

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 decrease genetic diversity as all cloned organisms will be genetically identical.

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

There are two possible evolutionary effects:

- If cloned individuals ^{are} not immune to disease they will all die as there is no genetic variation. This decreases the chance of the rest of population's survival leading to the extinction of the population.
- If cloned individuals are immune to disease, due to the fact that they are all genetically identical, all cloned individuals will survive and the population will continue to live for many more years.

∴ Population could become extinct or continue to live and evolve over time as they adapt to different environmental conditions.

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 acted as forms of acquired immunity which is used in vaccinations/immunisations today. Smallpox scabs would have contain small quantities of the small pox antigen which would have invoked the ^{body's} immune response when entering the body. ~~However~~ The low ~~quantity~~ ^{dosage} would not have been sufficient enough to cause the disease, but would still have caused antibodies to be produced by the B cells and stored later in memory cells for future rapid response to the disease.

Question 24 (4 marks)

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

4

Anorexia nervosa is a form of under-nutrition caused by psychological and behavioural factors. It commonly occurs in adolescent girls and a major symptom is excessive self-induced weight loss. The cause of this is under-eating, often due to the social pressures placed on girls by the media, to be slim and attractive.