

2001 HIGHER SCHOOL CERTIFICATE EXAMINATION
Biology

Section I – Part B (continued)

Marks

Question 22 (6 marks)

- (a) Cloning is a technique that could be used to increase numbers in an endangered species. What effect would cloning have on the genetic diversity of the species? 2

... Cloning would reduce genetic diversity of the species as cloning involves creating an organism genetically identical to another. Cloning results in a species that is genetically identical ^{so} + variation is reduced in the population.

- (b) Explain TWO possible evolutionary effects of a disease entering an endangered population containing some cloned individuals. 4

• If a disease enters a population with some cloned individuals, the cloned individuals may not carry the gene for resistance and as they are all genetically identical, they will die out. Those who aren't cloned and show genetic variation + happen to be resistant to the disease will thrive → ~~parent~~ ^{producing more offspring} who are resistant.

• If the cloned individuals are resistant, they will all survive the effects of the disease + reproduce more resistant individuals. The cloned population will thrive. The rest of the population may die out.

Marks

Question 23 (3 marks)

In twelfth-century China, people seeking protection from smallpox removed scabs from people mildly scarred from the disease. These scabs were then ground and inhaled as powder. Similarly, in the seventeenth century, an Englishwoman, Mary Montagu, injected bits of smallpox scabs into healthy children to protect them from the disease.

3

In the light of our current knowledge about the immune response, explain why these practices were successful.

These practices were successful as through giving mild disease particles to people not infected with the disease. They would stimulate the production of antibodies in the body ^{via the immune response + B cells} and thus if they became infected with the disease they would have enough antibodies ^{in memory stores} built up to fight it and thus be immune to severe effects or symptoms.

Question 24 (4 marks)

Explain the relationship between the cause and ONE symptom of ONE named non-infectious disease.

4

Minamata disease occurred in Japan when people ingested fish with high amounts of mercury in their system. ~~The~~ Mercury is a heavy metal which tends to accumulate in the brain and spinal fluid causing ~~disease~~ symptoms such as dementia because of the mercury's disruption of the brain's normal functioning. The effects and severity of ~~dementia~~ dementia in the victims was accentuated by the fact that mercury undergoes biomagnification in the ecosystem, accumulating in increasing amounts in the tissues of fish and other life in the contaminated water system.