 10 marks)



Q4. (a) Explain, as fully as you can, how the body's white blood cells respond to infections.

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(4)

(b) Describe, in as much detail you can, how **one** method of immunisation protects us from a named disease.

Name of disease

How immunisation protects us from this disease.

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(3)

(Total 7 marks)

Q5. 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.....

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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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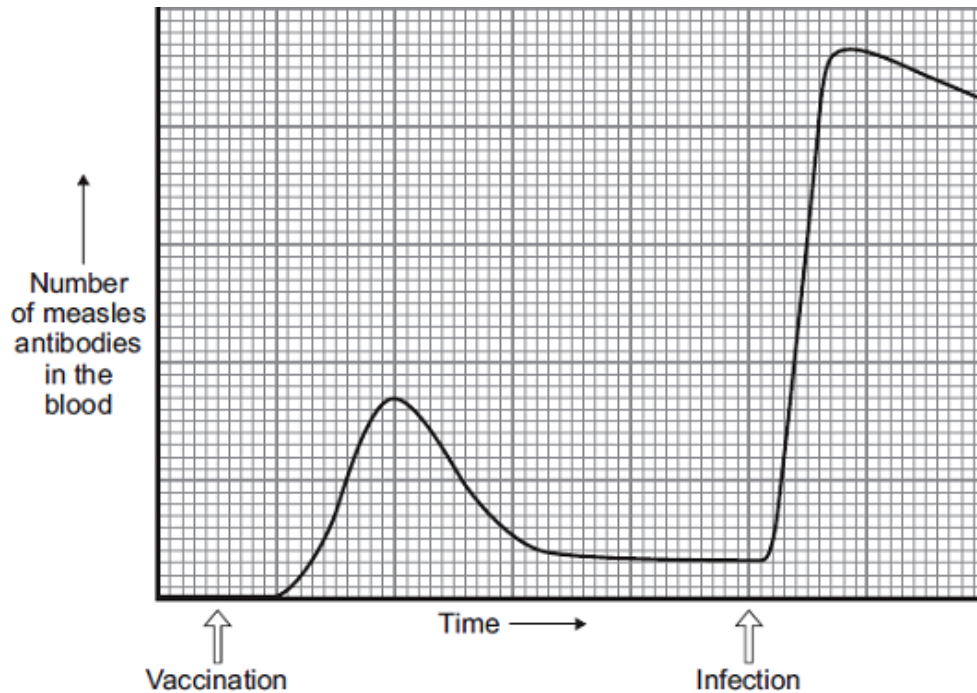
(2)

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- (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)