

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.

Outbreaks of  
1) Diseases in future might be limited due to antibiotics providing an effective way of killing the disease quickly  
2) As antibiotics are used more frequently, diseases may soon grow resistant to their use eg: ~~staph~~ golden staph. Stronger doses or new antibiotics may be needed in order to control the spread of diseases.

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 host's immune system may not recognise the transplanted organ as self, instead see it as a foreign antigen that has to be eliminated, and attack the new organ.

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

2

The patient could become more susceptible to other infectious disease as the immune system may not be able to fight off pathogens that it normally would be able to eliminate.

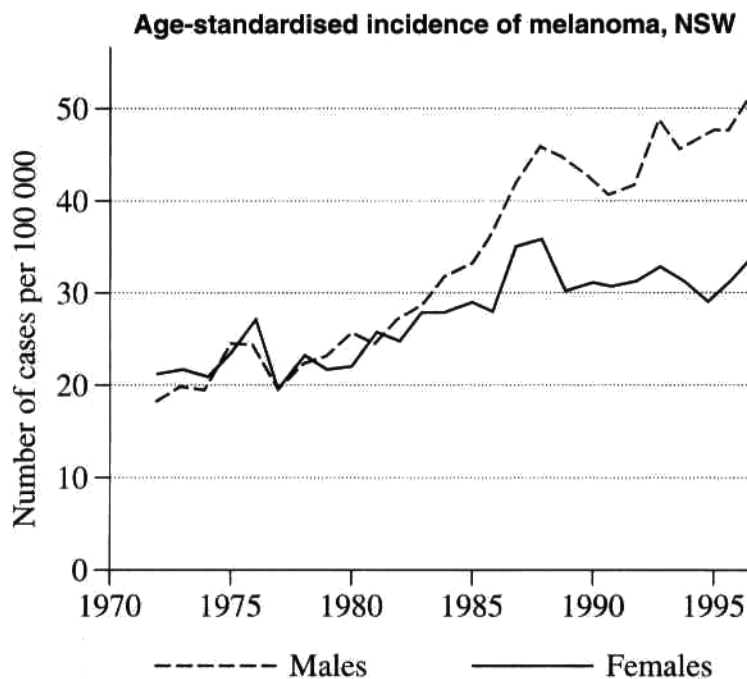
**Marks**

**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.

While the statement may appear to be valid from the data in the graph, the statement is too general to be fully justified. The data is age-standardised, ∴ only data on a specific age group has been used. Hence, it is unknown whether overall, ~~the~~ the incidence of melanoma is higher in males or females. Also, ~~the data in the graph shows~~ <sup>there are sharp peaks and troughs.</sup> the trend in the data is unpredictable. There is no general curve. Although it appears that ~~the~~ <sup>the</sup> incidence of melanoma in males is increasing at a greater rate, future data may not support this. Furthermore the data is only gathered on one state in Australia-NSW. The statement is general and does not consider location in the incidences of melanoma. Finally, the number of cases of melanoma in females and males in 1995 differ by approximately 18 cases in 100 000 - ~~is~~ <sup>is</sup> that is, 0.018% - an extremely small figure.

- Advances in science and technology (genetics)
- Reproductive technologies:
  - Artificial insemination
  - Artificial pollination
  - Cloning.

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

Advances in science on understanding and technology in genetics has dramatically increased over time. Even from Mendel's time, however, scientific understanding and technology was quite advanced as Mendel first demonstrated the process of artificial pollination when pure bred pea plants were crossed by hand by brushing stamens onto other plants after the other plants' own stamens were removed (prevent self pollination). This allowed scientists to understand that new hybrid species of plants could be evolved and developed. This lead to artificial insemination, as scientists realised that if ~~the~~ reproduction of plants could be manually or artificially achieved, ~~it~~ can ~~also~~ also be achieved in animals. This lead to the ZVF program and sperm banks where couples that could not have children could utilise artificial insemination to have a child of their own. This involves the implantation of a sperm into an egg cell outside the mother; The embryo is then inserted into the mother and the baby develops. This technology decreases or increases the proportion of some genes in the population as genes that would not have been passed onto next generation could be passed. This allowed scientists to further develop ~~the~~ technology of genetics as they could isolate and ~~preserve~~ <sup>preserve</sup> sperm cells. ~~As~~ As advances in genetics occurred, scientists realised cloning could be possible. This is the process by which genetically identical copies ~~of~~ of an animal is made by extraction of DNA into egg cells and cultured. This results in a population that is genetically identical and with no variation.