

2001 HIGHER SCHOOL CERTIFICATE EXAMINATION

Biology

Section I - Part B (continued)

Marks

Question 25 (3 marks)

Antibiotics are drugs widely used in most industrialised societies. They are used to treat bacterial infections, are added to animal feed, and have been included in plastic products such as sandwich bags.

3

Explain TWO possible effects of this widespread use of antibiotics on the likely spread of disease in the future.

• Large use of antibiotics can cause an increase in bacteria cultures, such as in hospitals, and can spread disease further without a successful treatment.

• Could reduce the ~~amount~~ amount of disease in future if bacteria is destroyed and can't occur in animals, people; it loses its sources of survival.

*If resistant strand is evident and reproduces.*

Question 26 (3 marks)

When a body organ is transplanted from one person to another, the immune system of the recipient is triggered.

- (a) Patients who have an organ transplant are given drugs to suppress their immune response. State the reason for this.

1

The organ is classed by the body as an antigen. The body therefore makes antibodies to fight the antigen, resulting in the organ being rejected so drugs are needed.

- (b) Explain a possible consequence for the general health of organ transplant patients as a result of suppressing the immune system.

2

By suppressing the immune system the patient will be more susceptible to other illnesses. If a pathogen gets through the first two lines of defence it won't be stopped at the third line as the immune system is suppressed. So they are more vulnerable to infections, illness or disease.

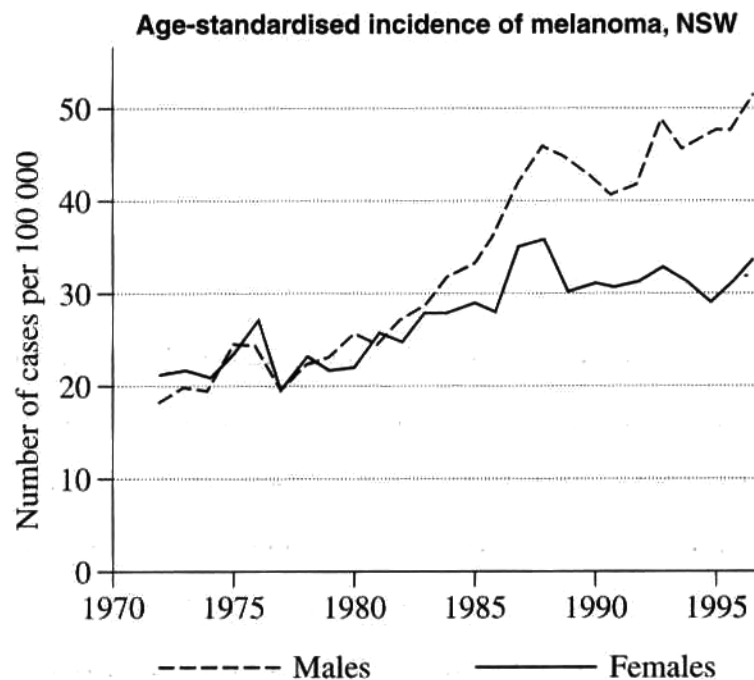
Marks

Question 27 (4 marks)

Epidemiological studies have demonstrated a relationship between ultraviolet radiation exposure and the development of melanoma, a type of skin cancer.

4

The graph shows the rate of occurrence of melanoma in males and females between 1972 and 1997.



A student studying the graph made the following statement.

'The incidence of melanoma will continue to increase beyond 1997 at a greater rate in males than in females.'

Analyse the data in the graph to assess the validity of this statement.

As observed from the graph the general trend in the incidence of melanoma from 1972 to 1997 is increasing rapidly, going from 22 to 52 in males and 18 to 34 in females. The graph also indicates that the incidence of males contracting melanoma is greater than females ie in 1997 males were 52 and females were 34 thus the trend of the graph seems to support the statement that beyond 1997 the incidence of melanoma will be greater in males than females, if the trend continues this way. although if for some reason the trend pattern alters after 1997 the statement would no longer be valid as there is no actual data from 1997 onwards to support it.

Marks

Question 28 (8 marks)

Evaluate the impact of major advances in scientific understanding and technology, in the field of genetics, on developments in reproductive technologies. 8

Over the past century, the understanding and technology related to genetics has increased enormously. At the beginning the work of Mendel was unnoticed and Darwin's theories doubted and unproven. Yet the work of Sutton, Boveri and Morgan helped identify and understand processes which contributed to genetic inheritance and chromosomes. Perhaps the most influential, however was the work of Watson, Crick, Wilkins and Franklin in identifying the structure of DNA. Without this knowledge, many subsequent technological and understanding of advances could not have occurred.

Artificial insemination, requiring fertilisation but not copulation, is used to ensure favourable characteristics are produced in offspring, which improves the capacity for selective breeding. Artificial pollination of a female stigma from another plant's pollen may create new hybrid species of plants. Cloning too is a form of selective breeding, which accurately produces desired characteristics efficiently. All of these technologies have been enabled by the foundations better understanding, scientifically of genetics.

Perhaps the most controversial advance the knowledge of chemical nature of DNA has allowed is the production of transgenic species. Where desired characteristics of a species are spliced by restriction enzymes and inserted into the DNA of another, thus allowing it to both produce and pass on the characteristic. Thus we can see that without the basis of knowledge, reproductive technologies could not have been developed.