AQA GCSE BIOLOGY (HIGHER) · 8461

BIOLOGY



EXAM QUESTION PACK

4.3.1 COMMUNICABLE DISEASES (PACK 3)

SCORE	PERCENTAGE
/126	%

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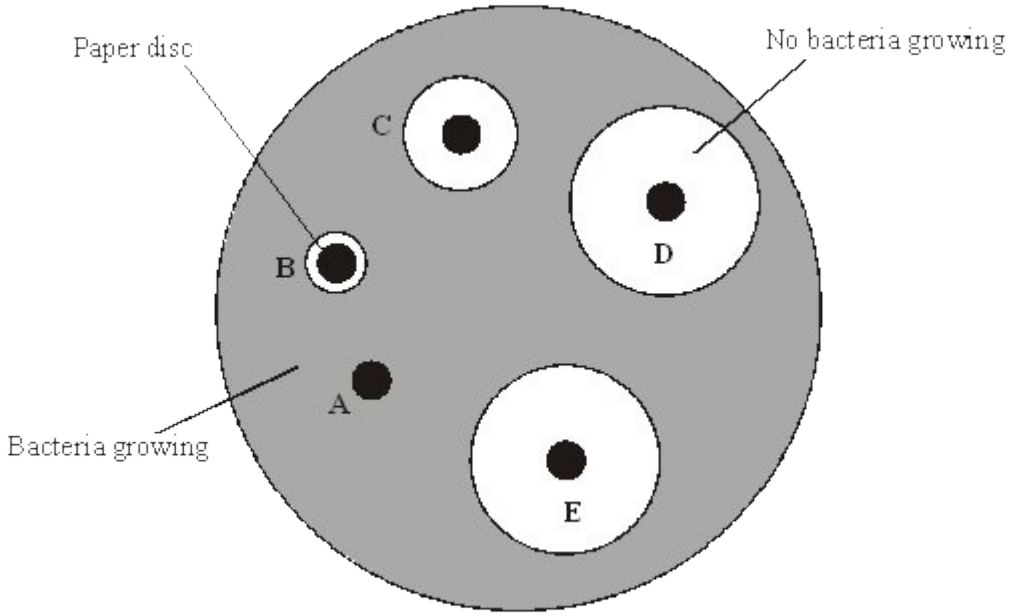
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Q1.

An investigator placed paper discs containing different concentrations of an antibiotic onto a culture of bacteria in a petri dish.

After an incubation period of two days, the dish looked like this.



(a) Explain why there are areas around some of the paper discs where no bacteria are growing.

_____

_____

(2)

(b) The concentration of the antibiotic on the paper discs is given in the table, along with the diameter of the circles where no bacteria are growing.

Disc	Concentration of the antibiotic in units	Diameter of circle where no bacteria are growing, in mm
A	0	0
B	2	8
C	4	14
D	6	26
E	10	26

What effect does an increase in the concentration of the antibiotic have on the growth of the bacteria?

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_____

_____

_____

(2)

(c) When students carry out this experiment, they need to take several safety precautions.

The precautions include:

- passing inoculating loops through a flame
- sealing the lid of the petri dish with tape
- incubating at a maximum temperature of 25 °C.

Explain why each of these precautions is necessary.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific word.

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(5)

(d) Scientists are concerned that many bacteria are developing resistance to antibiotics.

Suggest **two** ways by which this problem could be limited.

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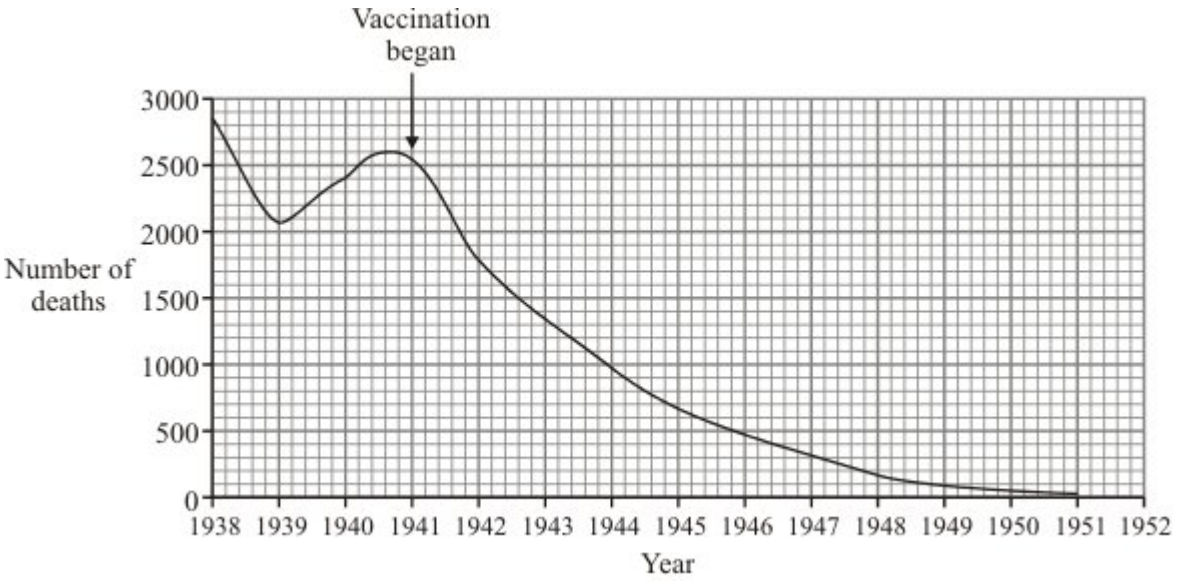
(2)

(Total 11 marks)

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Q2.

Diphtheria is a disease of the human breathing system. The graph shows the number of deaths from diphtheria in the United Kingdom between 1938 and 1951. Vaccination against diphtheria was begun in 1941.



(a) What evidence in the graph suggests that vaccination protects people from diphtheria?

_____

(1)

(b) Complete the passage by choosing the correct words from the box.

antibodies	**bacteria**	**platelets**
red blood cells	**white blood cells**	

During vaccination, harmless _____ are injected into the body.

This causes _____ to make _____ which help to protect the body against diphtheria.

(3)

(Total 4 marks)

Q3.

Doctors give antibiotics to patients to kill bacteria in their bodies.

Explain how the overuse of antibiotics has led to the evolution of antibiotic-resistant bacteria.

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To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

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(Total 3 marks)

Q4.

Read the passage.

> MMR is a triple vaccine used to protect against three viral diseases. Weakened strains of the three viruses are injected together. The weakened strains cause the body to become immune to the diseases. The vaccine is usually given to children between one and two years old.
>
> Some people believe that the vaccine can trigger a response called autism in children. Autism damages the mental and social development of the child. The vaccine can also lead to problems in the large intestine.

(a) What are the **three** diseases that the MMR vaccine protects against?

_____

(1)

(b) Use the information in the passage and your own knowledge to evaluate whether a parent should or should not have their child vaccinated.

To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.

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(5)

(Total 6 marks)

Q5.

The following are precautions taken when preparing a streak of bacteria on an agar jelly plate.

Give a reason for each.

(i) The inoculating loop is heated in a hot bunsen flame.

REASON:

_____

_____

(1)

(ii) The loop is allowed to cool before putting it into the bacterial culture.

REASON:

_____

_____

(1)

(iii) The lid of the petri dish is only partly opened.

REASON:

_____

_____

(1)

(iv) The petri dish is sealed with sticky tape.

REASON:

_____

_____

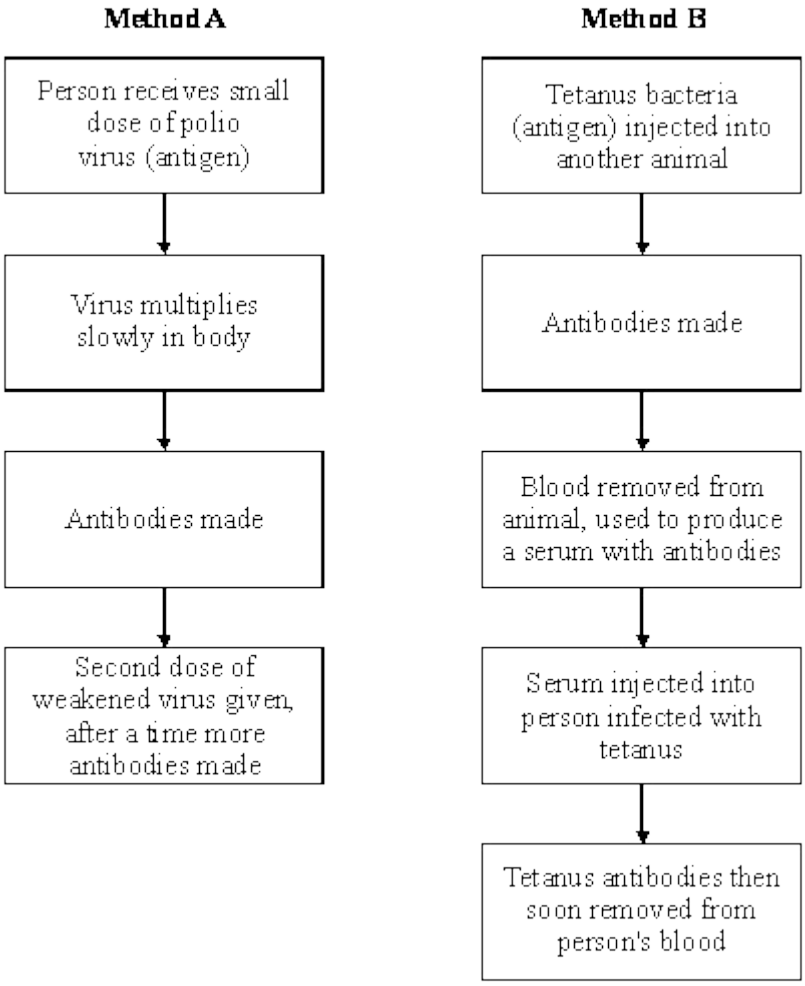
(1)

(Total 4 marks)

Q6.

The diagram shows two methods which are used to give humans protection against disease. **Method A** shows active immunity and **Method B** shows passive immunity. **Method A** can be used against polio. **Method B** is often used against tetanus.

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(a) What is the name of the substances produced by the body which destroy harmful viruses and bacteria?

_____

(1)

(b) Why does **Method A** give long lasting protection against polio?

_____

(1)

(c) Why does **Method B** not give long lasting protection against tetanus?

_____

(1)

(d) In immunisation against polio a second dose of the weakened virus is given (this is known as a booster). Suggest why this booster is necessary.

_____

(1)

(e) **Method A** would **not** be helpful for a person who had just been infected with tetanus bacteria. Explain the reason for this.

_____

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_____

(2)

(f) Why is **Method B** very good for dealing quickly with an infection of tetanus?

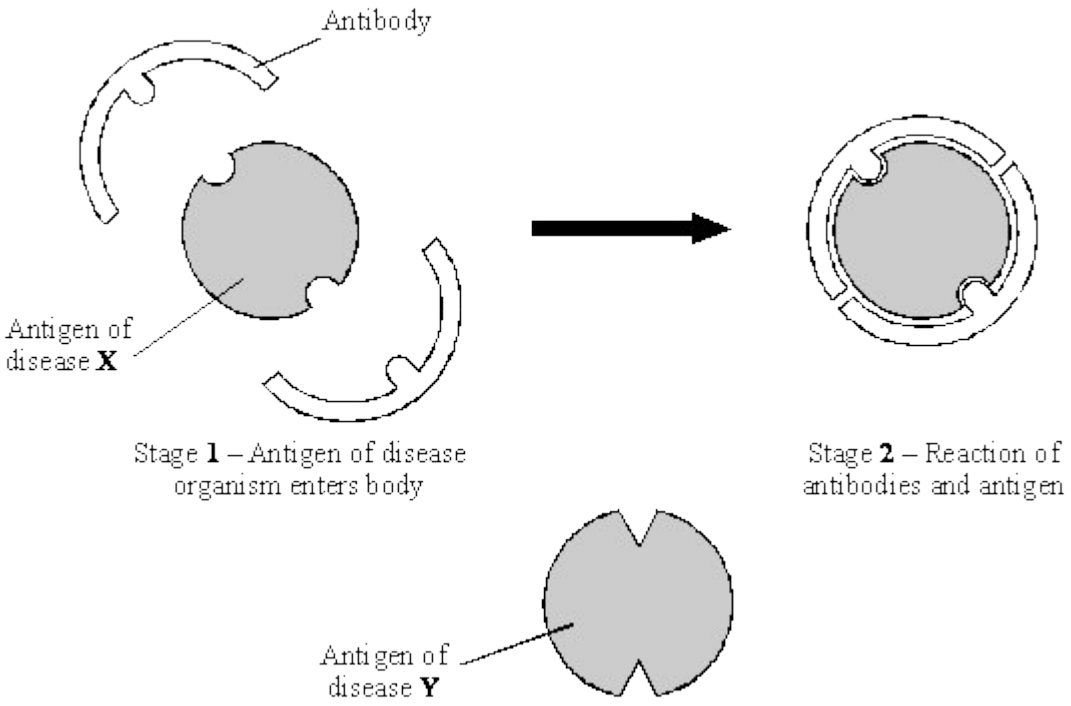
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(1)

(Total 7 marks)

Q7.

(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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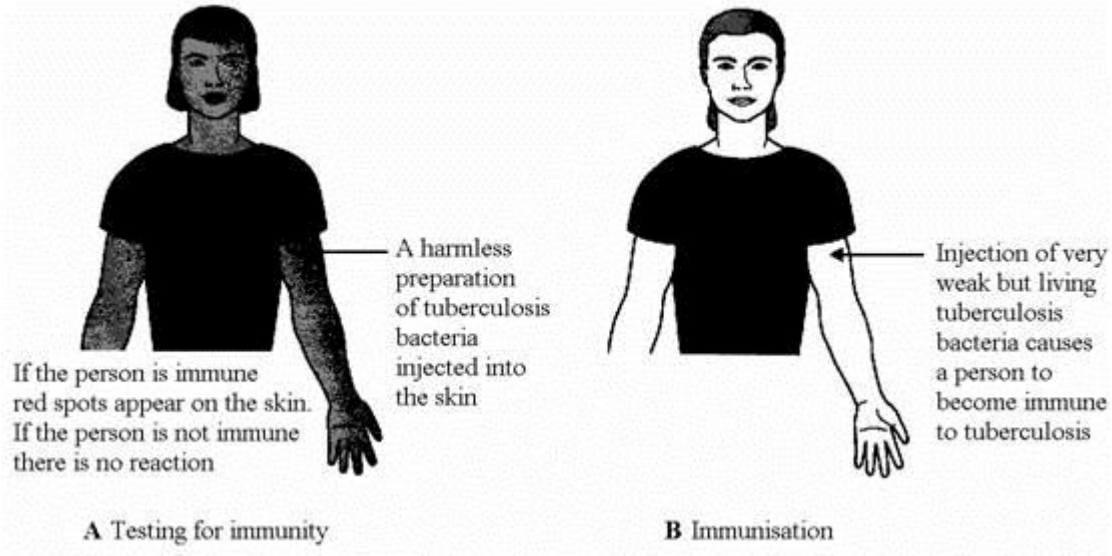
_____

(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.

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

_____

_____

_____

(2)

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

_____

_____

_____

_____

_____

(3)

(Total 7 marks)

Q8.

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)

Q9.

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.

_____

(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.

_____

_____

(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)

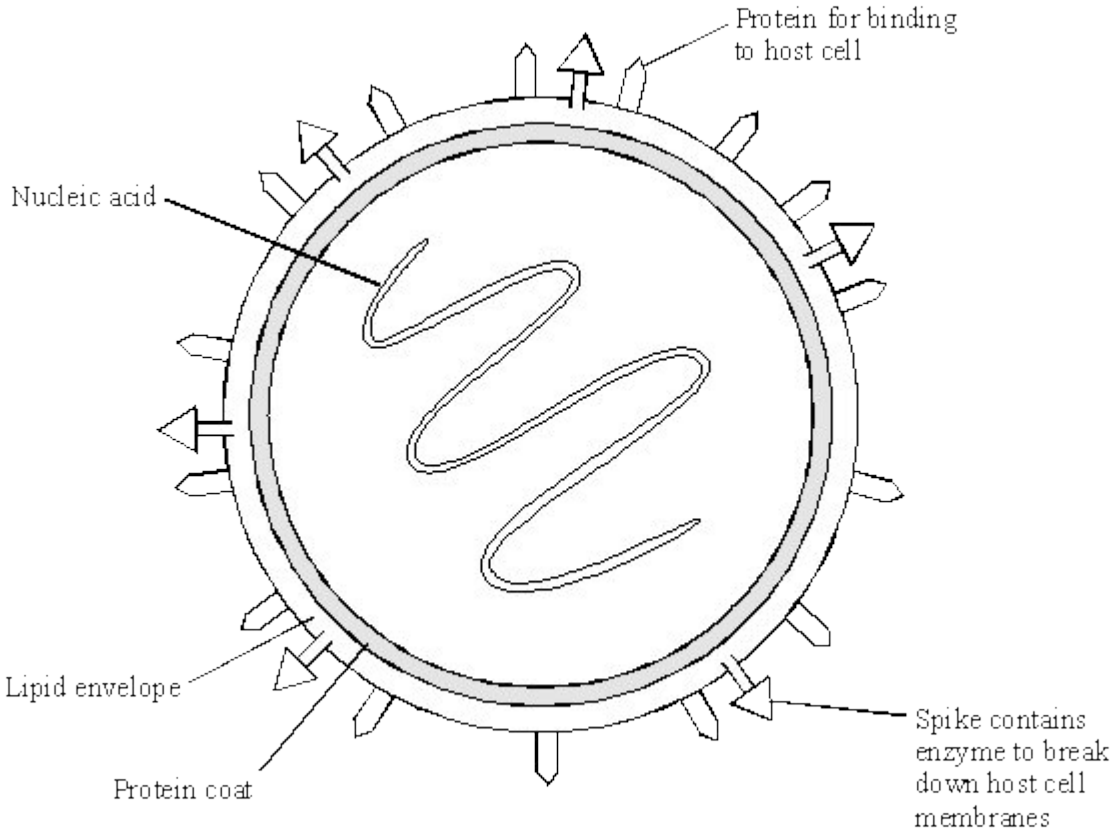
(ii) This type of immunity resulting from an influenza injection is described

as _____ immunity.

(1)

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

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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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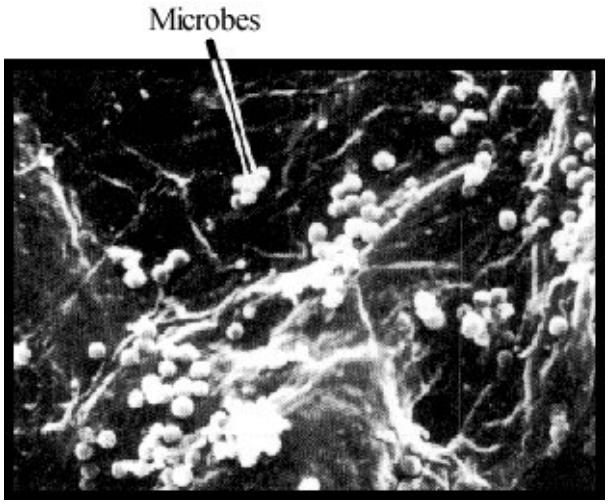
(3)

(Total 10 marks)

Q10.

The photograph below shows human skin highly magnified. Groups of microbes can be seen on the skin.

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Give **two** ways in which the body protects itself from these microbes.

1. _____

_____

2. _____

_____

(Total 2 marks)

Q11.

(i) Give **two** ways in which white blood cells protect us from disease.

1. _____

_____

2. _____

_____

(2)

(ii) Explain, as fully as you can, how immunisation protects us from disease.

_____

_____

_____

_____

_____

_____

(3)

(Total 5 marks)

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Q12.

(a) Explain how diseases caused by bacteria are usually treated by doctors.

_____

_____

(2)

(b) Explain, as fully as you can, how white blood cells protect us from disease.

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(5)

(Total 7 marks)

Q13.

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

_____

_____

_____

_____

_____

(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)

Q14.

(a) Name **two** types of microbe which cause disease in humans.

1 _____

2 _____

(2)

(b) Why do we feel ill when we have an infectious disease?

_____

_____

(1)

(c) Give **two** ways in which white blood cells protect us against disease.

1. _____

_____

2. _____

_____

(2)

(d) Explain, as fully as you can, how immunisation protects us against a named disease.

Name of disease: _____

How immunisation protects us: _____

_____

_____

_____

_____

(3)

(Total 8 marks)

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Q15.

Read the following passage.

> One of the deadliest diseases seems to be making a comeback in Britain. Doctors are alarmed at the rising number of cases of tuberculosis (TB).
> TB is caused by microbes called bacteria. When people carrying the TB bacteria cough or sneeze, the TB bacteria get into the air. Other people may then breathe them in.

(a) Which organs will be infected first when someone breathes in the TB bacteria?

_____

(1)

(b) Explain how the TB bacteria inside the body may cause disease.

_____

_____

(2)

(c) Name **one other** group of microbes that often causes disease.

_____

(1)

(d) Suggest why people who live in overcrowded areas are more likely to catch TB than people who live in less crowded areas.

_____

_____

(1)

(e) People infected with a small number of TB bacteria often do **not** develop the disease.

Explain, as fully as you can, how the body defends itself against the TB bacteria.

_____

_____

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_____

_____

_____

(3)

(Total 8 marks)

Q16.

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Read the following passage.

> One of the deadliest diseases in history to be making a comeback in Britain. Doctors are alarmed at the rising number of cases of tuberculosis (TB) over the past three years, after decades in which it had declined.
> In the middle of the last century TB accounted for 16% of all deaths in Britain. The turning point in the fight against TB came in 1882 when Robert Koch identified the bacterium that causes the disease. In 1906 two French scientists began developing the vaccine to provide immunity against TB. The vaccine, BCG, (so-called from the initials of the two scientists) has routinely been injected into children aged 12 or 13 who are not already infected with the TB bacterium. BCG does not protect people who are already infected with TB. Recently, however, some Health Authorities have dropped their school vaccination programme.

(a) People infected with a small number of TB bacteria often do **not** develop the disease.

Explain, as fully as you can, how the body defends itself against the TB bacteria.

_____

_____

_____

_____

_____

(3)

(b) The BCG vaccine contains a mild form of the TB bacterium. A person injected with it does **not** develop the disease.

Explain, as fully as you can, how the vaccine makes the person immune to tuberculosis.

_____

_____

_____

_____

_____

(3)

(c) Explain why the BCG vaccine is **not** effective as a cure for people who already have tuberculosis.

_____

_____

_____

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_____

(2)

(Total 8 marks)

Q17.

A young child goes to school for the first time. Soon after, the child gets a cold and a sore throat.

(a) Explain, as fully as you can, what causes the child's illness.

_____

_____

_____

_____

(2)

(b) The doctor tells the child's mother that children often get ill when they start school and mix with other children.

Why is a child more likely to get an infectious illness when he or she starts school?

_____

_____

_____

_____

(1)

(c) The child gets better without taking any medicine. Explain how.

_____

_____

(1)

(Total 4 marks)

Q18.

Read the following passage.

'The immune system is the body's defence force. It protects against infections which might enter the body. The potential invaders include bacteria and viruses. The two basic defences are cells and chemicals. The best known action of defence cells is the ingesting and killing of microbes. The best known chemical defence is the antibody - a protein specially made to match with the surface of an invading microbe. Once covered with antibody, the microbe becomes easier to destroy.

So how do the invaders ever win? Part of the answer is that the chemical defenders take some time to become effective. When the body is infected for the first time by a particular microbe, there is a race between the multiplying microbes and the multiplying

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10 cells producing the antibody. Given time, the body usually wins; eventually enough antibodies are formed to overcome the invaders. But if the initial invasion force is large, or the immune system is weak, the battle may be lost.'

(a) (i) Which type of cells ingest and kill invading microbes? (lines 3 - 4)

_____

(1)

(ii) Give **two** circumstances in which the initial invasion force might be very large (lines 11 - 12).

1. _____

_____

2. _____

_____

(2)

(iii) After being ingested, the microbes are digested in the cells. Briefly explain what happens to the proteins that the microbes contain.

_____

_____

_____

_____

(2)

(b) Explain how bacteria cause disease once they get into the body.

_____

_____

_____

_____

(2)

(c) Name a type of medicine that kills bacteria inside the body.

_____

(1)

(d) People often risk first-time infection by a particular microbe while visiting other countries. People can be immunised against the disease that the microbe causes.

Explain, as fully as you can, how immunisation works.

_____

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(3)

(Total 11 marks)

Q19.

A child has a sore throat. The mother takes the child to the doctor. The doctor says that the child has a bacterial infection.

Explain how the infection makes the child ill.

_____

_____

_____

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(Total 2 marks)

Q20.

A child has a sore throat. The mother takes the child to the doctor. The doctor says that the child has a bacterial infection.

Explain how the infection makes the child ill.

_____

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(Total 2 marks)

Q21.

Read the passage about antibiotics.

People do not always agree about the use of antibiotics in food production.

If we put low doses of antibiotics in feed for animals such as cattle and sheep, it helps to produce high-quality, low-cost food. Antibiotics help to keep animals disease-free. They also help animals to grow. Animals get fatter quicker because they do not waste energy trying to overcome illness.

The use of antibiotics in livestock feed means that there is a higher risk of antibiotic-resistant bacteria developing. The rapid reproduction of bacteria means there is always a chance that a population of bacteria will develop

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which is antibiotic-resistant. These could be dangerous to human health.

(a) *To gain full marks for this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

Explain how a population of antibiotic-resistant bacteria might develop from non-resistant bacteria.

_____

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(3)

(b) Do you think that farmers should be allowed to put low doses of antibiotics in animal feed? Explain the reasons for your answer.

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(2)

(Total 5 marks)

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