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 'Information Processing' and 'Basic Programming Concepts.' Post-examination item analysis revealed the following:

1. Question 4 tests candidates' ability to integrate different concepts in Information Processing and Social Implications. To get the correct answer, candidates had to understand the basic concept of data representation, particular in digitisation of multimedia elements, and apply the basic concept of data encryption to verify that the file sizes of the compressed files. Nearly half of the candidates did not realise that HTML and TXT file formats are in fact the same in terms of the file structure and were lack of experience in compressing DOC and JPG files.

Q.4 The file sizes of the following original files are all 1 MB. Under normal circumstances, after compressing them, which compressed file has the largest file size?

	Original files	Compressed files	
A.	testA.html	testA.zip	(20%)
B.	testB.doc	testB.zip	(16%)
C.	testC.txt	testC.zip	(9%)
* D.	testD.jpg	testD.zip	(55%)

2. Candidates demonstrated a basic understanding of data representation in computers. In Question 7, about half of them were able to correctly apply the binary system to calculate the number of records that can be supported.

Q.7 A company designs a mobile application to process staff records. In each record, 10 bits are used to store staff numbers and 12 bytes are used to store Chinese names. How many staff records can the mobile application support?

* A.	2^{10}	(48%)
B.	2^{12}	(17%)
C.	2^{22}	(21%)
D.	2^{96}	(14%)

3. In Question 15, the majority of the candidates demonstrated sound knowledge of intellectual property. About a third of the candidates did not realise that the creator of an original article will be automatically granted the copyright, a form of intellectual property, and the copyright of articles cannot be removed before incorporating in the encyclopedias. In other words, the focus should be the ownership of the copyright instead of its existence.

Q.15 Free online encyclopedias such as *Wikipedia* contain a huge number of articles. Which of the following statements about the online encyclopedias are correct?

(1) People can search the relevant articles for a topic quickly.
(2) The articles have no copyright.
(3) These encyclopedias are updated frequently.

A.	(1) and (2) only	(11%)
* B.	(1) and (3) only	(64%)
C.	(2) and (3) only	(2%)
D.	(1), (2) and (3)	(23%)

4. Question 16 focuses on the functions of [illegible] devices such as router and switch, [illegible] in using computer networks with common network connecting devices. In the four options, all connections are possible but they were not able to identify the fundamental functions of the devices. In the four options, only Option A is the fundamental function of a router.

Q.16 A router should be used to connect _____.

* A. two different networks (47%)
B. a printer and a local area network (20%)
C. two computers (6%)
D. a computer to a server (27%)

5. In Question 28, only about one third of the candidates demonstrated sound knowledge of streaming technology and identified the use of DNS and IP in the video application.

Q.28 When watching videos from a web site using streaming technology, which of the following will be involved?

(1) DNS
(2) FTP
(3) IP

A. (1) and (2) only (12%)
* B. (1) and (3) only (33%)
C. (2) and (3) only (35%)
D. (1), (2) and (3) (20%)

6. Question 40 was deleted as it did not effectively discriminate between weak and able candidates. This question tests candidates' understanding of the benefits of using a fingerprint over a password for authentication in computer systems, which generally include a shorter input time, not easily lost, shared or duplicated, and being unique. The majority of candidates knew that Statement (2) is incorrect. Some candidates, however, thought that Statement (3) is also a correct answer. They might have overlooked the fact that although this statement is correct in describing a particular situation when using a fingerprint for authentication, it is not a comparative benefit of using a fingerprint over using a password.

Q.40 What is/are the benefit(s) of using a fingerprint over a password for authentication in computer systems?

(1) In general, the input time is shorter.
(2) The system development cost is cheaper.
(3) It results in fewer mistakes as long as the finger is clean.

A. (1) only
B. (2) only
C. (1) and (3) only
D. (2) and (3) only

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)	Fair. Though nearly all candidates should have the experience of using touch screen and keyboard/mouse, only less than half of them were able to correctly describe their advantages. However, over 60% of candidates answered (a)(ii) correctly. Candidates should note that only naming an output device without justification would not be awarded any mark.
	(b)	Poor. Only a very small number of the candidates correctly described the use of network interface cards and about one sixth of the candidates correctly described the use of network cables in connecting workstations to a local area network. Candidates should realise that answers such as 'to build a network' and 'to transmit network signal' were too general and would not be awarded any mark.
	(c)	Satisfactory. Most of the candidates gave at least one benefit, but only about one quarter of the candidates got full marks in this question. Some candidates gave two benefits of similar nature which were therefore been treated as one.
	(d)	Fair. Many candidates might not have the experience in forwarding email. Only about one quarter of the candidates correctly answered (d)(i). Some weaker students thought that including a hyperlink to a file in an email could reduce the size of the file.
2	(a)	Good. Candidates seldom gave reasons other than updating virus definitions in (a)(i).
	(b)	Fair. Candidates performed quite good in (b)(i) though weaker candidates misunderstood the three modes of operation. Some thought that software was installed on many computers at the same time, and therefore its operation should be parallel processing. For (b)(ii), only a small number of the candidates correctly stated two differences. Nearly 40% of candidates got no marks for (b)(ii).
	(c)	Good. Candidates in general were aware of the issues related to digital divide, though some only listed one factor for (c)(i). However, most of the candidates were able to give two ways for (c)(ii).
3	(a)	Good. Nearly all candidates were able to state the benefit of MP4, while about 60% of them correctly stated the benefit of AVI.
	(b)	Good. Some candidates wrote the unit of the result incorrectly.
	(c)	Fair. Not many candidates knew that video files were already compressed and there was little room to further compression. Candidates' concept on defragmentation in general was weak.
	(d)	Satisfactory.
	(e)	Poor. More than half of the candidates got a zero mark on this question. Their concept on encryption key was weak. Candidates were confused about the use of private key and public key. Only about 5% of candidates got full mark.

Question Number		Performance in General
4	(a)	Very good. Over 80% of candidates correctly answered this question. Some candidates correctly pointed out that there were identical teacher names in the records but did not illustrate the answer with an example. Candidates should read the question carefully.
	(b)	Good.
	(c)	Good. Weaker candidates mixed up with validation check and improving accuracy.
	(d)	Fair. About two thirds of the candidates answered (d)(i) correctly. But for (d)(ii), more than half of the candidates did not use `'COUNTIF'` in their answer. For those who used `'COUNTIF'`, only a few of them were able to answer in correct syntax.
	(e)	Good. About half of the candidates got full mark. There was no specific format to present the answer for this question. Candidates freely expressed their designs in the given box. Weaker candidates had difficulty to present their answers clearly. For example, some candidates did not indicate whether their drawing was included in one slide or a series of slides.
5	(a)	Very good. Candidates demonstrated their competence in understanding the algorithm.
	(b)	Satisfactory. Just under half of the candidates got a full mark for (b)(i). For (b)(ii), though many candidates noted that the loop would terminate incorrectly, they did not precisely describe the cause of the problem.
	(c)	Satisfactory. Nearly all candidates got at least one mark on (c)(i). Some candidates answered this question by giving two examples of similar nature, and therefore they were only awarded one mark. For (c)(ii), some candidates overlooked the requirement set in the question ('other than taking breaks'). Only less than 20% of the candidates got a full mark in (c)(ii).

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)	Good. A high proportion of the candidates demonstrated a sound understanding on data dependency and data redundancy.
	(b)	Fair. A high proportion of the candidates correctly gave the required field names in the tables, but only a small number of them wrote the primary and foreign keys precisely.
	(c)	Good. Candidates were able to complete the ER diagram with appropriate relationships. Yet, some did not correctly specify the cardinalities.
	(d)	Satisfactory. Many candidates answered well but some provided answers that were not related to the technical aspects.
2	(a)	Very good.
	(b)	Very good.
	(c)	Good.
	(d)	Satisfactory. About half of the candidates omitted to input `2018` in the `SELECT` clause to match the `GRAD` parameter. Almost all candidates correctly answered the deletion of the records from `STUDENT` which have just been added to `ALUMNUS`. However, a high proportion of them did not delete the corresponding records from `PARENT`.
	(e)	Satisfactory. About half of the candidates wrote the `CREATE VIEW` command correctly.
3	(a)	Good. A high proportion of the candidates demonstrated a sound understanding of the different stages in a development life cycle.
	(b)	Satisfactory.
	(c)	Poor. Candidates in general had difficulty in describing the considerations for data integration.
	(d)	Good. A high proportion of the candidates were able to give a good design of the user interface. However, a small number of them used text boxes for data input without taking the advantage of different input options, such as drop-down list and check boxes.
4	(a)	Satisfactory.
	(b)	Satisfactory.
	(c)	Poor. Candidates demonstrated an insufficient knowledge of distributed database. They did not understand the effects of `SELECT` and `UPDATE` commands with different distribution approaches.
	(d)	Good. A high proportion of the candidates knew the purpose of the SQL command, but the weaker ones were not familiar with the use of `GROUP BY` and `HAVING` commands.

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. The majority of the candidates were able to give at least one of the benefits of using fibre optics in the network. However, many candidates wrongly suggested another transmission medium for the network.
	(b)	Satisfactory. Only a minority of the candidates were able to give a correct application for each communication mode that could be used in the communication network of the oil company. Many of the other candidates just gave some irrelevant examples.
	(c)	Satisfactory.
	(d)	Satisfactory.
2	(a)	Very good.
	(b)	Satisfactory. Candidates were able to identify the advantage of using a particular wireless connection. However, some candidates gave vague answers, such as 'faster' or 'larger' without relating to any attribute.
	(c)	Poor. Candidates were not able to clearly explain the related network design in a smart home. Some candidates even gave identical but wrong answers for both VPN and PAN.
	(d)	Good. The majority of the candidates were able to explain the number of network addresses available in IPv4 and IPv6 to support their answers. However, a small number of candidates still just gave a vague answer, such as 'not enough addresses in IPv4'.
3	(a)	Satisfactory.
	(b)	Satisfactory. In network testing, some candidates just gave the commands, such as PING, instead of a proper description of network testing.
	(c)	Fair. The majority of the candidates were able to identify the correct RAID type. However, they did not point out the connection to the information about the 2.5 TB photo file size given in the question. Besides, many candidates' understanding on the issue of disaster recovery was narrow and weak.
	(d)	Satisfactory. About half of the candidates were able to explain the issue of public and private key encryption system.
4	(a)	Satisfactory. Candidates in general were able to complete the network diagrams. However, some candidates gave unnecessary components, such as switch, in the separate networks.
	(b)	Satisfactory. Candidates in general understood the benefits of using subnets in the LAN. However, only a small number of them correctly gave the IP address ranges and subnet masks for the related rooms.
	(c)	Fair. Many candidates just gave the function of DHCP, instead of the advantage and disadvantage of using DHCP.
	(d)	Poor. Candidates were able to identify the issue of bottleneck or loading in the network traffic. However, they gave vague answers, such as 'too many people were using the network'. Hence, it was a bad and unfriendly solution, suggesting to limit the number of people to use the network.

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. The majority of the candidates were aware of the difference between the GIF format and the SWF format. They commonly focused on the difference in file sizes, colour options, interactivity, and audio support. However, not many candidates were able to list out the reasons why the GIF format is more preferred than the SWF format.
(b)	Satisfactory. Candidates showed good understanding on video control and were able to suggest additional video control features. Some candidates were relatively weak at describing their proposed features. Candidate performed poorly in b(ii), the majority of them were not familiar with the conversion between units (e.g. Mbps to bps, bit to GB).
(c)	Satisfactory. Candidates showed understanding on the technique of using text (style sheet) to show a mathematical formula on the web page. Candidates were able to compare technically the use of text (style sheet) and image to show the mathematical formula.
(d)	Poor. A small number of the candidates showed good understanding on the use of metadata in web site development. In particular, only a very small number of the candidates were able to relate the content attributes with the target Internet applications.
2 (a)	Good. Candidates in general showed good understanding on client side validation check. A few candidates mixed up the meaning of validation checks and verification checks on server side.
(b)	Good. A high proportion of the candidates were able to understand the hacker's attempts described in the question and pointed out its impact related to data privacy, loading and security of the online system. However nearly half of the candidates failed to explain how the hackers' attempts could eventually lead to those impacts.
(c)	Satisfactory. Candidates were able to identify the potential design problems with the given enrolment page. However, candidates were in general weak at describing how their new enrolment pages could alleviate the design problems.
(d)	Fair. Quite a number of candidates attempted to re-colour the chart. However, that does not solve the problem of printing the chart with a black and white printer as stated in the question.
3 (a)	Fair. Stronger candidates were able to analyse different design aspects of the desktop version against mobile version. Their answers in general covered the bandwidth, the screen size, the content layout, and the user interface aspects. Weaker candidates provided more narrowed answers and elaborated several points within the same aspect only.
(b)	Satisfactory. Candidates were familiar with the concept of sampling rate, sampling size and channels in audio files.
(c)	Very Good. Candidates showed good understanding on the concepts of frame rate, frame size and colour depth and were able to choose the most appropriate setting for different situations.

Question Number		Performance in General
4	(a)	Good. Weaker candidates, however, showed a common mistake of answering 255^3 in (i).
	(b)	Satisfactory. Candidates showed good understanding on vector graphics and bitmaps. Weaker students often got the point of smaller file size while missing the point that vector graphics can be scaled to any size without loss of quality.
	(c)	Fair. The majority of the candidates failed to provide a correct script for the mathematical game. Although in general candidates were able to include variables, subprogram calls, conditional branching, and looping in a standalone manner, many candidates failed in expressing a correct logic flow when the above components were used together. As an example, many candidates implemented a simple loop that terminates after 10 iterations, while the question requires a loop that terminates only when 10 questions are answered correctly. Another example is that many candidates were able to call the subprogram `myrand` to generate random numbers, but failed to put the subprogram call inside the loop body to generate different sets of questions in each iteration of the loop.
	(d)	Satisfactory. About half of the candidates were able to apply cookies to solve the problem described.
	(e)	Satisfactory. The majority of the candidates showed good understanding on the client-server model and were able to identify the client side data (the time a client needed to complete the game) and server side data (a database storing the time or the current rank list). However, only few stronger candidates were able to describe the process for generating the global rank list, which includes a systematic data flow and a precise algorithm.

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)	Very good. More than two thirds of the candidates were able to trace the subprogram and give correct outputs. A few candidates did not answer explicitly the purpose of the subprogram and instead they just explained the flow of the subprogram.
	(b)	Fair. More than half of the candidates were not able to explain clearly the need to test the boundary cases even they were able to identify these cases.
	(c)	Good. More than two thirds of the candidates were able to identify the overflow error of a data array. However, about half of the candidates were able to explain clearly and justify why the enlargement of the dimension of the array is needed.
2	(a)	Very good. A very high proportion of the candidates were able to complete the readings and identify the benefit of Method A. However, only very few candidates were aware that the original data cannot be reinstated in Method A.
	(b)	Excellent. A very high proportion of the candidates were able to complete the table of the data representation with Method B.
	(c)	Good. Weaker candidates, however, wrongly spelt the keywords such as 'survey' and 'questionnaire'.
	(d)	Satisfactory. About half of the candidates were able to give the advantages of the two conversion methods.
	(e)	Poor. About a quarter of the candidates were able to correctly describe the characteristics of the two different types of programming languages. Candidates were found with some knowledge of libraries but with little experience in using them. Candidates are recommended to spend more time on studying the relevant concepts of a compiler against with an interpreter.
3	(a)	Fair. Less than half of the candidates were able to correctly write down the subprogram with the defined variables. Candidates were found unfamiliar with the use of a subprogram. Candidates are recommended to pay attention to the use of punctuations in writing programs with a specific programming language.
	(b)	Fair. Only about one third of the candidates were able to correctly write a subprogram with a Boolean return value.
	(c)	Good.
	(d)	Fair. Candidates were found in general weak in tracing the given algorithm and assessing its efficiency.
	(e)	Good.

Question Number		Performance in General
4	(a)	Fair. About one third of the candidates were able to correctly list all the sizes that could be printed.
	(b)	Satisfactory. Candidates were found quite familiar with nested looping in programming.
	(c)	Satisfactory. Less than half of the candidates demonstrated a good understanding on how to trace and set the correct values for the counters in a program segment of pseudocode.
	(d)	Good. About half of the candidates were able to draw correctly the output constructed by the pseudocode program segment.
	(e)	Satisfactory. A few candidates were not aware of the requirement to use `SQ` in (a) and `HollowSQ` in (c) to answer this question.

School-based Assessment (SBA)

1. 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 revealed that 56.3% of schools fell into the 'within the expected range' category, while 22.1% of schools were higher than expected, and 21.6% were lower than expected. Majority of the teachers demonstrated a good understanding about the SBA implementation, and hence the marking standards were generally appropriate.

2. 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 samples and other teaching materials. Moreover, two batches of samples of Guided Tasks with 16 samples have been developed for teachers to download through the HKEAA web site.

3. Teachers are reminded to inform students clearly various requirements and regulations regarding the SBA component at the beginning of the course, which include task requirements and assessment criteria, schedule of assessment, the school's regulations and administrative procedures for conducting SBA, the importance of academic honesty and proper conduct in SBA, record keeping requirements and guidance on how to acknowledge sources properly in their SBA work.

4. Teachers were requested to provide guided tasks for their students to suit their needs. Students were asked to complete two guided tasks and recorded their work with products. When setting guided tasks for students, teachers are encouraged to consider whether their students can make use of the tasks to effectively demonstrate their knowledge and understanding, generic skills and practical skills learnt from the ICT curriculum. The guided tasks were asked to be recorded in written documents such as project reports and presentation documents, or in other formats when appropriate.

5. It is encouraging that some students completed guided tasks with creative work in developing databases, computer networks, web sites and computer programs. They did not treat SBA only as a means to attain a high mark in the HKDSE but took this chance to develop their skills and practise their ICT knowledge in a meaningful context.

6. Thirty hours of curriculum time is allocated for SBA. Teachers are encouraged to conduct the SBA in class to ensure the authenticity. Teachers can offer general advice on SBA at the initial stage. However, they are reminded not to give specific and detailed guidance or advice in such a way as to put into question the student's authorship of his/her work.

7. Teachers are advised to set milestones for their students in such a way that they can evaluate students' work at different stages of completion and give student feedback accordingly, including their marks or grades on individual assessment tasks for the guided tasks.

8. Guided tasks are a part of the learning and teaching process. Teachers should use the tasks to help students develop and integrate their skills and knowledge, and put them into practice for the examination as well as in their future lives.

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	64
D. Software Development	21

2. To enrich the knowledge of ICT, candidates are encouraged to observe a wide range of ICT applications in their everyday lives and understand the fundamental principles and theories behind.

3. Candidates are encouraged to express their views with examples or elaborate their answers in detail. They should try not to give ambiguous answers, such as 'larger', 'faster' and 'better', without any reference to the functions or characteristics of computer systems and services.