1 **(a)** The World Health Organisation has promoted the concept of health.

What is meant by the term *health*?

.....

.....

.....

.....

..... **[2]**

(b) The body has adaptations that provide it with a primary defence against the entry of pathogens and parasites.

State **two** features of the body that form part of the primary defence.

For each feature, explain how it **helps to prevent the entry** of pathogens and parasites into the body.

feature 1 .....

explanation .....

.....

.....

feature 2 .....

explanation .....

.....

..... **[4]**

(c) Fig. 4.1 shows the life cycle of the threadworm. This is a common parasite in young children.

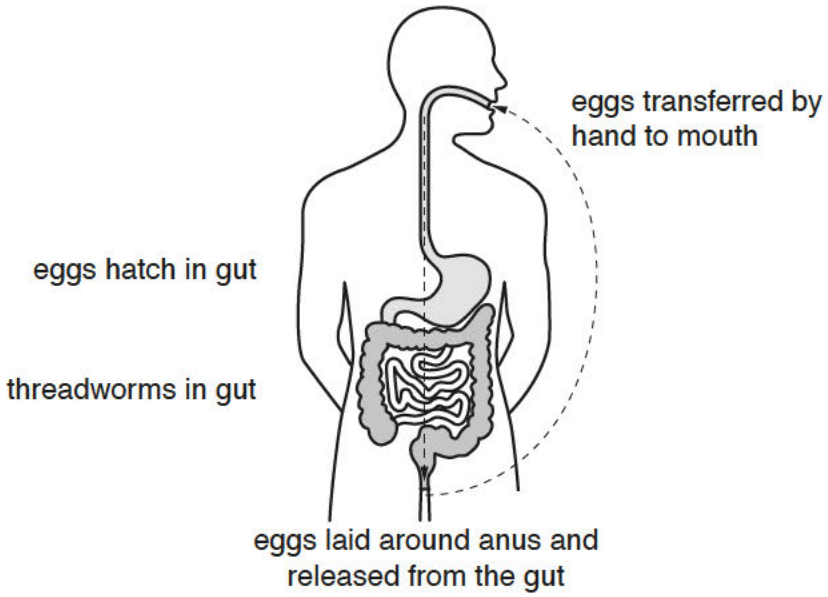


Fig. 4.1

(i) Define the term *parasite* **and** suggest how the threadworm benefits from this relationship.

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..... **[4]**

(ii) Using the information in Fig. 4.1, suggest **two** ways in which the cycle of infection could be broken.

.....

.....

.....

..... **[2]**

[Total: 12]

2 Complete the following passage by selecting the most suitable term from the list below.

Each term may be used once, more than once or not at all.

antibiotics	**natural**
antibodies	**non-specific**
antibody	**specific**
antigen	**vaccination**
artificial	**vaccines**

The body can acquire immunity in a number of different ways.

In passive immunity, ... are introduced directly into the body. This may occur via breast milk or the placenta, in which case it is described as ..... immunity. This immunity provides the growing child with valuable protection until its immune system has developed fully. It is sometimes important to provide immediate protection, such as when a person has a wound that could be contaminated with tetanus bacteria. In this case, suitable blood serum from another individual is injected into the bloodstream to provide ..... immunity.

Edward Jenner pioneered the technique of stimulating the immune system into action so that the body develops immunity without developing the symptoms of the disease. Jenner's technique mimics the way in which the body would develop ..... immunity from direct contact with the pathogen and the stimulation of the primary response. Nowadays, a harmless form of the ..... is injected so that the body develops antibodies and memory cells for future defence. This technique is known as ..... . **[6]**

[Total: 6]

3 **(a)** In Scotland, in 2007, there was a major food poisoning outbreak that killed three people.

Suggest **one** group in the population that is more likely to die from food poisoning **and** give a reason for your suggestion.

group .....

reason .....

..... **[2]**

(b) The food poisoning outbreak involved the bacterium *Escherichia coli* 0157 (*E. coli* 0157) which had been responsible for contaminating meat products. The meat had been stored at 11 °C rather than the recommended 5 °C and this led to meat spoilage.

(i) Explain how bacteria cause food spoilage.

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..... **[3]**

(ii) Food normally spoils much faster if stored at temperatures higher than 5 °C.

Explain why food spoils faster at higher temperatures.

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..... **[3]**

(iii) Food can be preserved by keeping it at low temperature in a refrigerator or freezer.

Name **two other** methods of food preservation and state how each method works.

method .....

.....

how the method works .....

.....

.....

method .....

.....

how the method works .....

.....

..... **[4]**

(c) Microorganisms, such as the fungus *Fusarium*, can be grown and then purified to produce mycoprotein. This mycoprotein can be used as a food source for humans.

Table 3.1 compares mycoprotein with beef.

Table 3.1

food	content per 100g					
	energy (kJ)	protein (g)	carbohydrate (g)	total fat (g)	saturated fat (g)	iron (mg)
mycoprotein	357	12	9	2.9	0.6	0.1
beef	1163	26	0	18.2	7.0	2.6

Use the data in Table 3.1 to **describe and explain** the advantages and disadvantages of using microorganisms to produce food for human consumption.

In your answer you should make comparisons using the information in Table 3.1.

advantages .....

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.....

.....

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.....

.....

disadvantages .....

.....

.....

.....

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..... **[8]**

[Total: 20]

4 **(a)** Smoking increases the risk of lung infections.

(i) Explain how the mucus and the cilia in the air passages reduce the chance of developing lung infections.

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..... **[2]**

In an individual with bronchitis, the mucus contains a large number of pathogenic bacteria. Phagocytic white blood cells destroy the bacteria.

Fig. 5.1 shows the sequence of events that results in the destruction of a bacterium.

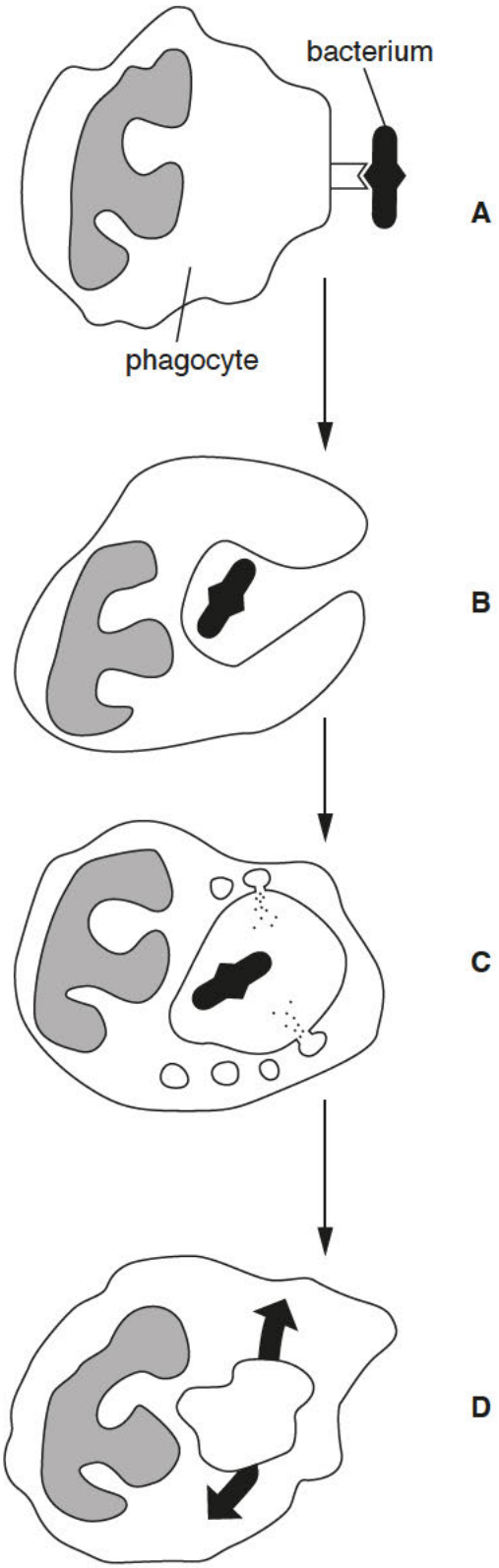


Fig. 5.1

(ii) Describe the events taking place at stages **A**, **B**, **C** and **D**, in sequence.

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..... **[6]**

(b) The immune system will produce specific antibodies in response to infection.

(i) Name the type of cell that produces antibodies.

..... **[1]**

(ii) Describe how the structure of an antibody molecule is related to its function.



In your answer you must clearly link structure and function.

.....

.....

.....

(iii) Identify the type of immunity provided by antibodies in breast milk.

Place a tick (✓) in the correct box.

type of immunity	
artificial active	
artificial passive	
natural active	
natural passive	

[1]

[Total: 17]