

Immunity

Question Paper

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

Time Allowed : 40 minutes

Score : / 33

Percentage : /100

Grade Boundaries:

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

- 1 During an outbreak of a very infectious disease, vulnerable people need immediate protection.

Which type of immunity would be given to these people?

| | natural | artificial |
|---------|----------|------------|
| active | A | B |
| passive | C | D |

- 2 Which cells become memory cells in the immune response?

- 1 B-lymphocytes
- 2 T-lymphocytes
- 3 phagocytes

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

- 3 Which soil would have the smallest number of denitrifying bacteria?

- A** compressed agricultural soil
- B** poorly drained forest soil
- C** water-logged clay soil
- D** well-aerated garden soil

- 4 Which action is taken by a B-lymphocyte activated by an antigen?

- A** It attaches to the infected cell displaying the antigen and destroys it.
- B** It divides repeatedly to form a clone of genetically identical plasma cells.
- C** It engulfs the infected body cell which displays the antigen.
- D** It secretes cytokines which stimulate T-lymphocytes to produce plasma cells.

- 5 What describes natural passive immunity?

- A** protection against a pathogen by an injection of antibodies
- B** protection against a pathogen by drinking colostrum containing antibodies
- C** stimulation of lymphocytes by antigens contained in a vaccine
- D** stimulation of lymphocytes by antigens on the surface of invading pathogens

6 What happens when people are injected with dead bacteria?

- A B-lymphocytes produce antibodies.
- B B-lymphocytes produce antigens.
- C T-lymphocytes produce antibodies.
- D T-lymphocytes produce antigens.

7 The following events occur when a phagocyte responds to the presence of a pathogen.

- 1 endocytosis
- 2 enzymic digestion
- 3 exocytosis
- 4 phagocytosis
- 5 vacuole formation

Which is the correct sequence of events?

| | first | → | | last |
|----------|-------|---|---|------|
| A | 1 | 5 | 2 | 3 |
| B | 3 | 2 | 5 | 1 |
| C | 4 | 2 | 5 | 3 |
| D | 4 | 5 | 2 | 1 |

8 One type of antigen is formed by a reaction between two different molecules.

Apart from oxygen, which other elements are found in this antigen?

- A carbon and hydrogen only
- B hydrogen and nitrogen only
- C carbon, nitrogen and phosphorus
- D carbon, hydrogen, nitrogen and sulfur

9 Which is **not** a correct statement about phagocytes?

- A They are white blood cells with a lobed nucleus.
- B They have many lysosomes containing hydrolytic enzymes.
- C They have many mitochondria to produce ATP for endocytosis.
- D They provide specific defence against disease-causing organisms.

10 What are antigens?

- A non-self macromolecules found only on bacteria that trigger the formation of antibodies
- B non-self macromolecules that trigger an immune response
- C proteins that consist of two light and two heavy polypeptide chains
- D self macromolecules embedded in B-lymphocyte cell membranes

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

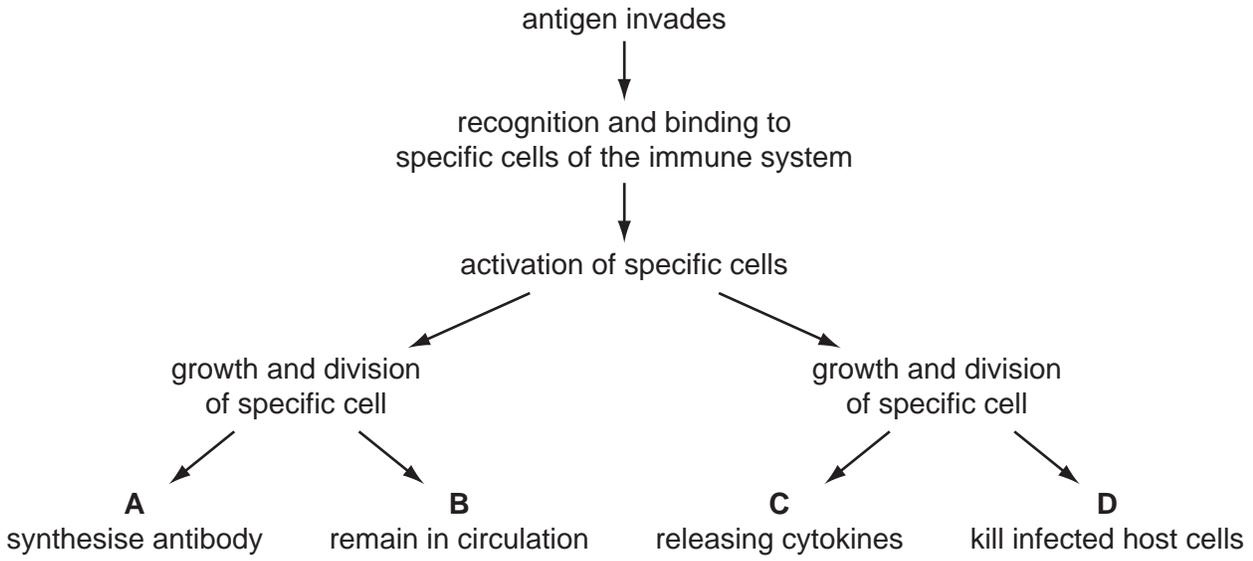
12 Which statement about both B-lymphocytes and T-lymphocytes is correct?

- 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.

13 Which cells become memory cells in the immune response?

- 1 B-lymphocytes
 - 2 T-lymphocytes
 - 3 phagocytes
- A** 1 only
 - B** 2 only
 - C** 1 and 2 only
 - D** 1, 2 and 3

14 Which describes a T-helper lymphocyte?



15 To prevent a disease, dead bacteria may be injected into the body.

What type of immune response is produced?

| | passive | artificial |
|----------|---------|------------|
| A | no | no |
| B | no | yes |
| C | yes | no |
| D | yes | yes |

16 What is a difference between T-lymphocytes and B-lymphocytes in the immune system?

| | T-lymphocy | B-lymphocyt |
|----------|--|--|
| A | do not form plasma cells | form plasma cells which secrete antibodies into the blood stream |
| B | do not stimulate macrophages to carry out phagocytosis | stimulate macrophages to carry out phagocytosis |
| C | formed from cells in the thymus | formed from bone marrow cells |
| D | produce memory cells | do not produce memory cells |

17 A person inhales minute particles from a very dusty environment.

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

| | B-lymphocy | goblet cells |
|----------|-------------|--------------|
| A | less active | less active |
| B | less active | more active |
| C | more active | less active |
| D | more active | more active |

- 18 A person's blood group is determined by antigens present on the red blood cells. Most people have antibodies in their blood plasma even if they have never received a blood transfusion. It is these antibodies in the plasma of the person who receives the blood which makes some blood transfusions unsafe.

The table shows the antigens and antibodies in the blood of people with different blood groups.

| blood group | antigens on red blood cells | antibodies in plasma |
|-------------|-----------------------------|--------------------------|
| A | A | antibod to B |
| B | B | antibod to A |
| AB | A and B | no antibodies to A and B |
| O | neither A nor B | antibodies to A and B |

Which are the blood groups of people who can safely receive blood from a person who has blood group A?

- A A and AB
 - B A and O
 - C B and O
 - D AB only
- 19 Cells which divide and give rise to macrophages are called stem cells.

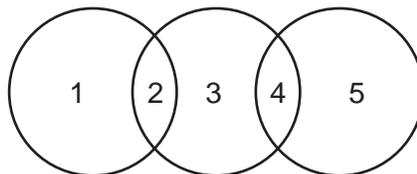
Where in the body do these stem cells divide?

- A blood plasma
 - B bone marrow
 - C lymph nodes
 - D tissue fluid
- 20 What are the function(s) of T-lymphocytes during an immune response?

- 1 destroy infected body cells
- 2 differentiate into memory cells
- 3 secrete antibodies

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

21 The diagram shows the relationship between cholera, measles and TB.



Which is correct?

| | 1 | 2 | 3 | 4 | 5 |
|----------|---------|------------|---------|------------|---------|
| A | cholera | bacteria | TB | airborne | measles |
| B | cholera | virus | measles | waterborne | TB |
| C | measles | airborne | cholera | bacteria | TB |
| D | measles | waterborne | TB | virus | cholera |

22 Which description is correct for B-lymphocytes?

| | processed in the thymus | release antibodies immediately after formation | act in the cell mediated response | can act as antigen presenting cells |
|----------|-------------------------|--|-----------------------------------|-------------------------------------|
| A | ✓ | ✓ | ✓ | x |
| B | ✓ | x | ✓ | x |
| C | x | ✓ | x | ✓ |
| D | x | x | x | ✓ |

key

✓ = correct

x = incorrect

23 What happens when people are injected with dead bacteria?

- A B-lymphocytes produce antibodies.
- B B- lymphocytes produce antigens.
- C T- lymphocytes produce antibodies.
- D T- lymphocytes produce antigens.

24 Which of the following increases the risk of contracting measles?

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

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

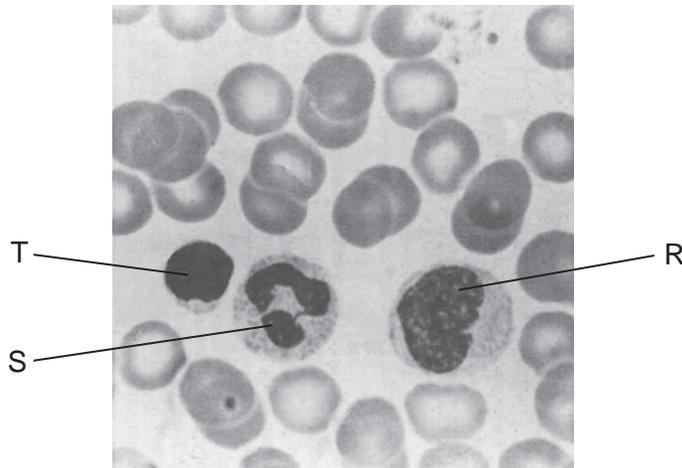
25 Which row shows the effects of chronic bronchitis?

| | T-helper cells | bronchioles | infection |
|---|----------------|-------------|-----------|
| A | destroyed | inflamed | absent |
| B | destroyed | narrowed | present |
| C | increased | stiffened | absent |
| D | increased | scarred | present |

26 Why has it proved difficult to develop an effective vaccine against malaria?

- A Mosquitoes have many stages in their life cycles.
- B The human immune system does not recognise the antigens of the parasite.
- C The parasites can only be attacked when outside the liver cells and red blood cells.
- D Vaccines are rapidly broken down by proteases in the stomach.

27 The photomicrograph shows human blood, with three types of white cell labelled.



Which row correctly identifies these white cells?

| | cell R | cell S | cell T |
|----------|------------|------------|------------|
| A | lymphocyte | lymphocyte | phagocyte |
| B | lymphocyte | phagocyte | lymphocyte |
| C | phagocyte | lymphocyte | phagocyte |
| D | phagocyte | phagocyte | lymphocyte |

28 What are produced by B-lymphocytes?

| | killer lymphocyte clones | memory cells | plasma cell clones |
|----------|--------------------------|--------------|--------------------|
| A | ✓ | ✓ | x |
| B | ✓ | x | ✓ |
| C | ✓ | ✓ | ✓ |
| D | x | ✓ | ✓ |

29 Some children are born with Severe Combined Immune Deficiency (SCID). These children do not normally have any T-lymphocytes and suffer from many diseases.

How can these children be cured?

- A** bone marrow transplantation
- B** continual use of antibiotics
- C** transfusion of antibodies
- D** vaccination against all diseases

30 Which sequence of events correctly describes the action of a phagocyte when a pathogen is encountered?

- A** endocytosis → digestion by lysosome enzymes → phagocytic vacuole formation → exocytosis
- B** endocytosis → phagocytic vacuole formation → digestion by lysosome enzymes → exocytosis
- C** exocytosis → phagocytic vacuole formation → digestion by lysosome enzymes → phagocytosis
- D** phagocytosis → digestion by lysosome enzymes → phagocytic vacuole formation → endocytosis

31 What is the difference between B and T lymphocytes in the immune system?

| | B lymphocytes | T lymphocytes |
|----------|--|--|
| A | do not produce memory cells | produce memory cells |
| B | formed from bone marrow cells | formed from cells in the thymus |
| C | form plasma cells which secrete antibodies into the blood stream | do not form plasma cells |
| D | stimulate macrophages to carry out phagocytosis | do not stimulate macrophages to carry out phagocytosis |

32 Cells which divide and give rise to lymphocytes are called stem cells.

Where in the human body do these stem cells divide?

- A** bone marrow
- B** lymph nodes
- C** spleen
- D** thymus

33 Which description is correct for B-lymphocytes?

| | made from bone marrow stem cells | processed in the thymus | release antibodies |
|----------|----------------------------------|-------------------------|--------------------|
| A | ✓ | ✓ | ✓ |
| B | ✓ | ✓ | x |
| C | ✓ | x | ✓ |
| D | x | x | ✓ |