

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

Genetic diversity would be decreased as the clone is identical to the organism that provided it nucleus for the clone. Cloning would produce "super" organisms that could in turn wipe out other species, decreasing diversity, by "Natural Selection".

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

• If the disease was a hazard to the population then all the cloned species could be wiped out as they are identical. - leaving none of that species.

• If the disease ~~was~~ <sup>did</sup> not effect the cloned individual but effect the other species then the cloned organism would survive. But eventually the whole race would be extinct due to the clones being exactly similar. - They could not reproduce unless more clones were manufactured.

**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 were successful, as when mild parts of the pathogen were placed into the body, this gave way for an immune response. B and T lymphocytes attacked these scabs which meant memory cells were produced. These memory cells would then be able to recognise this antigen if the immunized person came into contact with it, and the chance of getting a 'full dose' is dramatically decreased.

**Question 24** (4 marks)

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

**4**

Disease - Malignant Melanoma

Cause - excessive exposure to ultraviolet radiation, either from the sun or from artificial sources such as a solarium.

Symptom - an existing mole, freckle or birthmark changes colour or shape due to the exposure to ultraviolet light.