

**LIBERAL STUDIES (SCIENCE, TECHNOLOGY & SOCIETY) AS-LEVEL**

8.30 am – 11.00 am (2½ hours)

This paper must be answered in English

1. This paper consists of **Section 1** and **Section 2**. Section 1 carries 75% of the module marks, and Section 2 carries 25%.
2. **Section 1** consists of three questions, *all* of which are to be answered. **Section 2** consists of four questions, of which candidates may attempt any *one*.
3. Each question is worth 25 marks : 18 marks are allocated for content and 7 marks for effective communication.
4. The maximum content marks are indicated in brackets at the end of each question and sub-question. They are a guide to the length of answer required, which may vary from one to several paragraphs.
5. Candidates are reminded that this subject emphasises the ability to present and support points of view in a clear, concise and logical manner, rather than the ability to recite facts.

## SECTION 1

Answer *all* the questions in this section.

1. Consider the following extract:

### **Biological weapon intended to kill only Arabs**

Israel is reportedly trying to identify genes that are carried only by Arabs which could be used to develop a biological weapon that would harm Arabs but not Jews.

The *Sunday Times* newspaper, citing unidentified Israeli military and Western intelligence sources, said Israeli scientists were trying to create a genetically modified bacterium or virus that only attacked people who carried certain genes.

According to the above report, researchers had pinpointed a characteristic in the genetic profile of certain Arab communities, particularly the Iraqi people. The idea of such research had provoked controversy in Israel because of parallels with Nazi genetic experiments. Officials at Britain's biological weapons research centre said that such weapons were theoretically possible.

In Israel, a senior aide to Prime Minister Netanyahu, rejected the report, saying there was no truth to it. He said such stories only proved 'that there is no limit to human naivety and also no limit to the desire to sell newspapers'.

- (a) Supposing you were the Prime Minister of Israel, would you use the threat of such a biological weapon to ensure that a lasting peace could be established? Explain your answer. (9 marks)
- (b) Supposing you were the President of Iraq, how would you protect your people against such a biological weapon? (9 marks)

2. Consider the following letter to a friend:

As all of you know, I have primary peritoneal (abdominal lining) cancer. Both this cancer and ovarian cancer are diagnosed in the same way (with the 'tumor marker' CA-125 blood test), and are treated in the same way (surgery to remove the primary tumor followed by chemotherapy).

I've always had an annual physical examination, an annual breast X-ray and cervical uterine smear, and did a monthly self-breast examination. When I had a total hysterectomy\* in 1993, I thought that I did not have to worry about getting any of the female reproductive organ cancers.

I don't have ovaries (and they were healthy when they were removed!), but I have what is essentially ovarian cancer. Strange, isn't it? These are just some of the things our doctors never tell us. One out of every 55 women will get ovarian or primary peritoneal cancer! The classic symptoms of both cancers are sudden enlargement of the abdomen and either constipation or diarrhea.

I had these classic symptoms and went to the doctor. Since these symptoms seemed to be 'abdominal', I went to a stomach and bowels specialist. He ran tests to determine whether there was a bacterial infection; these tests were negative, and I was diagnosed with Irritable Bowel Syndrome.

I guess I would have accepted this diagnosis had it not been for my enlarged abdomen. I swear to you, it looked like I was 4-5 months pregnant! I, therefore, insisted on more tests. They took an X-ray of my abdomen; it was negative. I was, again, assured that I had Irritable Bowel Syndrome and was encouraged to go on my scheduled month-long trip to Europe. I couldn't wear any of my shorts because I couldn't get them buttoned, and I knew something was radically wrong. I insisted on more tests, and they reluctantly scheduled me for a CT-Scan (just to shut me up, I think). The CT-Scan showed a lot of fluid in my abdomen. I had 2 kg of fluid drawn off at the hospital. Tests revealed cancer cells in the fluid. Finally, the doctor ran a CA-125 blood test and I was properly diagnosed.

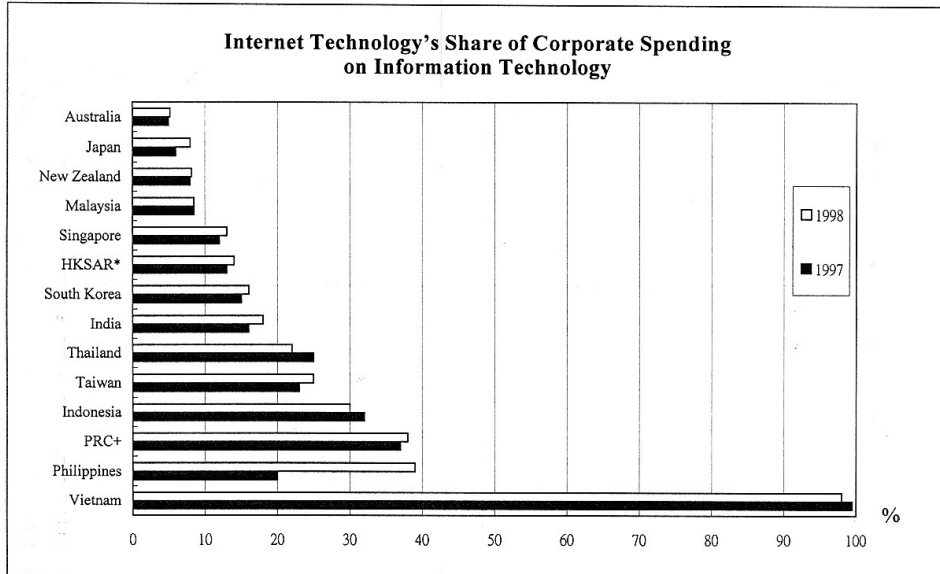
I had the classic symptoms of ovarian cancer and, yet, this simple CA-125 blood test had never been run on me – not as part of my annual physical examination and not when I had symptoms. This is a simple and inexpensive blood test!

\* total hysterectomy : removal of ovary and the womb

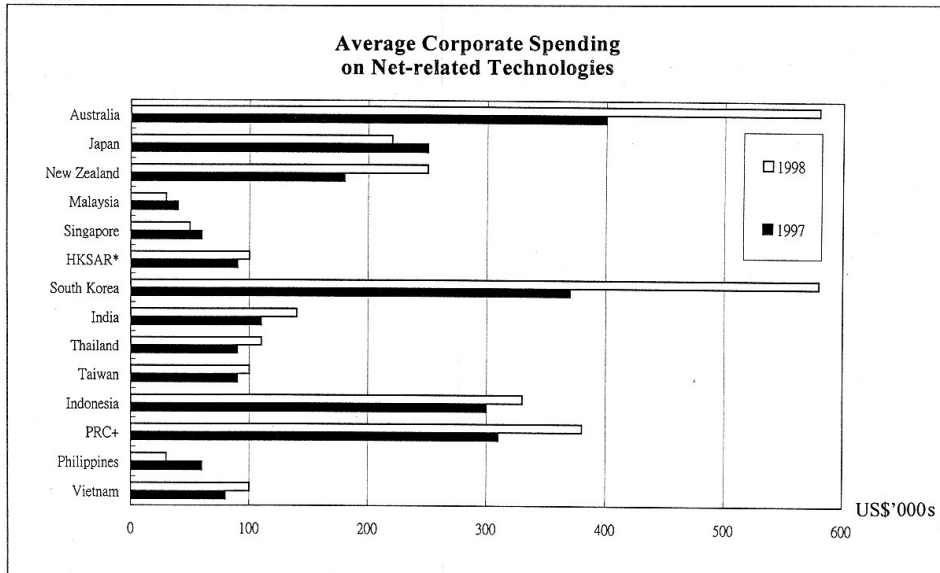
- (a) Explain what problems are revealed in the letter with respect to the patterns of behaviour of the doctors and the patient involved. (8 marks)
- (b) In the light of the above letter, discuss the role of modern technology in the diagnosis and treatment of diseases. (10 marks)

3. Sources A and B show the Asian business corporations' spending on Internet technology :

Source A



Source B



\*HKSAR : Hong Kong Special Administrative Region

\*PRC : People's Republic of China

- (a) What significant patterns are revealed by Sources A and B with regard to the spending on Internet-related technologies among different countries or regions? How would you account for these patterns? (12 marks)
- (b) Which *one* of the countries or regions shown above do you think has the greatest potential for developing advanced information technology? Explain your answer. (6 marks)

## SECTION 2

Answer *one* question from this section.

4. Consider the following extract from a local newspaper dated 7 November 1998:

### Patient's death sparks call to change donor law

The law must be amended to make it easier for an organ transplant to be carried out between two living persons, the grieving widow of terminal liver patient Fung Kwok-leung said shortly after his death.

According to Mr Fung's doctor, he would have had an 80 per cent chance of survival if he had received a transplant early this week. His wife and daughter had made a tearful appeal for a liver donation.

At least four persons, including an inmate at Stanley prison, had inquired about donating a liver to Mr Fung. However, according to the hospital, there was no firm commitment from any of the callers.

Under the Human Organ Transplant Ordinance, surgeons are required to obtain approval from the Human Organ Transplant Board before carrying out a transplant from live donors. Exemption is given only to a donor who is related to the recipient, either genetically or by marriage that has lasted for at least three years.

'It's a pity that living persons were willing to give their organs, but no one was willing to donate a liver from a dead person,' Mrs Fung said.

'People who are willing to donate an organ already know the risk and they must have considered their family responsibility,' she said. 'The government should respect their right to do so. There is a need to amend legislation in this regard.'

- (a) To what extent is the Human Organ Transplant Ordinance adequate in protecting the rights of potential donors (living or dead) and transplant patients? (9 marks)
- (b) Do you think that advanced medical technology can help to solve the problems related to organ transplants? Explain your answer. (9 marks)

5. Consider the following newspaper extract:

### **HKSAR\* aims for technology-led growth**

The Government will reform its funding schemes and technology support bodies in a bid to boost technological development and eventually utilise the advantages for economic recovery and long-term growth.

Chief Executive Tung Chee-hwa announced the establishment of an Innovation and Technology Fund (ITF) and an Applied Science and Technology Research Institute (ASTRI) in his 1998 Policy Address.

The ITF will finance projects that encourage collaboration between universities and private industry, or between the HKSAR and the mainland, and other information technology related activities, including those of the ASTRI.

The ASTRI will complement research and development (R & D) at universities by spinning off the research into commercial technology.

The ASTRI is expected to perform four functions – carry out R&D to bridge the gap between industry and academia; serve as an avenue for university graduates to receive practical training; attract R&D personnel to Hong Kong; and supply technology and human resources for the future science park.

Technology highlights from the 1998 Policy Address were:

- Establish a \$750 million Applied Science and Technology Research Fund.
- Set up a \$5 billion ITF.
- Spend \$173 million to launch Electronic Services Delivery.
- Undertake trials of digital terrestrial television services.
- Develop a centre at Chung Hom Kok for global satellite communications links.
- Consider an enterprise board for small and emerging technology companies.
- Fund projects for small businesses, for example, to overcome the Year 2000 (Y2K) problem.
- Spend \$630 million on information technology education.

\*HKSAR : Hong Kong Special Administrative Region

- (a) In the light of the above extract, explain how the proposed strategy will boost technological development in Hong Kong. (9 marks)
- (b) Discuss whether Hong Kong should develop advanced technology as a means to enhance its competitiveness and eventually bring about economic recovery and long-term growth. (9 marks)

6. The following is adapted from an article in a local newspaper dated 1 September 1998:

### **What is the highest technology?**

The benchmark of the effectiveness of computers should be how helpful they are in enhancing the efficiency of our work. Interestingly enough, despite many years of research, none has yet been able to tell us exactly how much computers have enhanced our work efficiency.

In my opinion, automated machines can replace a large amount of labour in industrial production, and it is at this level that computers can enhance efficiency. However, strictly speaking, this is mechanisation rather than information technology. The information technology we encounter in our daily lives has not only failed to reduce labour substantially, but also generated a series of new demands for administrative personnel, facilities and capital.

Computer technology should be considered to have completed its task as long as it serves well in providing information and ensuring the free flow of information. It should not be expected to save manpower. Viewed from this perspective, computer technology developed so far has merely been passable. In order to use computers, we have to spend a large amount of time attending training courses, repairing the printer and learning how to install the modem, etc. Wouldn't these efforts contribute more towards enhancing our work efficiency if they were spent on the work itself?

In the end, when it comes to using any technology, we have to answer this question : 'Why?' If we cannot see the reason for using such technology, we should not be afraid to go back to primitive means. That may possibly save the most time and effort.

In the light of the above article, discuss whether you consider that advanced technology improves or destroys our lives. (18 marks)

7. Consider Sources A and B:

**Source A**

In North America, high-tech food has met with little consumer or political resistance. However, in Europe, a controversy about genetically-modified food has flared. In Britain, where mad-cow disease has had a profound impact on attitudes towards food safety, the tabloids have blasted biotech giants and raised fears about ‘Frankenstein Food’.

**Source B**

- ‘Over the next 30 years, we have to double or treble food production per hectare to satisfy the needs of a growing global population. Genetic engineering will help us produce more, and healthier, food.’ (*President of a fast-growing agriculture company*)
- ‘Science has strayed into realms that belong to Nature!’ (*Organic farmer*)
- ‘We worry about genetic pollution – the potential for genes to migrate from hardy genetically-modified varieties to native plants, creating super weed.’ (*Green Party activist*)
- ‘France has blocked the import of genetically-modified maize varieties, and the European Union’s slow and complicated approval process annoys the United States. France’s foot-dragging will cost the United States some \$200 million in genetically-modified maize exports annually.’ (*US Agricultural Office*)
- ‘Genetic tinkering will make our agriculture cleaner and more environmentally sustainable – eliminating costly diseases and pest problems, boosting yields and substantially reducing the need for chemical treatments. Genetic techniques are much more precise than classical agricultural crossbreeding. The challenge is to make sure consumers understand that reality.’ (*Plant geneticist*)

- (a) In the light of the above sources, explain whether you agree with the view that ‘genetic engineering will help us produce more, and healthier, food’. (9 marks)
- (b) What do you think are the possible reasons why many Europeans may resist genetically-modified food? (9 marks)

**END OF PAPER**