

Immunity

Question Paper 1

Level	International A Level
Subject	Biology
Exam Board	CIE
Topic	Immunity
Sub Topic	
Booklet	Multiple Choice
Paper Type	Question Paper 1

Time Allowed : 48 minutes

Score : / 40

Percentage : /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	'77.5%	70%	62.5%	57.5%	45%	<45%

1 Which row is correct for malaria?

	nature of disease	method of transmission	pathogen
A	infectious	insect vector	species of <i>Plasmodium</i>
B	infectious	water- borne	species of <i>Vibrio</i>
C	non-infectious	insect vector	species of <i>Plasmodium</i>
D	non-infectious	water-borne	species of <i>Vibrio</i>

2 Which row is correct for cholera?

	nature of disease	method of transmission	causative agent (pathogen)
A	infectious	insect vector	species of <i>Plasmodium</i>
B	infectious	water- borne	species of <i>Vibrio</i>
C	non-infectious	insect vector	species of <i>Plasmodium</i>
D	non-infectious	water - borne	species of <i>Vibrio</i>

3 The synthesis of specific antibodies in response to vaccination is an example of which type of immunity?

	natural	artificial
active	A	B
passive	C	D

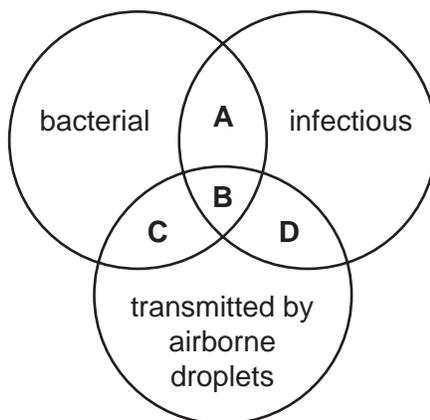
4 A person breathes in small particles from a very dusty environment.

What effect will this have on B-lymphocytes and goblet cells?

	B-lymphocy	goblet cells
A	less active	more active
B	less active	no change
C	more active	more active
D	no change	less active

5 The diagram shows properties of diseases.

What shows the properties that are common to **both** tuberculosis (TB) and measles?



6 Strains of *Mycobacterium* have been found that are:

- multiple drug-resistant (MDR) – resistant to the drugs most commonly used to control tuberculosis (TB)
- extensively drug-resistant (XDR) – resistant to the drugs most commonly used to control TB and to some of the drugs less commonly used to control TB
- totally drug-resistant (TDR) – resistant to all known drugs used to control TB.

Comparisons of some of these strains of *Mycobacterium* found differences in the thickness of their cell walls, as shown in the table.

<i>Mycobacterium</i>	thickness of cell wall / nm
non-resistant	15
MDR	17
TDR	20

What conclusions may be drawn from this information?

- A Bacteria secrete thicker cell walls when in contact with a mixture of drugs.
- B The cell walls of TDR bacteria are impermeable to drugs.
- C Thicker cell walls may form a physical barrier to drugs.
- D XDR bacteria have cell walls between 17 and 20 nm thick.

- 7 The first column in the table contains statements about disease. Columns headed 1-4 represent four different named diseases.

statement about disease	disease			
	1	2	3	4
infectious disease		✓	✓	✓
can be treated with antibiotics			✓	
caused by a bacterium			✓	
degeneration of lung tissue	✓			

key
✓ = true

Which is the correct set of column headings for the diseases in the table?

	disease			
	1	2	3	4
A	bronchitis	measles	malaria	smallpox
B	emphysema	malaria	HIV/AIDS	chloera
C	emphysema	mphysema	cholera	HIV/AIDS
D	lung cancer	smallpox	HIV/AIDS	chloera

- 8 Which type of immunity occurs as a result of the ingestion of antibodies by an infant through its mother's milk?

	artificial	natural
active	A	B
passive	C	D

- 9 The malarial parasite, *Plasmodium*, infects red blood cells and breaks down haemoglobin. Free haem groups are toxic to *Plasmodium* and the parasite converts them into non-toxic, crystalline haematozoin, using an enzyme, HDP, which is found in all species of *Plasmodium*.

What will be the long term result of giving patients with malaria a drug which inhibits HDP?

- A** a decreased concentration of free haem groups in infected red blood cells
- B** a decreased concentration of haemoglobin in infected red blood cells
- C** more rapid reproduction of some species of *Plasmodium* in infected red blood cells
- D** slower reproduction of all species of *Plasmodium* in infected red blood cells

- 10 During a primary immune response, the following events occur.

- 1 Some B-lymphocytes form plasma cells.
- 2 B-lymphocytes with the specific cell surface receptors divide repeatedly by mitosis.
- 3 Specific antibody is produced.
- 4 T-helper cells secrete cytokines.
- 5 T-helper cells identify a specific antigen.

In which order will the events occur?

- A** 2 → 1 → 4 → 3 → 5
- B** 2 → 4 → 3 → 1 → 5
- C** 5 → 4 → 2 → 1 → 3
- D** 5 → 4 → 3 → 1 → 2

- 11 Which statement concerning the defence in the body against infectious disease is **not** correct?
- A Antibodies against specific antigens are produced by plasma cells in passive immunity, but the protection is short-lived as no memory cells are produced.
 - B A specific immune response involves activation of B-lymphocytes and T-lymphocytes following recognition of, and binding to, a specific antigen.
 - C Following invasion by microorganisms, natural active immunity can be gained by initiating an immune response.
 - D Lysosomes fuse with vacuoles that have been formed by phagocytes and which contain invading microorganisms.
- 12 An antiserum to a snake toxin can be obtained by injecting the toxin into a horse. The antiserum is made from blood plasma taken from the horse a few weeks later. The antiserum is injected into a person who has been bitten by the same species of snake.

Which type of immunity occurs as a result of using this antiserum?

- A artificial active
 - B artificial passive
 - C natural active
 - D natural passive
- 13 Which factors may increase the risk of cholera in refugee camps?

- 1 no refrigeration of food
- 2 increase in the number of people
- 3 lack of hand washing facilities

- A 1, 2 B 1 and 2 only C 1 and 3 only D 2 and 3 only

- 14 Which development in vaccine production would be most important in the fight to eradicate measles in **developing** countries?
- A a combined vaccine to combat it and other diseases
 - B a single vaccine, without the need for boosters
 - C a vaccine containing only live measles viruses
 - D a vaccine produced by genetic engineering techniques

15 What could cause an outbreak of malaria in a country where it had been eliminated?

- 1 mosquitoes became resistant to insecticides
- 2 migration of population due to war
- 3 malarial parasites became resistant to quinine

A 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2 and 3

16 Which of the following increases the risk of contracting cholera?

- 1 drinking unpasteurised milk
- 2 eating shellfish which have fed on raw sewage
- 3 living in overcrowded conditions

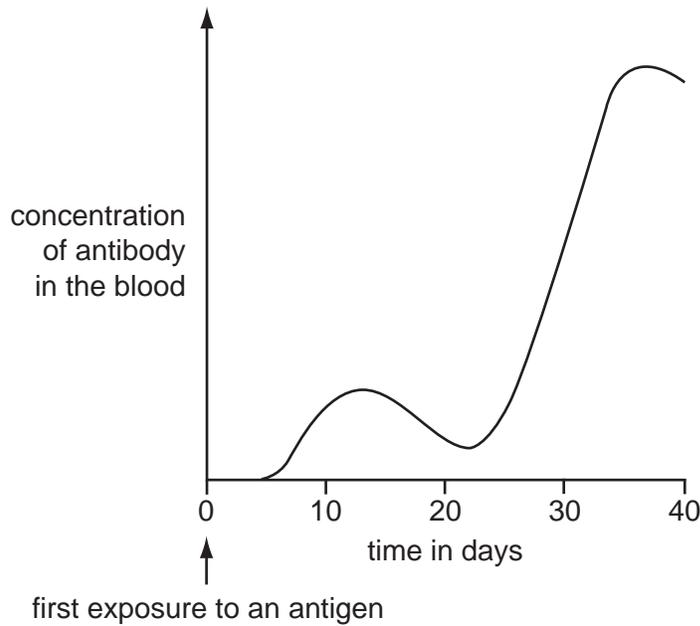
A 2 only
B 1 and 2
C 1 and 3
D 2 and 3

17 Antibodies can act in a number of ways to protect the body from pathogenic bacteria.

Which event will **not** occur following antigen-antibody binding?

- A** agglutination of bacteria to reduce their spread
- B** increased susceptibility to phagocytosis
- C** neutralisation of toxins to make them harmless
- D** secretion of histamine to produce an allergic reaction

18 The graph shows the amount of antibody produced in response to an antigen.



From the graph, which statement is correct?

- A It takes 25 days to achieve active immunity.
 - B Memory cells for this antigen are present in the body within 20 days.
 - C T-helper lymphocytes are activated on day 12.
 - D The second exposure to the antigen occurred on day 25.
- 19 Which of the following two diseases are caused by viruses?
- A HIV and cholera
 - B malaria and cholera
 - C measles and smallpox
 - D TB and HIV
- 20 Cholera is no longer common in many countries. What is the reason for this?
- A education of the citizens about the spread of the disease
 - B routine vaccination by local health authorities
 - C treatment of water supplies and separate sewage treatment
 - D treatment of water to control mosquitoes

21 Which disease is **not** likely to be passed directly from parents to child?

- A** cholera
- B** malaria
- C** sickle cell anaemia
- D** tuberculosis

22 Smallpox has been eradicated, but not malaria or cholera.

Which statements correctly explain this?

- 1 Cholera bacteria in the intestines are not destroyed by antibiotics.
- 2 Plasmodium antigens change during the life cycle.
- 3 Smallpox antigens remain stable.
- 4 Vaccines only work against viruses.

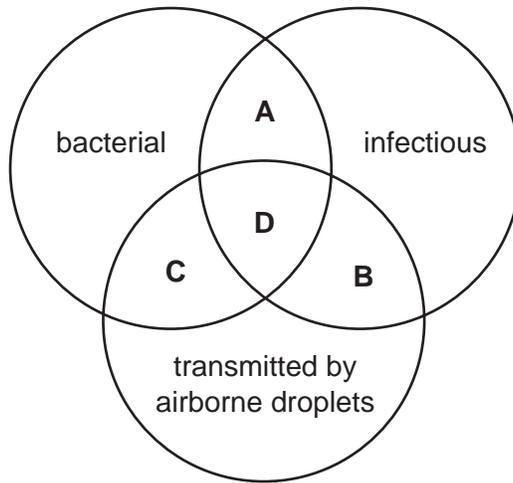
- A** 1, 2 and 3 **B** 1, 2 and 4 **C** 1, 3 and 4 **D** 2, 3 and 4

23 Which of the diseases listed in the table are only treatable using antibiotics?

	cholera	measles	TB	
A	✓	✓	✓	key ✓ = treatable x = not treatable
B	✓	x	✓	
C	✓	✓	x	
D	x	✓	✓	

24 The diagram shows properties of diseases.

Which area of the diagram shows the properties that are common to **both** cholera and tuberculosis?



25 The disease smallpox has been eradicated by a worldwide vaccination programme.

Which set of reasons correctly identifies the problems associated with planning vaccination programmes to eradicate other diseases?

	TB	malaria	sickle cell anaemia	cholera
A	invade gut cells where immune system less effective	genetically inherited recessive condition	different vaccines needed for active and dormant-to-active forms	poor response with malnourished children; boosters then required
B	different stages with different antigens; invades body cells	poor response with malnourished children; boosters then required	genetically inherited recessive condition	different vaccines needed for active and dormant-to-active forms
C	different vaccines needed for active and dormant-to-active forms	different stages with different antigens; invades body cells	genetically inherited recessive condition	invade gut cells where immune system less effective
D	genetically inherited recessive condition	different vaccines needed for active and dormant-to-active forms	invade gut cells where immune system less effective	different stages with different antigens; invades body cells

26 What are the causative agents of cholera, malaria and TB?

	cholera	malaria	TB
A	bacterium	insect	virus
B	bacterium	protocist	bacterium
C	virus	insect	virus
D	virus	protocist	bacterium

27 40 % of the world's population live in an area where malaria is a threat to health. In recent years there have been many more cases in Africa.

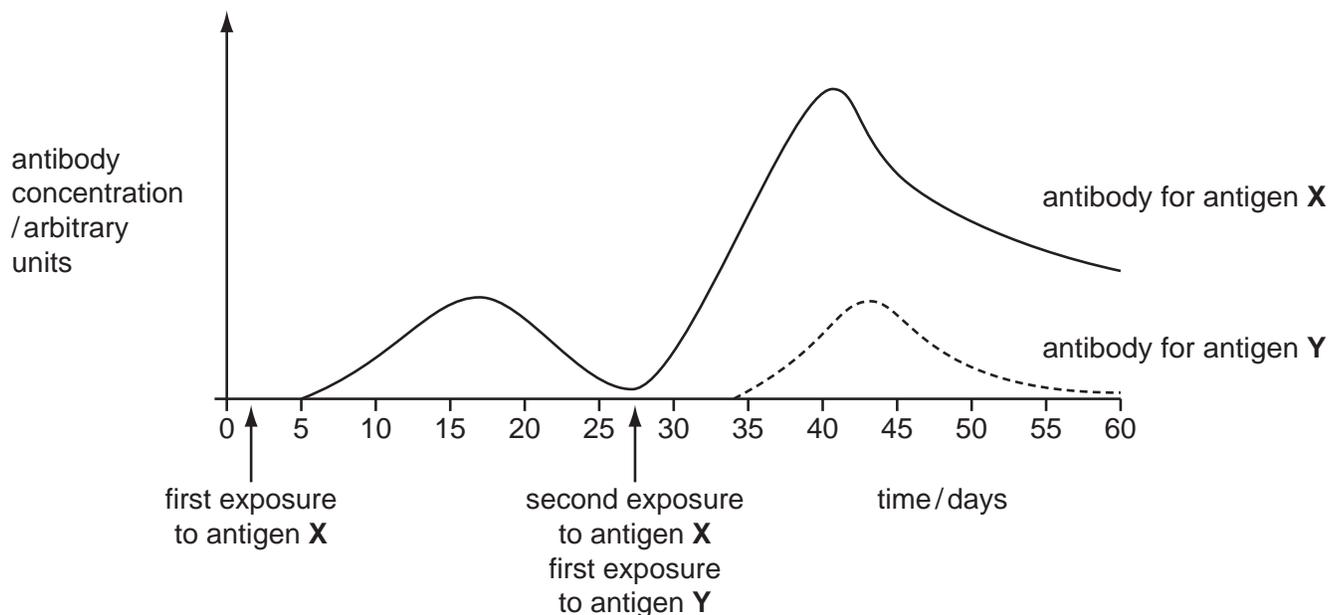
What is the social factor that is letting the spread of malaria get out of control?

- A an increase in drug resistant forms of malaria
- B climate change
- C difficulty in producing a vaccine
- D migration of people because of wars

- 28 In an investigation into the immune response, a volunteer was exposed to two different antigens, **X** and **Y**.

The relative antibody concentration in the blood was measured at regular intervals over 60 days.

The graph shows the time when the volunteer was exposed to each antigen and the antibody concentration against time for antigens **X** and **Y**.



What is the explanation for the results displayed on the graph?

- A** A primary and secondary immune response against antigen **X** occurred, with the memory B-lymphocytes inhibiting the secondary immune response against antigen **Y**.
- B** A primary immune response to antigen **Y** occurred and memory B-lymphocytes specific to antigen **Y** enhanced the secondary immune response to antigen **X**.
- C** Memory B-lymphocytes specific to antigen **X** enabled a secondary immune response to occur; different B-lymphocytes were activated for a primary immune response for antigen **Y**.
- D** Plasma cells remaining from the first exposure to antigen **X** undergo rapid clonal selection to produce high levels of antibody against antigen **X** and lower levels of antibody against antigen **Y**.

29 Four ways of being immune are

- 1 having memory cells after an infection
- 2 having memory cells after being injected with dead bacteria
- 3 being injected with antibodies
- 4 receiving antibodies from breast milk

Which row in the table correctly shows the types of immunity?

	natural active	artificial active	natural passive	artificial passive
A	1	2	3	4
B	1	2	4	3
C	2	1	3	4
D	2	1	4	3

30 A graft of tissue, such as skin, from a different person is usually rejected by the body.

Which statement about graft rejection is correct?

- A** The graft is rejected by T-lymphocytes because they circulate in the blood and can gather at the graft site.
- B** The graft is rejected by B-lymphocytes because they make and release antibodies which react with the surface antigens on the graft cells.
- C** The graft is rejected by B-lymphocytes because T-lymphocytes are not stimulated to produce antibodies.
- D** The graft is rejected by T-lymphocytes because the graft tissue causes T-lymphocytes to release antibodies.

- 31 Which statement about both B- and T-lymphocytes is correct?
- A They become active only when a specific antibody binds to their surface receptor.
 - B They divide to form clones when meeting an antitoxin in a cell.
 - C They produce memory cells to respond to an antigen when exposed in the future.
 - D They release hormone-like cytokines which stimulate release of antibodies.
- 32 Which disease is treated with drugs that have a similar molecular structure to DNA nucleotides?
- A cholera
 - B HIV/AIDS
 - C malaria
 - D tuberculosis (TB)
- 33 Which factors would help prevent which disease?
- 1 covering water containers
 - 2 disinfecting and chlorinating water
 - 3 use of antiviral drugs
 - 4 vaccination

	cholera	malaria	tuberculosis (TB)
A	2	1	4
B	1 and 2	2	3
C	4	2	3
D	3	1 and 2	4

34 Which future development in vaccine production is most important in the fight to eradicate measles in **developing** countries?

- A a combined vaccine to combat it and other diseases
- B a single vaccine, without the need for boosters
- C a vaccine containing only live measles viruses
- D a vaccine produced by genetic engineering techniques

35 The following statements describe some of the stages in phagocytosis.

- 1 Bacteria become surrounded in a phagocytic vacuole.
- 2 Bacteria release chemicals that attract neutrophils.
- 3 Lysosomes fuse with the phagocytic vacuole.
- 4 Receptor proteins on the neutrophil bind to the bacteria.

Which order defines the correct sequence for phagocytosis?

				
A	3	2	4	1
B	2	4	1	3
C	4	1	3	2
D	1	3	2	4

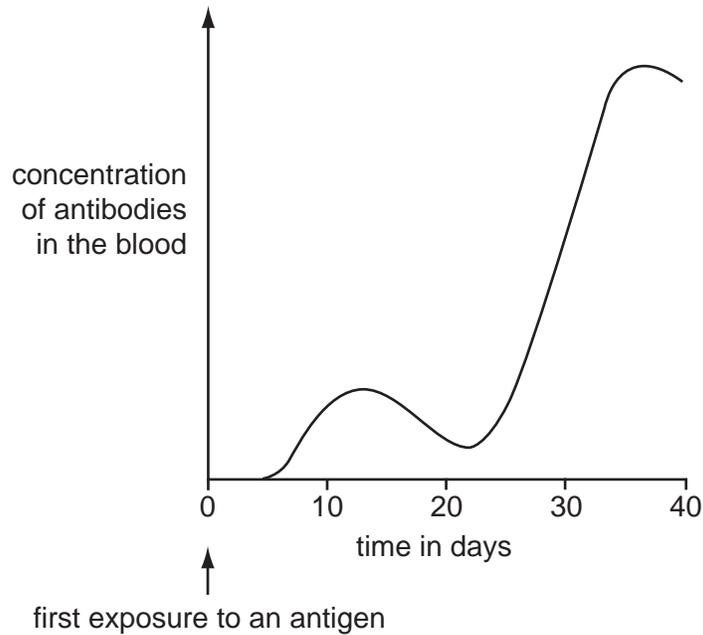
36 What causes the measles vaccine to be less effective in children from less economically developed countries?

- A Their diet does not contain enough carbohydrate.
- B Their diet does not contain enough protein.
- C They are carriers of the disease.
- D They rapidly become reinfected.

37 What is the function of the plasma cells during an immune response?

- A to secrete antibodies
- B to engulf bacteria
- C to kill cells infected with viruses
- D to change into memory cells

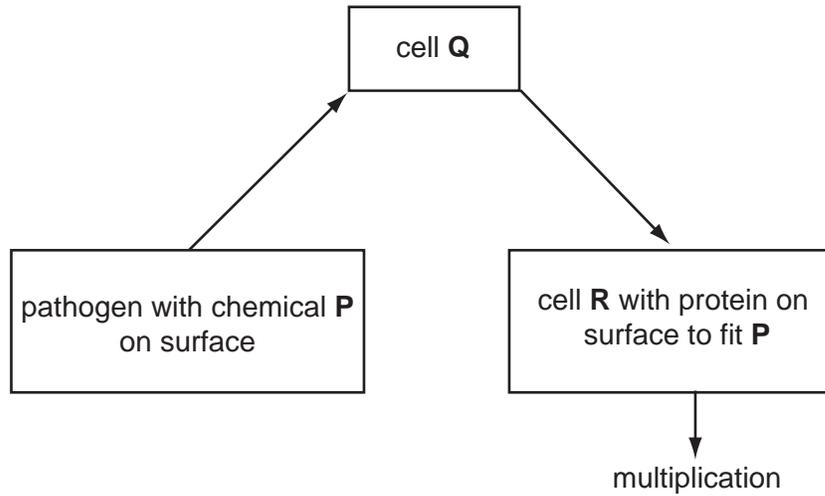
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- A It takes 25 days to achieve active immunity.
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- C T helper cells are activated on day 12.
- D The second exposure to the antigen occurred on day 25.

39 The diagram shows part of the immune response.



What are **P**, **Q** and **R**?

	P	Q	R
A	antibody	phagocyte	T helper cell
B	antigen	T helper cell	B-lymphocy
C	antibody	T helper cell	phagocyte
D	antigen	B-lymphocy	T helper cell

40 New-born babies have natural passive immunity.

Why is this only temporary?

- A** No memory cells are produced in the baby.
- B** The antibodies are insufficient in number.
- C** The antibodies only act in the mother.
- D** The immunity is not inherited.