

HONG KONG EXAMINATIONS AUTHORITY
HONG KONG ADVANCED LEVEL EXAMINATION 1995

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

9.00 am–11.30 am (2½ hours)
This paper must be answered in English

1. This paper consists of Sections 1, 2 and 3. Sections 1 and 3 both carry 25% of the module marks, and Section 2 carries 50%.
2. Candidates are required to answer ALL questions from Sections 1 and 2, and ONE question from Section 3. They are advised to spend 40 minutes on each of Sections 1 and 3, and 70 minutes on Section 2.
3. Answers to all questions should be written in the same answer book.
4. The weighting of each question is indicated in brackets. It is 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

(25% of the module marks)

Answer *all* the questions in this section.

1. Study the following table on transport in Hong Kong in 1993:

Types of vehicles/cars	Number of vehicles/cars	Number of passengers carried (thousand journeys)	Number of traffic accidents (involving casualties)
Mass Transit Railway	671	751,005	0
Kowloon-Canton Railway	351	207,855	0
Light Rail Transit	100	106,884	21
Hong Kong Tramways	163	125,708	148
Private cars	259,874	–	6,287
Public buses	4,467	1,254,190	1,456
Public light buses	4,350	368,139	886
Taxis	17,728	471,580	3,885

- (a) With reference to the above data, discuss the extent to which public transport in Hong Kong depends on modern technology. (7%)
- (b) Referring to the number of traffic accidents given in the above table, do you agree that advanced technology plays an important role in enhancing the safety of the modern transport system? Explain your answer. (6%)

2. The following is adapted from a newspaper report:

Patent row over breast cancer breakthrough

Scientists in America have announced that they have discovered the first gene involved in inherited breast cancer. They are trying to patent the rights to the gene. Mark Skolnick, the scientist leading the American team, has set up a company called Myriad Genetics to obtain commercial benefits by providing genetic screening tests for breast cancer. After years of funding by governments and charities, Mr Skolnick created the company two years ago when he realized the breakthrough was within reach.

Those opposed to the move argue that it is morally wrong to try to patent an element of human life. Legal experts say it depends on how the application to patent the gene is worded.

If the patent is secured, the American team intends to charge at least HK\$7,000 for every screening test.

Doctors believe if the information from the discovery is shared, it will provide many clues to understanding the development of breast cancer, and help to develop genetic screening tests that could be offered to all.

Members of the American team have defended their stance. Alexander Kamb, Myriad Genetics' director of research, said, 'Progress costs money.'

- (a) In the light of the above report, explain whether you think it is right to grant patents to inventors of new medical technology. (7%)
- (b) What should government do to protect the interests of researchers without impairing the interests of the public? (5%)

SECTION 2

(50% of the module marks)

Answer all the questions in this section.

3. (a) Study Figures 1, 2 and 3:

Figure 1: Number of industrial robots in operation in major industrial countries in 1985 and 1992

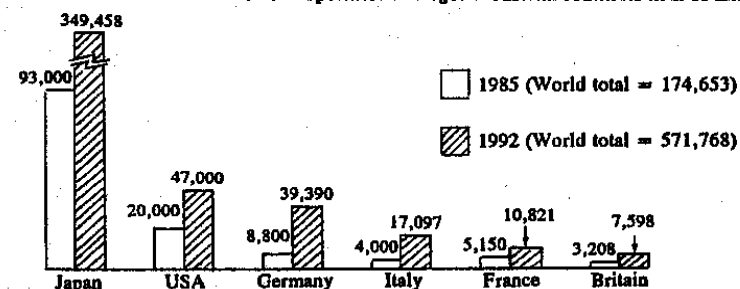


Figure 2: Wage costs in manufacturing industries in major industrial countries in 1992

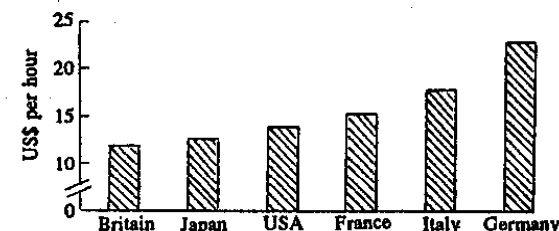


Figure 3: Unemployment rates of major industrial countries in 1985 and 1992

Countries	1985	1992
Japan	2.6%	2.2%
USA	7.1%	7.3%
Germany	9.3%	6.6%
Italy	10.3%	11.5%
France	10.2%	10.2%
Britain	11.2%	9.6%

- (i) To what extent can the data provided in Figure 2 explain the differences in the number of industrial robots in operation in the major industrial countries shown in Figure 1? Explain your answer. (6%)
- (ii) Based on the information given in Figures 1 and 3, explain whether or not you can conclude that automation is the most important factor leading to unemployment in the major industrial countries. (14%)

- (b) The following is adapted from a newspaper report on technological development in Hong Kong:

Strategy to develop HK technology

The Government's advisers on science and technological matters have proposed a major strategy to rescue Hong Kong industries from slipping behind neighbouring competitors.

It has suggested identifying key technologies for focused development and using financial incentives to stimulate private organizations to invest in technology.

While Hong Kong is still depending upon technology importation, which features the elementary stage of industrial development, Taiwan has already developed its own technology and Singapore is striving hard in the same direction.

For high-quality products, Hong Kong is being passed over by Singapore, Taiwan and South Korea. They are each making a concerted effort to go hi-tech. Hong Kong now relies on price and speedy delivery for competition, but Southeast Asian countries such as Thailand and Indonesia are catching up on these fronts.

Hong Kong is now at the bottom of the 'Four Little Dragons of Asia'* in terms of industrial technology development. South Korea, for example, has established a strong technology infrastructure with ample government support.

The bulk of Hong Kong's manufacturing sector is made up of small and medium-sized enterprises. Investment in technology carries no guaranteed return, it is understandable that they are reluctant to take the risk without some support from the Government.

Taiwan spends 1.2% of its Gross National Product** (GNP) on research and development, half of which is funded by its government. Singapore spends 0.9% of its GNP, of which its government shoulders 40%. Hong Kong spends only 0.04% of its GNP on technology research.

Singapore is actively attracting foreign technologists into the country to train locals.

Notes: * Hong Kong, Taiwan, Singapore and South Korea are regarded by some economists as the 'Four Little Dragons of Asia'.

** Gross National Product is an index used to show the total value of goods produced and services provided by a country in one year.

- (i) Explain why Hong Kong is now at the bottom among the 'Four Little Dragons of Asia' in terms of industrial technology development. (15%)
- (ii) Which one should bear greater responsibility in developing technology for Hong Kong's manufacturing industry, the government or the industrial sector? Justify your answer. (15%)

SECTION 3

[25% of the module marks]

Answer one question from this section.

4. The following is adapted from a newspaper report on a new breed of high-yielding rice plant:

New 'super rice' carries hope for well-fed future

Scientists have developed a breed of 'super rice' that they hope will feed an additional 450 million people – if it is acceptable to the palates of Asians, i.e. if it is accepted by Asians as far as its taste is concerned.

Genetic engineers have successfully bred the new rice plant, which is thicker and shorter than current varieties, but is expected to produce 25 per cent more grain per hectare. The plant could, for a time, keep back a coming food crisis in Asia.

While it is too early to judge if Asians will in fact accept the 'super rice' and adopt it as a part of their diet, the breeders are spending five more years of research on improving the taste.

'We have to deal with a doubling of the population over the next 40 years,' said Dr Klaus Lampe of the Consultative Group on International Agricultural Research. He described the 'super rice' as a very important development.

Before the new rice is ready to grow, scientists will have to make it resistant to pests and diseases by crossing it with current varieties that are particularly strong.

At present, hybrid varieties of 'super rice' are sterile. Thus researchers have to produce hybrid varieties of 'super rice' which can reproduce themselves so that farmers can use this year's seed to plant next year's crop.

But a lot of factors affect quality, including the height of a plant, temperature, and altitude.

The new breeding techniques will allow us to be optimistic that the rice in the next century will be high-yielding and of high quality.

Some people think that the above report is too optimistic. They argue that the world's food crisis cannot be solved solely by adopting advanced technology. Do you agree with their view? Explain your answer.

(25%)

5. Study these views about kidney transplants in Hong Kong:

Mr Lam (a patient with kidney failure):

'I have been waiting for five years for a kidney transplant from an accident victim. However, my doctor warned me that I still have to wait a long time since very few people are willing to donate their organs for transplantation. I think I will have to suffer from the discomfort of dialysis treatment until I die. Or what I could do is to receive a kidney transplant in China where organ sales are available even though the risk is very high.'

Dr Cheng (a doctor in a government hospital):

'At present, about 1700 kidney patients in Hong Kong require dialysis. They are on the list for transplants. Some of them might try to receive kidney transplants in China. About 55 kidney transplants are performed annually in Hong Kong. But the number performed overseas, with follow-up treatment in government hospitals in the territory, rose from 11 in 1988 to 77 in 1993. A survey conducted in 1990 indicated that the death rate of kidney transplants performed in China was four times that of those carried out in Hong Kong.'

Dr Chan (a renal specialist who refers patients to China to receive kidney transplant):

'I am not an organ broker. However, it is the responsibility of doctors to save their patients' lives. If any patient needs a kidney transplant, my job is to make sure the patient has as smooth a path as possible to getting what he wants.'

Dr So (a spokesman of the Kidney Action Group):

'The Hong Kong Government should adopt a policy allowing medical personnel to remove kidneys from accident victims for transplant unless these victims carry a card to show that they are unwilling to donate their kidneys.'

Explain your view on the organ trade and Dr So's proposal.

(25%)

6. Study the following comment on the relationship between technology and scientific activities:

The world of science wants everyone to believe that engineering and technology are led by scientific progress, i.e. both engineering and technology depend on scientific progress. But it is not true. In fact, most inventions, for example the steam engine, motor car, aeroplane, telephone and electric light were first produced by engineers and technologists; then scientists came in to find scientific explanations for how these things work. However, nuclear power is an exceptional case because scientists were the first to discover nuclear fission and then engineers and technologists joined in to develop nuclear power afterwards.

In the light of the above comment, explain whether you think technological development is dependent on scientific progress or vice versa.

(25%)

7. The following statement concerns the effect of military research on technological development:

People who support military research claim that war is a spur to the development of technology. They point to space research, aviation, nuclear energy, electronics, communication and transport as the consequence of military rivalry in peace or war.

To what extent is socially useful technology the by-product of military research and development? Give examples to justify your answer.

(25%)

END OF PAPER