

Communicable diseases, disease prevention & the immune system

Question Paper 2

Level	A Level
Subject	Biology
Exam Board	OCR
Module	Biodiversity, evolution & disease
Topic	Communicable diseases, disease prevention & the immune system
Booklet	Question Paper 2

Time allowed: 41 minutes

Score: /30

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E
>69%	56%	50%	42%	34%	26%

Question 1

Influenza (flu) is a disease that affects millions of people worldwide. Many vulnerable people receive vaccinations against flu each year.

- (a) A flu vaccination consists of a suspension of antigenic material from the flu virus, which is then injected into patients.

Tick the box that best describes the type of immunity provided by the flu vaccination.

active and natural	<input type="checkbox"/>
active and artificial	<input type="checkbox"/>
passive and natural	<input type="checkbox"/>
passive and artificial	<input type="checkbox"/>

[1]

- (b) Fig. 2.1 represents an influenza virus. Various protein antigens are attached to the outer surface of the virus.

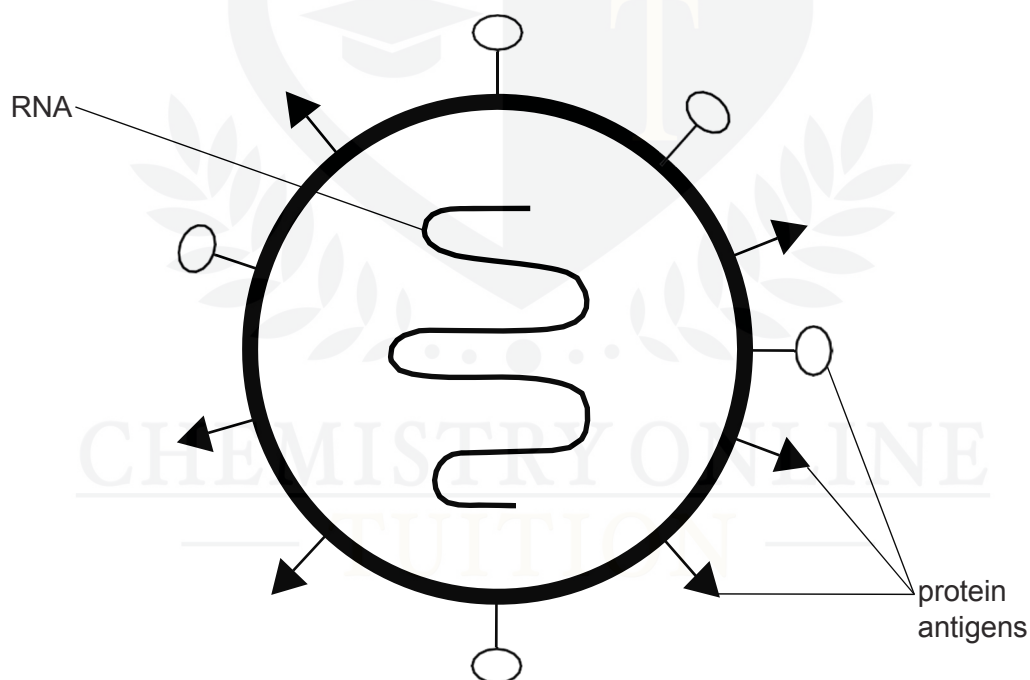


Fig. 2.1

When a virus infects a human host, it causes the host's cells to produce many new copies of the virus.

- (i) The flu vaccination must be given each year because there are frequent mutations in the RNA of the virus.

The antigens on the surface of the virus are made of protein.

The virus uses the organelles and enzymes in the host's cells to produce new copies of itself.

Suggest the role of the viral RNA in the production of viral proteins. [2]

- (ii) Explain why a mutation in the viral RNA leads to a change in the 3-D shape of the protein antigens. [3]

- (iii) The head teacher of a school decided to offer teachers free flu vaccinations every year.

Suggest why the head teacher thought this would be a good use of the school's money.

[1]

- (c) Compare the primary and secondary immune response by filling in the table below.

	Primary response	Secondary response
Relative concentration of antibodies produced		
Relative duration of response		

[2]

- (d) Name **two different** types of T-lymphocytes **and** describe their roles in the immune response.

[2]

[Total: 11]

Question 2

Antibodies are important biological molecules.

- (a) Describe how the structure of antibodies allows them to perform their function.



In your answer you should clearly link structure to function.

[7]

- (b) Antibodies can defend the body against pathogens in a number of ways.

Outline the mode of action of antibodies in defending the body against pathogens by describing the processes of **neutralisation** and **agglutination**.

[4]

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[Total: 11]

Question 3

Vaccination can provide immunity to disease.

(a) Complete the following passage by using the most appropriate term from the list.

active antigen(s) double-helix membrane(s) memory
mutation passive phagocytic receptor(s)
species specific strand strain white blood

Some vaccines contain a dead or weakened form of a pathogen. The
on the cell surface of the pathogen are still able to trigger the production of
..... antibodies in the person being vaccinated. Cells called
..... cells are also produced, which retain the ability to divide and produce
the antibodies quickly, should the pathogen return.

A new of pathogen can arise if there is a in the
DNA of the pathogen. If this happens, the original vaccine is not likely to be effective. **[5]**

(b) The term *immunity* is often used when describing how vaccines work.

In a piece of school homework a student wrote:

"Bacteria can evolve quickly and many are now immune to antibiotics."

Explain why the student's use of the word 'immune' was incorrect. **[3]**

[Total: 8]