# **GENERAL HUMAN BIOLOGY – YEAR 12 Task 10**

## Test: Vaccines, immunology, community and global health

**Part A: Multiple-choice**

|  |  |  |  |
| --- | --- | --- | --- |
| **1.** | **B** | **6.** | **A** |
| **2.** | **B** | **7.** | **C** |
| **3.** | **D** | **8.** | **D** |
| **4.** | **A** | **9.** | **D** |
| **5.** | **D** | **10.** | **D** |

**Part B: Short answer**

1. Immunity can be classed as passive or active and natural or artificial. Complete the table below, describing the different types of immunity.

|  |  |  |
| --- | --- | --- |
| **Description** | **Mark** | |
| |  |  |  | | --- | --- | --- | |  | Passive | Active | | Natural | Antibodies enter bloodstream by transfer across the placenta or through breast milk | Antibodies produced by body as a result of being infected by a pathogen | | Artificial | Antibodies are introduced into blood stream | Antibodies produced by the body as a result of an antigen being introduced by vaccination | | 1–4 |
| **Total** | **4** |

1. The effects of many diseases have been minimised in many countries due to the introduction of live attenuated vaccines. A live attenuated vaccine uses a weakened version of the disease-causing pathogen to stimulate an immune response in the vaccinated person. The MMR (measles, mumps and rubella) vaccination program attracts a lot of media attention, which highlights some of the risks and ethical considerations associated with the use of vaccines.
2. Discuss **two** benefits and **two** risks for the use of vaccines.

|  |  |
| --- | --- |
| **Description** | **Mark** |
| Benefits:   * causes an immune response to develop long-term immunity * stops an individual from contracting disease * herd immunity/if enough people vaccinated, then could stop pathogens infecting whole populations * generally only requires a single dose for immunity to develop * fewer side effects | 1–2 |
| Risks:   * mild allergic reactions to vaccine * reversion of pathogen to more virulent form * can’t be given to immune-compromised patients | 1–2 |
| **Total** | **4** |

1. Vaccines are designed to work against specific microbes and can be produced in a number of ways.

Complete the following table on the different types of vaccines.

|  |  |
| --- | --- |
| **Description** | **Mark** |
| |  |  |  |  | | --- | --- | --- | --- | | **Vaccine type** | **Description** | **Advantage** | **Disadvantage** | |  | 1 mark for one point in each category/heading | | | | Live attenuated | * consists of weakened virus or bacteria * doesn’t cause disease * stimulates an immune response | * closest to developing natural immunity * long-term immunity | * needs to be refrigerated * can revert to virulent form | | Inactivated/dead microbe | * contains either whole or parts of killed virus or bacteria | * stable and safe * easily stored and transported | * stimulates a weaker immune response * requires several doses or ‘booster’ | | 1–3  1–3 |
| **Total** | **6** |

1. “In Africa infectious diseases are the number one cause of death”. Create an argument stating why this statement is true in relation to the transmission of pathogen. (2 marks)

*Link to hygiene / sanitation 1 mark, explanation 1 mark*

*e.g.*

* Lower standards of hygiene / sanitation
* Contamination of food or water

1. Australia and the United States of America are both first world countries. The FDA (Food Drug and Administration) in America has recently told Americans that they are taking antibacterial soaps off supermarket shelves for good.
2. Parents across agree that this is a good idea. Why do you think this is? (3 marks)

*Any 3 for 1 mark each*

* Children need to be exposed to allergens (1)
* Helps build immunity (1)
* Antibacterials kill/eliminate non-harmful allergens (1)
* Causing higher incidence of allergies (1)
* Removing antibacterials help children develop proper immunity (1)
* Lowers the incidence of allergic reactions (1)

1. Do you think Australia should follow America in this case? Why/Why not? (4 marks)

*Any 4 suitable for 1 mark each. Example:*

* Hygiene Hypothesis (1)
* Exposure as child 🡪 decrease infection disease / allergies (1)
* 99% effective (1)
* Decrease in allergy rates (1)

**Part C: Extended Response**

1. Answer the following questions on the lined paper at the end of this test.
2. There is a link between the number of allergies children have and the level of hygiene in their environment. What model / hypothesis is used to explain this link? (1 mark)

* Hygiene Hypothesis (1)

1. How might the difference between the number of allergies expressed by children of the two groups be explained using information about their hygiene OR sanitation? (3 marks)

*Any three for 1 mark each*

* Hygiene:

1. Hygiene is better in Perth (1 mark) therefore children have less exposure to allergens/dirt/bacteria/viruses (1 mark) and are more likely to react later on in life to them (1 mark). This is because lack of exposure at a young age results in a hypersensitive immune system (1 mark).
2. Rural Africa has poor hygiene (1 mark), therefore they will be exposed to more allergens/dirt/bacteria/viruses (1 mark) and are less likely to react later on in life to them (1 mark). This is because exposure at a young age results in a normal immune system (1 mark).

* Sanitation:

1. Sanitation is better in Perth (1 mark) therefore children have less exposure to allergens/dirt/bacteria/viruses (1 mark) and are more likely to react later on in life to them (1 mark). This is because lack of exposure at a young age results in a hypersensitive immune system (1 mark).
2. Rural Africa has poor sanitation (1 mark), therefore they will be exposed to more allergens/dirt/bacteria/viruses (1 mark) and are less likely to react later on in life to them (1 mark). This is because exposure at a young age results in a normal immune system (1 mark).
3. Explain, using information from the table above, which group is more likely to develop a superbug and why? (3 mark)

*Any three points for 1 mark each – students must draw some comparison between the two locations and define what a superbug is.*

* Superbugs develop due to resistance to/overuse of multiple drugs (1 mark)
* Perth/Australia more likely / Africa less likely (1 mark)
* Perth/Australia has lots of medicine (1 mark)
* Perth: overuse of medicine (1 mark)
* Perth/Australia is a first work country (1 mark)
* Africa has less medicine (1 mark)
* Africa is a third world country (1 mark)
* Africa: hard to overuse medicine (1 mark)