

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 reduces genetic diversity of a species.
This is because clones are exact replicas of
the parent. As exact replicas, there is no genetic
differences between them, therefore reducing amount of genes
genetic diversity.

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

The cloned individuals will have the same
reaction to the disease, be it to succumb to the
disease or to be resistant. If it is injected, the
population will decrease as all clones will be infected.
If clones are resistant but others are infected,
the genetic diversity of the population would be
reduced affecting the evolution of the species.
If species is endangered, any reduction in populations may
cause further endangerment or extinction.

This may further endanger the species, reducing

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 stimulated the response of the T-cells. The memory T-cells had now recognised the small pox virus therefore when the disease was exposed to the body again the immune response was more quickly activated as T-cells had built up reserves against the disease. This process is now known as vaccination

Question 24 (4 marks)

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

4

Diabetes is a non-infectious disease. Diabetes is caused by individuals when the pancreas is unable to convert glucose to energy and produce a hormone called insulin. The symptom of extreme tiredness and lack of energy would be due to the lack of ATP / the energy produced by the pancreas due to the absence of insulin.