

INFORMATION AND COMMUNICATION TECHNOLOGY

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. In Question 1, less than half of the candidates demonstrated basic knowledge of cell format in spreadsheet and its application.

Q.1 In a spreadsheet, 5-digit membership numbers for a sports club, 00001, 00002, ..., 99999, are entered in some cells. Which of the following cell formats should be used?

- A. General format (9%)
- B. Number format (51%)
- * C. Text format (37%)
- D. Scientific notation format (3%)

2. Candidates demonstrated a basic understanding of data representation in computers. In Question 2, about half of them thought that '5' in a string was treated as a value in computer storage. In Question 8, only 39% of the candidates demonstrated the basic knowledge of two's complement representation although it is a popular topic in the examination.

Q.2 In a device, 8 bits and 16 bits are used to store a character and an integer respectively. How many bytes are required to store the string 'HKDSE5'?

- * A. 6 bytes (18%)
- B. 7 bytes (48%)
- C. 48 bytes (13%)
- D. 56 bytes (21%)

Q.8 1111 1111 is an 8-bit number using two's complement representation. What is its decimal value?

- * A. -1 (39%)
- B. 0 (10%)
- C. 1 (27%)
- D. 255 (24%)

3. In Question 12, the majority of the candidates understood the use of 'set columns' and 'insert a table'. Only about a third of the candidates were familiar with 'tab stops'.

Q.12 Peter uses a word processor to produce the rundown of a music performance, as shown below:

Name	Instrument	Time
Yvonne	Piano	2:00 pm
Alan	Violin	2:20 pm
Nelson	Flute	2:40 pm
Sammy	Oboe	3:00 pm

Which of the following can help Peter produce the rundown?

- (1) Set tab stops.
- (2) Set columns.
- (3) Insert a table.

- A. (1) and (2) only (5%)
- B. (1) and (3) only (11%)
- C. (2) and (3) only (50%)
- * D. (1), (2) and (3) (34%)

4. In Question 31, just below half of the candidates were able to apply basic analytical skills to trace the algorithm while the others overlooked the last output statement and its output value '15'.

Q.31 What is the output of the following algorithm?

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S ← 0
For J from 1 to 5
  Output J
  S ← S + J
Output S
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- A. 12345 (44%)
- * B. 1234515 (47%)
- C. 5432115 (6%)
- D. 5432121 (3%)

Paper 1B

- 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.
- Candidates' performance was generally satisfactory.

Question Number	Performance in General
1 (a)	Fair. Weaker candidates answered 'save storage', 'easy to share/search', or 'photos become clearer'. They were not aware of the need to compare the issues focusing on the differences between handling the ordinary photos and the digitised photos. For instance, digitising itself did not make any change to the original photos regarding storage saving.
(b)	Good.
(c)	Good.
(d)	Fair. Weaker candidates stated that grouping the photos into files is for easy searching. They were not aware that giving an appropriate filename is vitally important to facilitate searching in the computer system. The computer system needed 'data' (i.e. filename) to process.
(e)	Good.
2 (a)	Satisfactory.
(b)	Satisfactory. Weaker candidates did not demonstrate an understanding of the functions of DNS and wrongly wrote 'accessing a web site' as the answer.
(c)	Satisfactory. Some candidates gave some vague answers such as 'Charles would have loss in his bank account'. 'A loss of money' was not an answer because Charles had not provided any account information. Candidates should specify what would have happened after the click.
(d)	Poor. Many candidates were successful in tracing the value of FOUND. However, they were not able to analyse the two algorithms and point out the benefit of using an array to store the strings in the algorithm. Weaker candidates scored no mark by just describing what was happening in ALG2 without any comparison with ALG1.

Question Number	Performance in General
3 (a)	Fair. Some candidates wrongly stated that Solution Q could allow staff to use the software anywhere and anytime, which is unrelated to the requirements specified in the question. Some others focused on the exchange of data among staff which is not the benefit, because the arrangement is depending on the configuration of related software irrespective to whether the software is a standalone one or a cloud service.
(b)	Fair. Only a small number of the candidates were able to clearly explain both the functions of memory cache and bus system. Some other candidates seemed not to know the differences between memory cache, ROM, RAM and secondary storage and they mixed up the functions of different kinds of memory.
(c)	Satisfactory. Some candidates tried to address some health issues and focus on stating the arrangement of chair, desk, and monitor without any connection to the accounting system.
(d)	Satisfactory.
4 (a)	Good. Candidates should avoid writing vague answers in (i) such as 'product information'. Although costing is a feasible answer in (iv), it is difficult for candidates to provide a detailed analysis of the fixed cost and operating cost of different printers with a number of assumptions to be made.
(b)	Fair. About a third of the candidates were able to demonstrate sound knowledge of the use of chart to illustrate the result in a spreadsheet file.
(c)	Poor. Candidates were not able to state clearly the result of the pivot table. They wrongly treated the result as a graph.
5 (a)	Fair. In (i), only a quarter of the candidates answered correctly. The other candidates gave SSD, USB drive, etc. as the required memory storage and tried to describe the data transfer rate and justify their answer. In (ii), only a very small number of the candidates demonstrated sound knowledge of Bluetooth. Candidates usually gave vague answers such as 'faster speed' and 'connection at different places' without further elaboration.
(b)	Satisfactory.
(c)	Fair. Candidates should not only write partial content of PDATE, for example, either date or time, where no scores would be given.

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.
(b)	Fair. Weaker candidates used the wrong date format or omitted the quotation marks without reading the example of the date specification carefully.
(c)	Fair. Candidates were not familiar with the use of nested SQL or LEFT JOIN.
(d)	Poor. Candidates did not demonstrate an understanding of the concept of correlated query.
(e)	Poor. Candidates did not understand the question and gave irrelevant answers.
(f)	Good. Candidates were able to modify the table for the new requirement.
2 (a)	Fair. Only a small number of the candidates used INTERSECT to answer the question.
(b)	Fair. Weaker candidates omitted PID in the SELECT clause and just included the minimum and maximum. They did not use the view given in (i) to answer the question.
(c)	Very poor. Only a very small number of the candidates were able to compare different design approaches.
(d)	Very poor.
(e)	Very good.
3 (a)	Fair. Only a small number of the candidates were able to know more than one disadvantage of derived attribute.
(b)	Fair. Weaker candidates demonstrated limited knowledge of functional dependency and were not able to express them explicitly in writing.
(c)	Satisfactory. Weaker candidates were not able to express the potential problems in ORDER_FOOD even though they demonstrated some idea of the answer.
(d)	Satisfactory. The majority of the candidates identified the primary key and foreign key but did not justify the normal form correctly. Some of them considered ONO as the only primary key.
(e)	Satisfactory. Many candidates used text boxes for data input without taking the advantage of different input options, such as pull-down menu, check boxes and radio buttons.
4 (a)	Good.
(b)	Very good.
(c)	Good.
(d)	Very good. Candidates demonstrated good knowledge of ER diagram.
(e)	Fair. Weaker candidates demonstrated some difficulty in explaining the reason for their selected data fields for indexing. Their description of how data mining could be used mainly referred to frequency, minimum and maximum, demonstrating an insufficient understanding of the applications of data mining.

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 were able to identify the characteristics of the common wireless network standards.
(b)	Poor. Only a small number of the candidates were aware of the concept of roaming.
(c)	Satisfactory. Weaker candidates were not aware that the data transmission time for Network 1 is shorter because no encryption/decryption is needed.
(d)	Fair. Weaker candidates were not aware that although CSMA/CD uses collision detection, but collisions cannot be detected in wireless environment and hence CSMA/CD is not suitable for wireless networks. Only a small number of the candidates were able to specify that a random period of waiting time will be required for resending data in Network 2.
(e)	Fair.
2 (a)	Fair.
(b)	Satisfactory. Stronger candidates clearly illustrated the use of backup and the recovery process in the disaster plan for the database server.
(c)	Satisfactory.
(d)	Satisfactory. More candidates correctly answered the disadvantages compared with the advantages regarding online storage.
3 (a)	Satisfactory. A high proportion of the candidates demonstrated an adequate understanding of the setting of the IP addresses.
(b)	Poor. Only a very small number of the candidates realised the units for data transfer rate: 1 Gbps = 1,000Mbps.
(c)	Good. In (ii), a very high proportion of the candidates correctly identified the network setting of the mobile devices that are connected to the same network.
(d)	Fair. Weaker candidates demonstrated some difficulty in giving clear description of the ethical practices and user guidelines.
4 (a)	Fair. About half of the candidates demonstrated basic understanding of the use of different subnets.
(b)	Very poor. A small number of the candidates gave a suitable subnet mask and only some of them were able to describe how to configure the gateway for the router. Candidates should have more practice on configuring network devices.
(c)	Satisfactory.
(d)	Satisfactory. Stronger candidates gave a concise and organised description to illustrate the operation of the PING utility and the issue of Denial of Service (DoS) attack.

Paper 2C

- This paper assessed candidates' understanding of 'Multimedia Production' and 'Web Site Development', and the application of ICT knowledge in real life.
- Candidates' performance was generally fair.

Question Number	Performance in General
1	<p>(a) Satisfactory. Candidates were able to write down the pros and cons of the use of the latest version of HTML. Weaker candidates did not realise that plug-in may still be required by the latest version of HTML. They wrongly considered that some hardware or operating systems may not support the latest version of HTML.</p> <p>(b) Satisfactory. The majority of the candidates were able to give a valid reason to support the use of MP4. However, some candidates did not realise that it is not easy to edit a MP4 video file. About half of the candidates were able to give two commonly used video formats in web pages.</p> <p>(c) Fair. About half of the candidates realised that the font type is not installed in the computer. Weaker candidates just answered that it was due to the different browsers installed. They did not explain well why it would affect the display of the text in a different font. Only a small number of the candidates were able to give two ways to enable all users to view the text in the special font, especially the use of graphic to represent the text.</p> <p>(d) Satisfactory. A high proportion of the candidates were able to estimate correctly the file size of an uncompressed 20-second video. However, weaker candidates gave their answers not in the unit of MB as required. They just explained the different specifications between the three video settings without clearly describing how it will affect users to view the video. Moreover, their answers included some generic terms such as 'clearer', 'better' and 'smooth' without further elaboration. About half of the candidates demonstrated an understanding of streaming technology.</p>
2	<p>(a) Satisfactory. Candidates were familiar with the difference between the use of server-side and client-side scripts. However, the majority of the candidates wrongly explained why a client-side script instead of a server-side script is used in the system to implement the auto-fill function.</p> <p>(b) Poor. Only a very small number of the candidates were able to give a reason to support the use of the three text boxes. Weaker candidates mixed up 'data verification' with 'data validation'.</p> <p>(c) Poor. Candidates demonstrated the basic knowledge of the web design features like check box, range search and radio button. The minority were able to explain well how these features can help users to input data. However, only a very small number of the candidates gave a concise description for 'check box' in (i).</p> <p>(d) Very good. Candidates were very familiar with the distinctive features available in an online map. They seemed to frequently use online maps in their daily life.</p>

Question Number	Performance in General
3	<p>(a) Poor. Only a very small number of the candidates mentioned the issues of aspect ratio and inputting data for a small screen on mobile devices. Stronger candidates were able to describe clearly what should be considered in terms of web design skills and features.</p> <p>(b) Poor. Candidates wrote some generic terms without giving answers in web design context.</p> <p>(c) Satisfactory. Candidates were familiar with the concept of quiz and game in the web page design. Weaker candidates were not aware that they were asked to design the layout of a game for two-player on a mobile device. They were not able to describe clearly how to make use of their design to play the game. It was found that some designs of the online quiz were not feasible when the number of questions exceeds a certain amount.</p> <p>(d) Satisfactory. About half of the candidates suggested a good use of the location service for mobile devices. Weaker candidates were not aware the requirement of question that the service was provided for the company but not for the users or other agents.</p>
4	<p>(a) Good. The best candidates were aware that PNG is non-patented. Weaker candidates wrongly answered that the compression ratio of PNG is greater than that of JPG.</p> <p>(b) Fair. Weaker candidates mixed up the file formats of GIF and animated GIF.</p> <p>(c) Very good. Almost all candidates were familiar with the estimation of the file size of an uncompressed audio file. Weaker candidates were not aware that the answer should be expressed in MB.</p> <p>(d) Poor. The majority of the candidates realised the situations of wrong hyperlink and file missing in web page browsing. Only a small number of the candidates were able to list out the usage of the content of the metadata in the web page.</p> <p>(e) Poor. Candidates were in general very weak in describing an algorithm with the scripts. Only a small number of the candidates were able to use words precisely like 'switch alternatively' or 'toggle' to describe the change between the images after the click action. They usually based on JavaScript to write the scripts and manipulate the variable N, which stores the total number of  in the channel.</p>

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	<p>(a) Satisfactory. Stronger candidates were able to clearly identify the limitation of Rapid Application Development.</p> <p>(b) Poor. Only a small number of the candidates were able to recall the functions of linkers and loaders.</p> <p>(c) Good. Candidates were able to understand the string comparison and trace the subprogram <code>CmpRStr</code> correctly.</p>
2	<p>(a) Very good. A high proportion of the candidates were able to analyse the data structure and understand the use of queue.</p> <p>(b) Satisfactory. Only a small number of the candidates wrote the pseudocode completely correct. Weaker candidates used '7' instead of the variable 'n' in the code.</p> <p>(c) Fair. Weaker candidates used '7' instead of the variable 'n' in the code.</p> <p>(d) Satisfactory.</p>
3	<p>(a) Excellent. Almost all candidates were able to identify the sequence of the colouring method.</p> <p>(b) Fair. Stronger candidates wrote concise algorithms with minimal steps.</p> <p>(c) Very good. The majority of the candidates were able to understand the new colouring method and answered correctly.</p> <p>(d) Good. About two thirds of the candidates were able to identify the special cases for the images.</p>
4	<p>(a) Good. Although the question is a bit long, candidates were able to understand and analyse the critical statements in the algorithm and give the correct answers.</p> <p>(b) Very good.</p> <p>(c) Fair. Only a small number of candidates were able to write the program code to check the connectivity of the discs in a row. Some candidates gave irrelevant program code. They seemed to be lack of practice in programming skills.</p>

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 reveals that 61.4% of schools fell into the 'within the expected range' category, while 18.8% of schools were higher than expected, and 19.8% were lower than expected. Majority of the teachers do have a good understanding about the SBA implementation, and hence the marking standards are 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 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.
3. Teachers were requested to provide school-based project titles for their students to suit their needs. Students were asked to select a project title and recorded the project work with the product. When setting project titles for students, teachers are encouraged 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. The project work was asked to be recorded in written documents such as project reports and presentation documents, or in other formats when appropriate.
4. Students in general were able to manage an ICT project comprised of different stages, namely
 - (1) Design & Implementation
 - (2) Testing & Evaluation
 - (3) Conclusion & Discussion

It is encouraging that some students set appropriate titles and scopes of the projects for their individual needs and their teachers gave them advice on how to develop the good project management skills. In other words, students not only completed their project assignments effectively and scored well in the SBA, but also acquired good project management skills, which will help conduct and manage projects in ICT and projects in other disciplines in their future lives.

It is found that many students copied a lot of information from the web or make reference to the information provided by their teachers onto their projects, without giving their personal views on the ICT topics involved. Some students did not digest the meaning of the information well. Teachers should guide students to integrate what they have learnt and the information they have, in order to complete a more coherent and logical project assignment.
5. 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 and critical deadlines, 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.
6. Teachers are encouraged to 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 reminded to provide feedback to students, including their marks or grades on individual assessment tasks after the completion of the review or marking of those milestones planned for the project assignment.

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	66
D. Software Development	19

2. Candidates demonstrated a basic understanding of the applications of information and communication technology in the daily life. They should participate in more learning activities so as to have a wider exposure to different aspects of the ICT and its applications in the society.
3. Occasionally candidates made spelling mistakes or wrote incorrect words when writing keywords. For example,

Incorrect	Correct
Unque	Unique
Datbase	Dafabase
USB finger	USB flash memo _{ry}

4. Occasionally candidates gave flimsy answers, such as 'larger', 'faster' and 'better', without any reference to the functions or characteristics of computer systems and services. They were not able to apply relevant technical terms to various ICT concepts.