Candidates' Performance

Paper 1A

This section consisted of 40 multiple-choice questions. Candidates' performance was generally satisfactory with an average of 26 questions answered correctly. Comparatively, they performed better in 'Social Implications' but worse in 'Internet and its Applications.' Post-examination item analysis revealed the following:

1. Candidates well understood the application of charting and QR codes in daily life (Question 7 and Question 14). However, a high proportion of the candidates did not have a sound knowledge of two's complement representation and digital data (Question 3 and Question 4). They were not able to identify an incorrect two's complement representation and did not understand the relationship between the number of bits and number of combinations available. Only about a third of the candidates demonstrated proficient skills in data extraction and word processing (Question 8 and Question 9).

2. Candidates generally performed well in 'Computer System Fundamentals.' They were able to apply the concept of the mode of operation of a computer system to the daily life example. A very high proportion of the candidates understood that a global positioning system (GPS) is a kind of real-time processing (Question 20). About half of the candidates demonstrated a comprehensive knowledge of the characteristics of network-attached storage (NAS) (Question 22).

3. Candidates generally performed fairly in 'Internet and its Applications.' About two thirds of the candidates well understood the application of a wireless network and the ways to download files through the Internet (Question 25 and Question 28). Only a third of the candidates demonstrated a sound knowledge of proxy servers. Nearly half of the candidates wrongly answered that a proxy server could not store web pages for caching (Question 26).

4. About three quarters of the candidates understood the importance of defining the scope of a problem (Question 30). They were also able to apply basic analytical skills to trace conditional assignments (Question 32). On the other hand, about half of the candidates were able to trace algorithms with loops (Question 31 and Question 33).

5. Candidates generally performed very well in 'Social Implications' and demonstrated a sound knowledge and understanding of equity issues (Question 34). Half of the candidates demonstrated a comprehensive knowledge of Intellectual Property and Copyright. About a quarter of the candidates wrongly thought that the Office of the Government Chief Information Officer (OGCIO) was involved in the legal process of the copyright law while another quarter did not know that legal actions against copyright piracy can be taken without the initiation by copyright owners (Question 38).

Paper 1B

1. This paper assessed candidates' understanding of 'Information Processing', 'Computer System Fundamentals', 'Internet and its Applications', 'Basic Programming Concepts' and 'Social Implications', and the application of ICT knowledge in real life.

2. Candidates' performance was generally satisfactory.

Question Number			Performance in General
1	(a)	(i)	Satisfactory: Some candidates wrongly gave the number of lunch sets as an example. They were not aware that the quantity of lunch set was selected by the plus-sign and minus-sign buttons.
		(ii)	Poor: Candidates stated different types of validation check for non-numerical data but they were not aware that the input data were numeric.
		(iii)	Fair: Candidates gave the money to be paid for the lunch sets as the output which was not the waiters' concern. Some other candidates thought that the waiting time could be the output, which was a courtesy to the customers. However, the waiting time was an irrelevant output too. The examples of the output data should be considered as the needs of the waiters.
	(b)		Good.
	(c)	(i)	Satisfactory: Many candidates wrongly gave a tool or an application available in spreadsheet software instead of a spreadsheet function such as SUM.
		(ii)	Poor: Candidates stated that database software is better because it can produce reports and perform sorting which themselves are true. However, these answers are not the advantages of database software over spreadsheet software.
2	(a)		Satisfactory: Candidates just stated examples of the wireless data communication technology such as WiFi and infra-red instead of the types of computer applications such as instant messaging software.
	(b)		Satisfactory.
	(c)		Fair: Most candidates illustrated that the use of authentication and encryption could enhance the security. Only few candidates highlighted the issue of network resources control as one of the benefits, showing their limited understanding of the network application.
	(d)		Fair: Candidates gave the use of a router or a switch but overlooked the focus of the wireless connection in the network.
	(e)		Fair: Some candidates just stated 'convenient' as the benefit without further elaboration. They showed a limited understanding of the advantages of using a text editor and a web authoring tool.
	(f)		Satisfactory: The respective private and public keys in the file transfer process were not highlighted. Candidates showed a limited understanding of the use of public and private keys in a data encryption system.

Question Number			Performance in General
3	(a)		Fair: About a third of the candidates correctly traced the algorithms.
	(b)		Poor: Many candidates just stated that the processes involved different sub-tasks to be executed. They were not able to identify the main features of the parallel processing system and the distributed processing system and their differences.
	(c)	(i)	Good.
		(ii)	Poor: Candidates did not focus on the resources that the software provides. They only answered that the programs of open source software could be modified.
		(iii)	Good.
4	(a)	(i)	Satisfactory: Some candidates answered that the Hong Kong ID card number was sensitive or important data. They did not identify the important concept of 'private' or 'personal' data.
		(ii)	Satisfactory.
		(iii)	Satisfactory: Some candidates stated that the two fields were not unique. They overlooked that the data would be changed annually.
	(b)		Very good: Candidates showed sound knowledge of the design of a good password.
	(c)		Fair: Most candidates gave 'password-protection' or 'encryption' as a security measure to protect the data. However, few candidates gave correct answer related to the idea of access right control.
	(d)		Satisfactory.
5	(a)		Satisfactory: Some candidates wrongly answered that email, searching and downloading information through the Internet were e-learning activities. These answers are activities on the Internet but not e-learning activities involving interaction between participants.
	(b)		Very good: Candidates were able to identify the advantages of using desktop computers over smart phones. However, it should be noted that the computational power and screen size of smart phones are improving and so the answers of this question might change over time.
	(c)	(i)	Satisfactory: Some candidates stated that the text of a PDF file could not be edited. However, in practice, there are many ways in which a PDF file can be edited, using a wide range of editor tools in the market.
		(ii)	Fair: The majority of the candidates explained the advantage of email, but not that of the school network drive. They might have a limited experience in using a school network drive.

Paper 2A

1. This paper assessed candidates' understanding of 'Basic Concepts of Databases', 'Relational databases', 'Basic Concepts of Database Design Methodology' and 'Database Applications, Development and Society', and the application of ICT knowledge in real life.

2. Candidates' performance was generally satisfactory.

Question Number		Performance in General
1	(a)	Satisfactory: Candidates correctly answered the majority part of the questions. But some wrongly used '=' instead of 'LIKE' in (ii).
	(b)	Fair: About a third of the candidates correctly gave the integrity problem.
	(c)	Poor: It was a difficult question for the candidates. Only a small number of them correctly suggested a re-designed database to fit the situation.
2	(a)	Fair: Candidates pointed out the advantage of indexing but they were not able to write the SQL statement for creating an index file. Some of them failed to identify the primary key.
	(b)	Poor: Candidates showed an insufficient knowledge of indexing. They did not understand how indexing affects database performance.
	(c)	Good: The majority of the candidates correctly wrote the SQL statement while some other candidates did not know that `year()` function returns an integer.
	(d)	Satisfactory.
	(e)	Satisfactory: The majority of the candidates correctly pointed out that both markers and candidates were from the same centre in the context.
	(f)	Satisfactory: Candidates gave good answers about the benefits of the database modification, but failed to state the drawbacks of join operations. Moreover, some candidates forgot to include the foreign key in CAND.
3	(a)	Very good: Candidates were able to draw the ER diagram with appropriate entities and relationships. Yet, some did not correctly specify the minimal and maximal cardinalities.
	(b)	Fair: The minority of the candidates understood the meaning of prototype.
	(c)	Poor: Only a small number of the candidates well understood the meaning of data conversion and how it would affect testing.
	(d)	Fair: Many candidates wrongly thought that the cause of the problem was the bandwidth. Some candidates proposed limiting the number of accesses as the solution which was not the correct approach.
4	(a)	Satisfactory: Candidates were able to choose a correct data type for PUB. About half of them were able to identify the redundant field. However some candidates demonstrated an insufficient knowledge of domain integrity and got confused with data validity checking.
	(b)	Good.
	(c)	Satisfactory: Some candidates thought that a candidate key was a foreign key and they did not identify another candidate key in VID.
	(d)	Very poor: A very small number of the candidates were able to describe the distributed database model and the parallel database model clearly. Some other candidates just pointed out the hardware requirements or cost consideration.
	(e)	Satisfactory: Candidates performed well in comparing the two models with correct calculation.

Paper 2B

1. This paper assessed candidates' understanding of 'Data Communications and Networking Basic', 'Network Design and Implementation' and 'Network Management and Security', and the application of ICT knowledge in real life.

2. Candidates' performance was generally satisfactory.

Question Number		Performance in General
1	(a)	Satisfactory: About half of the candidates gave the characteristics of various transmission media.
	(b)	Good: A high proportion of the candidates were able to identify the major target users of the two subnets. About half of them gave suitable examples of the network applications.
	(c)	Satisfactory.
	(d)	Good: Candidates were familiar with the major advantages and disadvantages of using a wireless network over a wired network.
	(e)	Good: A high proportion of the candidates understood the need of limiting the throughput. However, only a small number of the candidates were able to demonstrate an adequate understanding of the bandwidth bottleneck issue.
	(f)	Good.
2	(a)	Very good: Candidates demonstrated sound knowledge of the basic concept of IP configuration.
	(b)	Satisfactory.
	(c)	Fair: A very high proportion of the candidates demonstrated a basic understanding of the peer-to-peer network.
	(d)	Satisfactory: The majority of the candidates were able to provide examples of the registration information and the daily uses of the device.
3	(a)	Good.
	(b)	Satisfactory: A very high proportion of the candidates were able to give the benefits of using a proxy server. However, only about a third of the candidates demonstrated an adequate understanding of the security risk.
	(c)	Good: The majority of the candidates knew the benefits of installing an anti-virus program in the proxy server, but only a quarter of the candidates were able to provide the potential problems.
4	(a)	Poor: Only a third of the candidates demonstrated sound knowledge of network design.
	(b)	Poor: About half of the candidates were able to name one or more commands/tools and explain the ways of the troubleshooting clearly.
	(c)	Fair: Only a very small number of the candidates were able to identify the issues of establishing an access control list in a daily life application.

Paper 2C

1. This paper assessed candidates' understanding of 'Multimedia Production' and 'Web Site Development', and the application of ICT knowledge in real life.

2. Candidates' performance was generally satisfactory.

Question Number		Performance in General
1	(a)	Fair: Only a small number of the candidates were able to state the advantages of using bitmap graphics.
	(b)	Fair: The majority of the candidates were able to suggest suitable control attributes to prevent overlapping of the popup windows. However, some candidates wrongly used 'alignment' or 'parallel' as their answers.
	(c)	Satisfactory: Candidates did not understand well how the data validation is carried out by the client-side scripting. A small number of the candidates only described the scenario and the response of the system. A high proportion of candidates were not aware that server-side scripting is required to access the database stored in the server.
	(d)	Fair: A high proportion of the candidates were able to suggest an appropriate file format for transparent images. However, many candidates were not able to clearly describe how to use layering to control the display of the walking paths.
	(e)	Poor: Only a third of the candidates gave a valid reason to support the use of MP3. Some other candidates wrongly gave 'streaming' or 'compression' as the answer.
	(f)	Satisfactory: About three quarters of the candidates were able to give the correct size of the frames while a few of them forgot to label the frames. On the other hand, some candidates wrongly gave the answer in horizontal frames.
2	(a)	Satisfactory: The majority of the candidates were able to give the benefits of including a site map in a web site. However, a few candidates wrongly suggested that a site map could help to have a proper display of the web site.
	(b)	Good: Only a small number of the candidates were able to suggest including a printable version to solve the problem of the broken page printout of a web page.
	(c)	Satisfactory: About half of the candidates were able to suggest 'attracting users' as the reason to support the use of a scrolling message and understood that the effect was not appropriate for the other occasion.
	(d)	Poor: Only a small number of the candidates demonstrated a sound knowledge of *style* in web page design.
	(e)	Fair: Candidates generally were able to suggest reducing the frame rate or limiting the connections to reduce the network traffic loading. However, a few candidates only mentioned lowering the quality of the video but they had difficulty in further elaborating the answer with details.

Question Number		Performance in General
3	(a)	Fair: Some candidates just mentioned 'interchange the left and right' and did not suggest a function that can be used.
	(b)	Fair: About a third of the candidates were able to name the correct technique. Candidates seemed to be unfamiliar with the differences between the video file formats MP4 and FLV. A high proportion of candidates wrongly answered that MP4 could support streaming while FLV could not.
	(c)	Fair: Candidates were familiar with the relationship between the sampling rate and the sample size of a video. Only a small number of the candidates were able to clearly explain how the bit rate affects the size of a video file.
	(d)	Fair: About a third of the candidates demonstrated an adequate knowledge of photo editing. They were able to name filters and explain their effects clearly. Moreover, they were aware of the requirement of keeping the original aspect ratio as well as the colour depth.
4	(a)	Poor: Only a small number of the candidates were able to formulate satisfactory ideas when analysing a comparison between the file formats PDF and JPG.
	(b)	Satisfactory: About a third of the candidates pointed out the potential problem of the design of the prototype. The majority of the candidates were able to suggest an appropriate design to solve the problem.
	(c)	Fair: About half of the candidates were able to trace the algorithm. Only a small number of the candidates were able to clearly describe how to improve the script with the help of introducing the variable N. Candidates were generally unfamiliar with the concepts of looping and iteration.

Paper 2D

1. This paper assessed candidates' understanding of 'Programming', 'Programming languages' and 'Systems Development', and the application of ICT knowledge in real life.

2. Candidates' performance was generally satisfactory.

Question Number		Performance in General
1	(a)	Satisfactory: Testing is a very important phase in the system development life cycle. Only a small number of candidates demonstrated a comprehensive understanding of various tests in the system development life cycle.
	(b)	Very good: A high proportion of the candidates were able to identify the order of the keypad numbers and complete the flowchart correctly.
	(c)	Satisfactory: Only a small number of candidates completed the program in (ii) correctly. Particularly, many candidates were not aware that the checking of an empty queue was necessary.
	(d)	Poor: Only a very small number of candidates knew the capacity of the queue and the problem encountered when inserting a new element in a full queue.
2	(a)	Very good: A high proportion of the candidates understood the accessibility of the maze with the array.
	(b)	Satisfactory: A high proportion of the candidates were able to discover the symmetric property of the array and identify the minimum number of elements needed.
	(c)	Satisfactory: A high proportion of the candidates were able to provide a set of correct parameters in (i). However, some candidates did not complete the program in (ii) by using the variable p.
	(d)	Poor: Only a very small number of the candidates demonstrated a basic understanding of the use of object-oriented programming (OOP). Most candidates gave the characteristics of OOP which were not suitable for the development of a mobile application.
3	(a)	Good: A high proportion of the candidates demonstrated a sound understanding of the representation of the linked list.
	(b)	Fair: Only a small number of the candidates were able to perform the operations and described the final content of the linked list correctly.
	(c)	Satisfactory: The minority of the candidates understood the concept of traversal of linked list and they were aware that the additional 'Previous' pointer could help the traversal.
	(d)	Good: In (ii), some candidates misused 'file size' instead of 'memory usage.'
4	(a)	Very good: A very high proportion of the candidates were able to trace the algorithm correctly.
	(b)	Satisfactory: About half of the candidates completed the program correctly. Some candidates made careless mistakes in the index of the string operation.
	(c)	Poor: Only a very small number of the candidates provided a correct answer. Candidates were not aware that the subprogram in (b) could be utilised. Moreover, they made errors in writing a subprogram such as the function definition and variable declaration. This showed that candidates might have insufficient practice in writing programs.

School-based Assessment (SBA)

1. The SBA component consists of one project assignment. It is evaluated in accordance with the following categories:
   - Objective & Analysis
   - Design & Implementation
   - Practical ICT Skills
   - Testing & Evaluation
   - Conclusion & Discussion
   - Documentation
   - Creativity & Project Management

   Teachers provided school-based project titles for their students to suit their needs. Students could select a project title and complete a written report together with the product (if any) for SBA.

2. The SBA marks submitted by schools were moderated in accordance with the principles and methods described in the booklet '*Moderation of School-based Assessment Scores in the HKDSE*'. The quantitative results in the SBA moderation reveal that 57.3% of schools fell into the 'within the expected range' category, while 22.6% of schools were higher than expected, and 20.1% were lower than expected. However, among the schools with marks higher or lower than expected, the majority only deviate slightly from the expected range. This is encouraging as the data showed that the majority of the teachers do have a good understanding about the SBA implementation, and hence the marking standards are generally appropriate.

3. An SBA Supervisor and 25 District Coordinators were appointed to oversee and support the implementation of SBA. They worked with teachers through the SBA conferences, territory-wide sharing sessions, district group meetings and a teachers' online e-platform. The e-platform made it possible for teachers to download the 'Resource Package on Professional Development for Teachers in Preparation for the School-based Assessment Component of HKDSE Information and Communication Technology', which contains project samples and other teaching materials. They were also able to communicate with each other through online discussion forums, thus creating their own SBA support community.

4. When setting project titles for students, teachers are advised to consider whether their students can make use of the project to effectively demonstrate their knowledge and understanding, generic skills and practical skills learnt from the ICT curriculum.

5. There was a serious plagiarism case involved a student who directly copied a report from another student. A zero mark was given to the SBA and a downgrade by one level in ICT was imposed on the student.

   It is reminded that students have to sign a declaration form to confirm that the work they produce is their own. Teachers are required to confirm that, to the best of their knowledge, the work presented for assessment is the student's own work. It is advised that a presentation of the project assignment with a question and answer session could be done to assure the originality.

6. A few students submitted a report without any prototype of ICT applications. Students are advised to not only summarise the data and information collected, but also carry out further in-depth analysis with critical thinking.

7. It was found that some schools regulated their students to strictly follow and complete guided worksheets for the project assignment. However the project assignment is served to motivate students to engage in meaningful activities. These schools' practice would easily lead to suspicion of plagiarism.

8. Students should maintain the time spent on SBA at a reasonable level as the assessment of the project assignment is focused on the quality of the project outcomes rather than the size of the project scope.

9. Students are expected to complete their SBA assessment tasks and activities in the same language as the medium of instruction according to their schools' medium of instruction policy.

10. Schools are reminded that if there is more than one subject teacher teaching the subject to the same cohort of their students, the teachers involved are required to agree on the criteria for awarding marks so that a unified standard of assessment will be applied to all students in the cohort.

General comments and recommendations

1. The popularity of the Elective Part is shown below.

Option	Popularity (%)
A. Databases	12
B. Data Communications and Networking	3
C. Multimedia Production and Web Site Development	69
D. Software Development	16

2. Candidates showed a limited understanding of the applications of information and communication technology in our daily life. They should have a wider exposure to different aspects of the applications in the society.

3. Some candidates are careless in reading questions and sometimes misinterpreted the technical terms in their answer.

4. Occasionally candidates made spelling mistakes when writing keywords.