

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.

1. The use of ~~of~~ antibiotics in society in a 'widespread' degree could decrease the amount of people getting sick due to bacterial infections, and kill off many types of common bacteria.
- or 2. ~~The~~ bacteria will become more resistant to the antibiotics and as the bacteria breed ^{more} ~~it~~ will become resistant to antibiotics as the non-resistant bacteria will die, then the antibiotics will have no effect on some forms of bacteria.

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 body recognises antigens on the transplanted organ as 'non-self' and the immune system would attack the antigen and reject the organ.

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

2

This can have dangerous side effects ^{such as reducing the ability of other organs to function} and can also increase the susceptibility of the patient to other infections. Therefore, the patient is also given antibiotics.

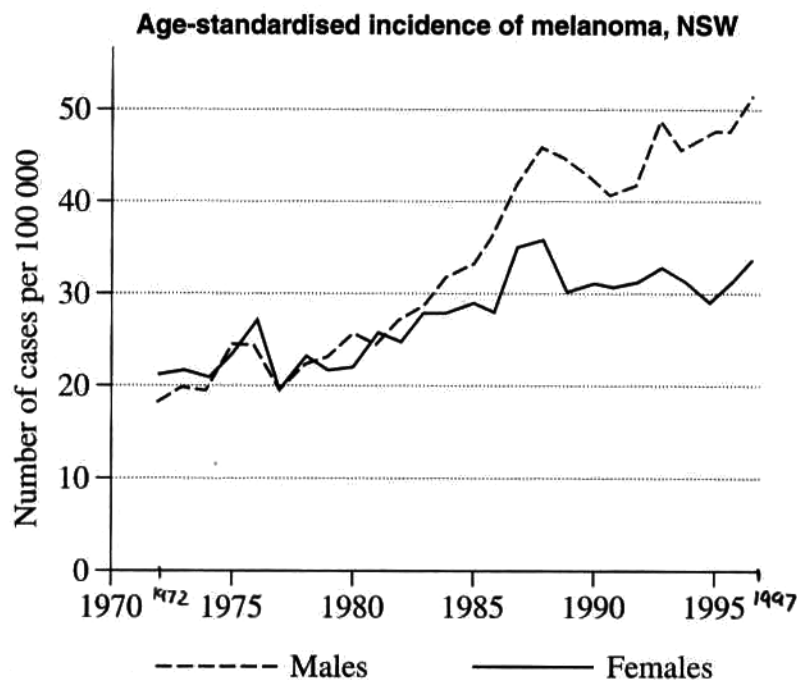
Marks

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.

The statement from the data on the graph appears to be a valid one as the number of cases although similar for both sexes till the early 1980's increasingly shows more cases of males getting the disease than women and in 1997 it appears to be on the increase again it is highly unlikely that the incidence for men will fall however whether or not it will increase at a greater rate than females may be questioned as in 1997 the females are also on the rise it may be the females rise at a greater rate, as more and more N.S.W women go out to enjoy the sun, than the male population.

DNA - cloning
artificial insemination
- sex link
- diseases
transgenic

Marks

Question 28 (8 marks)

8

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

Through major advances in the scientific field of genetics, such as the mapping of DNA and ~~the discovery of sex linkage~~, reproductive technologies have been developed, and ~~continue~~ ^{continue} to develop, in ways which benefit humans.

The use of the electron microscope and the work of scientists such as Gregor Mendel and Sutton + Boveri have allowed us to discover how meiosis ~~is reproduced~~ ^{& reproduction} occurs. ~~By identifying chromosomes~~ ^{This has allowed for} ~~& genes we are able to~~ the use of artificial insemination and pollination ~~& alter traditional~~ ^{which simulate the reproductive process of transferring pollen to stigma by hand} ~~reproductive methods~~ in order to promote favourable characteristics within species.

Hybridisation has been successfully used to produce more vigorous agriculture eg. mules, maize.

~~However~~ closer studying of genes + chromosomes ~~have~~ ^{has greatly} impacted on reproductive technology ~~by making it unnecessary to need sperm~~ ^{in cloning} ~~By isolating genes it has also~~ ^{for reproduction} ~~possible to create transgenic species eg. BT cotton, which~~ ^{possible to create transgenic species eg. BT cotton, which} would have ~~previously~~ been impossible using traditional reproductive methods.

As further knowledge of genes ~~is~~ ^{is} obtained eg. through the Human Genome project, this will impact on reproductive technologies as ~~to~~ genetic diseases may be able to be isolated and removed. However, advances in the field of genetics have raised a lot of serious moral & ethical questions, such as the implications of cloning humans and "designer babies" and the importance of traditional fathers + mothers in human relationships.

Reproductive technologies also threaten to disturb biodiversity by reducing ^{genetic} variation in species ~~and~~ and increasing the rate of evolutionary changes.

and enabling the creation of genetically identical species