

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

1.30 pm – 4.00 pm (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 carries 25 marks: 20 marks for content and 5 marks for effective communication.
4. 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 recall facts.

Not to be taken away before the
end of the examination session

SECTION 1

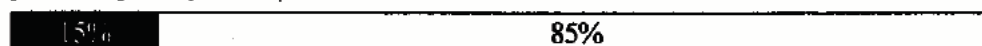
Answer *all* the questions in this section.

1. The following data show the results of a telephone survey of 935 U.S. teenagers (aged 12-17) who have ever used the Internet:

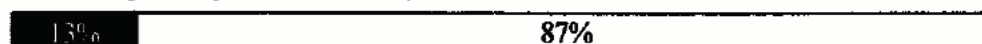
One of the questions in the survey was "Have you ever experienced any of the following situations online?".

☒ Yes ☐ No

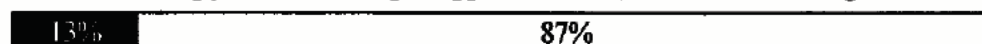
Someone forwarding a private email, MSN or a text message, sent by you, to another person or posting it where others could see it



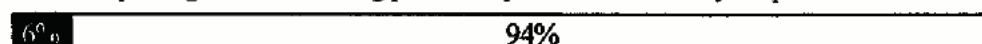
Someone spreading a rumour about you online



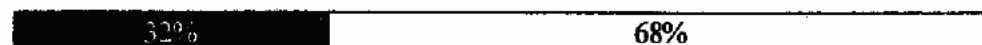
Someone sending you a threatening or aggressive email, MSN or text message



Someone posting an embarrassing picture of you online without your permission



Having experienced any one of the above four situations



- (a) What problem is suggested by the results of the survey? Explain how the presence of the Internet might have intensified this problem. (8 marks)
- (b) Suggest ways to tackle the problem you identified in (a). Elaborate on your answer. (12 marks)

2. Starting from the year 2002 a new programme has been running in Britain, aiming to bridge the gap between science and industry. It identifies future wealth-creating opportunities from science, engineering and technology and encourages closer interactions between scientists and industry. It operates with standing panels of experts, each looking at the future for a particular area of technology. The following are some of the areas which have been selected:

- Cyber-crime
- Brain science, addiction and drugs
- Detection and identification of infectious diseases
- Obesity
- The environment and sustainable energy management
- Mental health

When an area is chosen, a group of stakeholders is set up to oversee the project. Each group is composed of senior decision-makers and budget-holders from relevant government departments, research councils, industry, charities, and other professional bodies.

- (a) Suggest possible reasons why a government would choose to carry out such a programme. (12 marks)
- (b) What evidence is there that similar directions are being taken in Hong Kong? (8 marks)

3. The following is some information about new technology that the governments of some countries are considering using:

- The aim of the technology is to screen the psychological state of a person and to detect hostile intention. It can identify facial expressions, styles of walking, blood pressure, pulse and sweating rates that are characteristic of hostility or the desire to deceive.
- People betray their intentions by involuntarily revealing facial expressions known as “micro-expressions”. For example, if for a fraction of a second you expose your teeth, lower your eyebrows and wrinkle your nose, while pretending to smile, you have shown the micro-expression for disgust. The idea of the new technology is to use computers to automate the search for micro-expressions, and at the same time to detect more bodily signs.
- Remote sensors can be installed at passport controls to screen for terrorists, without impeding the flow of travellers.

- (a) Discuss the merits and demerits of using this new technology. (10 marks)
- (b) Should technology be used by governments to accuse people of crimes before they have committed them? (10 marks)

SECTION 2

Answer *one* question from this section.

4. Researchers in the U.S. have successfully brought a 38-year-old minimally conscious patient (MCP)* back to consciousness by implanting an electrode[#] into the patient's brain to stimulate cells responsible for consciousness. The patient lost consciousness for 6 years after a traumatic brain injury, but he can now name objects, eat and perform simple movements.

Researchers said that the treatment may help this kind of patient, but is not useful for patients with brain death.

* MCPs show occasional evidence of knowing about the world around them and are assumed to have little chance of recovery when no improvement is shown during their first 12 months of medical treatment.

[#] Implanting an electrode into the brain costs about US\$25 000.

Discuss whether or not such new medical technology should be developed further.

(20 marks)

5. Consider the following answers provided by two scientists to a question posed by a science magazine. Their answers illustrate how scientists may disagree with each other.

Is the Sun responsible for global warming?

Scientist A: **Yes.** I believe climate change is due to the Sun, the Sun and nothing but the Sun. The current period of global warming will be followed by a global cooling. By 2100 we will be back to conditions much the same as those in 2000. There is also global warming on Mars. Of course, conditions there are totally different, but in the end it all comes back to the Sun.

Scientist B: **No.** There have been several historical cases of global temperature change, which appear to have been linked to the Sun's magnetic activity, such as the Little Ice Age from 1300 to 1850. There's also convincing evidence that the warming of the Earth between the mid-1800s and the 1970s is linked to magnetic activity. However, the close association between the Earth's temperature and the Sun's magnetic activity has broken down since the 1970s. I think this shows that something else is responsible for the majority of global warming in the last 30 years or so. Most people think it's pollution.

- (a) Discuss why scientists may disagree with each other over some scientific issues. (10 marks)
- (b) It is not uncommon for scientists to disagree with one another over certain scientific issues. Also what they agree about at one time may be rejected by later scientists. Discuss whether or not this means that science lacks objectivity. (10 marks)

6. Extreme competition in space exploration between the U.S. and the U.S.S.R.* existed in the 1960s. The recent status of space exploration is illustrated by the information below:

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| <ul style="list-style-type: none">➤ Japan Aerospace Exploration Agency (JAXA) launched its long-delayed lunar orbiter SELENE from a remote Pacific island in 2007.➤ The first spacecraft of the Chinese Lunar Exploration Programme, Chang'e 1 (嫦娥一號) was launched in 2007. Two more launches, Chang'e 2 and Chang'e 3, are also part of the programme.➤ The U.S. National Aeronautics and Space Administration (NASA) will send a lunar orbiter and lander in 2008, the first of several lunar robotic projects before more U.S. astronauts are sent to the moon in the next decade.➤ Virgin Galactic, the world's first commercial space tourism company, will begin to operate a new spaceship (SpaceShipTwo) in 2009, carrying six space tourists to 360 000 feet above the Earth. |
| <ul style="list-style-type: none">➤ Google announced a US\$30 million contest in September 2007. The prize will go to the first private company that can land a robotic rover on the moon and beam back a gigabyte of images to the Earth.➤ A rich businessman is offering US\$50 million to the first private American team to send a manned craft into orbit around the moon by 2010. |

* The U.S.S.R was the Union of Soviet Socialist Republics, existing before 1991.

- (a) Discuss the possible reasons for the surge in interest in lunar exploration from governments and non-governmental parties in recent years. (12 marks)
- (b) What may be the impact of the support to space flight by non-governmental parties? (8 marks)

7. Some scientists have discovered that an experimental cancer drug, dichloroacetate (DCA), a rather common chemical, can shrink tumours in rats with no apparent side effects. They plan to do a clinical trial on humans, but it would take years to complete. Meanwhile, dying patients began buying this drug, which is unapproved*, and examining its effects on themselves. They collected results on the web for public viewing.

The scientists objected to the use of this drug before thorough testing as they feared that those taking the drug could suffer from unanticipated side effects. Patients argued that they did not have the time to wait for clinical trial to find out if there were any bad effects.

* Generally speaking, drugs sold for human use must have approval from the local drug control organisation.

Referring to the case above, discuss whether you agree with the view of the scientists or that of the patients. (20 marks)

END OF PAPER

Sources of materials used in this paper will be acknowledged in the *Examination Report and Question Papers* published by the Hong Kong Examinations and Assessment Authority at a later stage.

Marking Scheme

These documents were prepared for markers' reference. They should not be regarded as sets of model answers. Candidates and teachers who were not involved in the marking process are advised to interpret their contents with care.

Content

(Note: In the assessment process, markers should first determine an appropriate grade for an answer based on 3 factors, viz. understanding of the question, content and approach, and then convert that grade into a corresponding mark according to the following table.)

Criteria	Grade
<ul style="list-style-type: none"> Well-balanced answer which shows a full understanding of the demands of the question. Analytical in approach and critical in the use of supporting evidence. Arguments are cogent and effectively supported. Free from major inaccuracies/inconsistencies and important omissions. <p><i>(Note: Answers in this category need NOT be 'perfect' – they may contain minor flaws in content or approach.)</i></p>	A
<ul style="list-style-type: none"> Acceptably balanced answer which shows a good understanding of the demands of the question. Predominantly analytical in approach. Arguments are mostly coherent and well substantiated. Contains occasional inaccuracies and minor omissions. 	B
	C
<ul style="list-style-type: none"> Shows a general understanding of the demands of the question and a conscious effort to address the question, but the answer lacks balance. Shows some attempt to analyse the relevant issues, but the scope and depth of analysis are rather limited. Arguments tend to be inadequately sustained and exemplified. Marred by inaccuracies, omissions and inconsistencies. 	D
	E
<ul style="list-style-type: none"> Shows inadequate understanding of the question and/or a weak knowledge of the subject matter. Unduly narrative and weak in analysis. Arguments tend to be assertive and not substantiated. Containing fundamental errors/major inconsistencies/gross irrelevancies. 	E/F
	F
<ul style="list-style-type: none"> Shows a total misunderstanding of the question and a failure to distinguish between relevant and irrelevant material. Narrative in approach and lacking in analysis. Overwhelmingly assertive and fragmentary. Totally inadequate, containing little that is accurate, relevant or worthwhile. 	U

Effective Communication

— The criteria for awarding markings for effective communication are :

- whether the argument is logically and systematically set out;
- whether it is easy to understand the arguments relevant to the question; and
- whether the language is effectively deployed in the communication of relevant idea and viewpoints.

(Note : Grammar and spelling are only important insofar as they enhance or hinder communication.)

— Markers are advised to use the following grade-mark equivalence scale when awarding marks for effective communication:

Grade	A	B	C	D	E	F	U
Mark	5	4	3	2	2	1	0

Science, Technology & Society

Question Number	Popularity %	Performance in General
1	Compulsory	Fair
2	Compulsory	Not satisfactory
3	Compulsory	Quite good
4	13	Satisfactory
5	12	Satisfactory
6	63	Quite good
7	12	Satisfactory

Section 1

- Q.1 (a) This part of the question required the candidates to conceptualise the information given, so as to point out the problem shown by the data. While the main focus was on the intensification of the problem by the Internet, a lot of candidates only elaborated on the problem without analysing the role of the Internet. Therefore, candidates' performance was not up to standard in this part.
- (b) Most candidates were able to suggest possible ways to solve the problem they identified in (a). However, quite a proportion of candidates suggested solutions at a personal level without considering the role of the government in tackling social problems.
- Q.2 (a) Most candidates did not understand the requirement of this question, which involved the discussion of the bridging between science and industry. Most of them focused on the need to develop the examples of areas of technology given in the question. Thus, a lot of candidates' responses were not directly relevant to the question.
- (b) Not many candidates were able to grasp the main focus of the question. Following part (a), many candidates focused on how the individual areas of technology were developed in Hong Kong, without elaborating on the cooperation between science and industry.
- Q.3 (a) Most candidates gave well balanced answers with the possible merits and demerits of the technology. However, candidates commonly pointed out the possibility of faulty detection and the high cost of the technology as two of the demerits, without elaborating specifically on these points. Some also made contradictory points in their answers.
- (b) Most candidates presented clear standpoints in their answers. Quite a number of them made sound arguments in support of their viewpoints.

Section 2

- Q.4 Some candidates made persuasive arguments by analysing the issue from multiple perspectives, which included the viewpoints of different stakeholders involved, such as patients, patients' families, scientists, the government and so on. Sound arguments also included the consideration of cost as well as the worthiness of saving lives at a high cost. However, some candidates only focused on whether the operation should be done without evaluating the value of future development of the technology. Also, a lot of candidates did not consider counterarguments in their responses.
- Q.5 (a) Many candidates were able to suggest possible reasons for disagreement between scientists. However, most of them did not use relevant examples to demonstrate their points, undermining the cogency of the answers.
- (b) Some candidates were able to point out the basis for the objectivity of science. However, some candidates used irrelevant examples to elaborate their arguments, reflecting their inadequate knowledge of scientific investigation.
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- Q.6 (a) Most candidates were able to suggest possible reasons for the recent increase in interest in space exploration in general. However, not many of them were able to elaborate specifically on lunar exploration. They suggested similar reasons for governments and non-governmental parties, without considering the specific roles or characteristics of the two parties. Many candidates were not able to elaborate their points well enough. For example, some candidates suggested exploration of new resources as one possible reason, but did not explain which types of resources they were referring to.
- (b) Most candidates were able to point out the impacts of the participation of non-government parties, such as the problems of safety and environmental pollution. Nevertheless, more elaboration on their points was needed.
- Q.7 Most candidates were able to express clear standpoints on the issue and analyse the issue from different perspectives, including considering legal factors, side effects, patients' rights and responsibilities, the influence of the Internet, etc. However, most of them did not consider counterarguments and did not weigh up the risks and benefits. Some pointed out the issue of drug patenting, which was not relevant to the issue in the question, as it involved the use of a common chemical.
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General comments

Candidates were able to analyse issues using multiple perspectives, especially from the viewpoints of different social groups. However, the points raised should have been elaborated on more deeply and demonstrated with relevant examples.

Some candidates had difficulties in understanding the requirements or focus of the questions, and thus made peripheral or irrelevant responses. Also, the candidates were generally weak at conceptualizing data as reflected in their performance in Question 1. It is advisable that teachers should help students to build up the skill of interpreting and conceptualizing data, which is essential to the study of Liberal Studies.