

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2017

INFORMATION AND COMMUNICATION TECHNOLOGY PAPER 1 (SECTION A)

8.30 am – 10.30 am

(2 hours for both Sections A and B)

INSTRUCTIONS

1. Read carefully the instructions on the Answer Sheet. After the announcement of the start of the examination, you should first stick a barcode label and insert the information required in the spaces provided. No extra time will be given for sticking on the barcode label after the 'Time is up' announcement.
2. When told to open this book, you should check that all the questions are there. Look for the words '**END OF PAPER**' after the last question.
3. All questions carry equal marks.
4. **ANSWER ALL QUESTIONS.** You are advised to use an HB pencil to mark all the answers on the Answer Sheet, so that wrong marks can be completely erased with a clean rubber. You must mark the answers clearly; otherwise you will lose marks if the answers cannot be captured.
5. You should mark only **ONE** answer for each question. If you mark more than one answer, you will receive **NO MARKS** for that question.
6. No marks will be deducted for wrong answers.

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

There are 40 questions in this paper. Choose the most suitable answers.

1. Three plaintext files contain some characters, as shown below:

2017.	JULY.	二零一七。
(1)	(2)	(3)

Assume that Unicode (UTF-8) is adopted. Which of the following comparative statements about the file sizes is correct?

- A. (1) > (3)
- B. (2) > (1)
- C. (2) > (3)
- D. (3) > (2)

2. There are two methods for entering dates into a web page, as shown below:

Method 1

April 2017						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

Method 2

Date:

What are the benefits of using Method 1 instead of Method 2?

- (1) Reduces input errors.
 - (2) It is more user-friendly.
 - (3) Detects errors by parity checking.
- A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)

3. Which of the following are the major benefits of using Object Linking and Embedding (OLE) in office automation software?

- (1) Data from different applications can be included in a single file.
 - (2) Data from different applications can remain synchronised.
 - (3) Data from different applications can be stored in the same folder.
- A. (1) and (2) only
 - B. (1) and (3) only
 - C. (2) and (3) only
 - D. (1), (2) and (3)

4. Amy plans to upload her photos to cloud storage. What is the benefit of using JPG format instead of BMP format in this case?
- A. Decreases the width and length of the photos.
 - B. Decreases the file size of the photos.
 - C. Increases the number of pixels in the photos.
 - D. Increases the number of colours in the photos.
5. When a digital photo is printed on photo paper, the top and bottom parts of the photo paper are unused. What is/are the possible reason(s) for this?
- (1) The aspect ratios of the digital photo and the photo paper are not the same.
 - (2) The file size of the digital photo is too large.
 - (3) The colour depth of the digital photo is too low.
- A. (1) only
 - B. (2) only
 - C. (1) and (3) only
 - D. (2) and (3) only
6. In a college, the registration form for each student has a unique bar code. The college will digitise the forms and store them in PDF format. What is/are the major benefit(s) of handling the forms in this way?

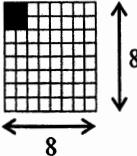
<u>Registration Form</u>	
Name: _____	
~~~~~	

- (1) The forms can be retrieved and used in different operating systems.
  - (2) Searching for a form can be faster.
  - (3) The forms can be printed on high quality paper.
- A. (2) only
  - B. (3) only
  - C. (1) and (2) only
  - D. (1) and (3) only
7. When creating an online email account, the following step needs to be completed.

Enter password:	*****
Re-enter password:	*****

What is the purpose of re-entering the password?

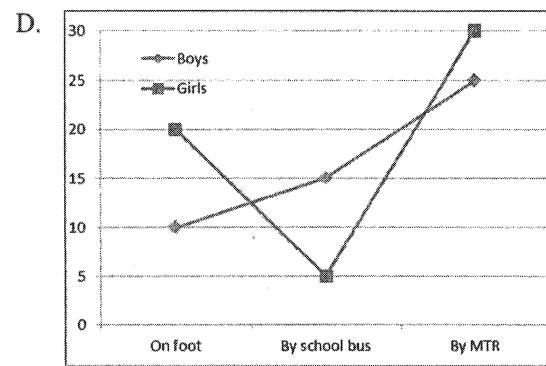
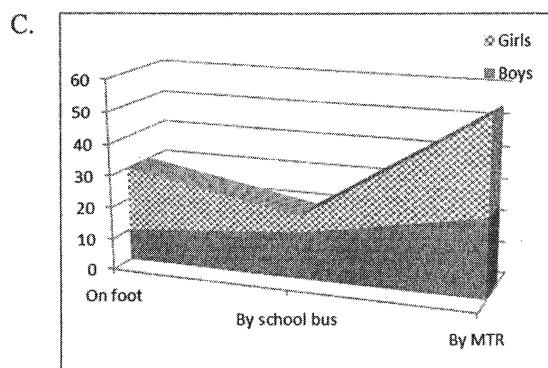
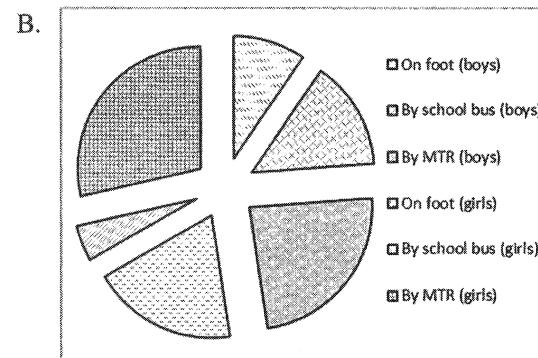
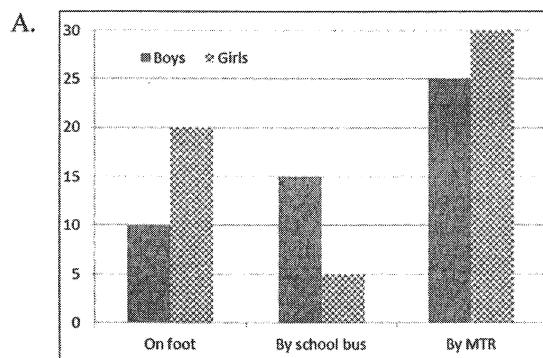
- A. Data collection
- B. Data verification
- C. Data organisation
- D. Data validation

8. Which of the following actions involve the conversion of analog to digital data?
- Using software to convert a spreadsheet file into a PDF file
  - Using software to convert speech to text
  - Using a digital camera to take photos
- A. (1) and (2) only  
B. (1) and (3) only  
C. (2) and (3) only  
D. (1), (2) and (3)
9. A black-and-white display board uses  $8 \times 8$  pixels to illustrate a pattern. The upper left 4 pixels must be black at any time. How many different patterns can the display board illustrate?
- 
- A. 60  
B. 120  
C.  $2^{36}$   
D.  $2^{60}$
10. What is the major benefit of using a form in a database management system?
- Simplifies data entry.
  - Simplifies report printing.
  - Saves storage space.
  - Filters data in a single database table.
11. For a chain convenience store, in which of the following examples should ‘what-if’ scenarios in spreadsheets be used?
- Estimates monthly expenses by changing different parameters.
  - Produces monthly sales analysis.
  - Compares sales data from different branches.
- A. (1) only  
B. (2) only  
C. (1) and (3) only  
D. (2) and (3) only
12. The following calculations involve 8-bit numbers using two's complement representation. Which one will generate an overflow error?
- 0001 0101 + 1000 1000
  - 0111 0011 + 1000 1000
  - 1100 0110 + 1000 1000
  - 1111 1100 + 1000 1000

13. Read the following survey data on ways of going home:

Ways of going home	Boys	Girls
On foot	10	20
By school bus	15	5
By MTR	25	30
Taxi	5	5
Private car	2	4

Which of the following types of spreadsheet charts can best represent data on the first three ways of going home?



14. Colour codes are used when defining the background colour on a web page. What is the range of hexadecimal values for the colour codes?

- A. 0 to 99
- B. 0 to FF
- C. 1 to 64
- D. 1 to AA

15. Which of the following items is/are system software?

- (1) Spreadsheet software
  - (2) Operating system
  - (3) Driver program
- A. (1) only
  - B. (2) only
  - C. (1) and (3) only
  - D. (2) and (3) only

16. Consider the following steps in a machine cycle for a particular instruction:

- (1) Executes the instruction.
- (2) Writes data in memory.
- (3) Translates the instruction into the operation code and operands.
- (4) Retrieves the instruction from memory.

What is the correct order of the steps?

- A. (3) → (1) → (2) → (4)
- B. (3) → (2) → (4) → (1)
- C. (4) → (1) → (3) → (2)
- D. (4) → (3) → (1) → (2)

17. A computer is used to edit videos. Which of the following specifications have a significant impact on the performance of the computer?

- (1) Size of RAM
  - (2) Number of USB ports
  - (3) CPU clock rate
- A. (1) and (2) only
  - B. (1) and (3) only
  - C. (2) and (3) only
  - D. (1), (2) and (3)

18. Which of the following statements about the registers in CPU is correct?

- A. Their read/write data transfer rates are high.
- B. Their functions are the same.
- C. They are used as secondary storage.
- D. Their total storage size is usually larger than 1 GB.

19. What information is usually provided by the system monitoring software in an operating system?

- (1) Current processes
  - (2) Memory usage
  - (3) Network traffic
- A. (1) and (2) only
  - B. (1) and (3) only
  - C. (2) and (3) only
  - D. (1), (2) and (3)

20. Which of the following is/are the government e-services provided by GovHK?

- (1) Enrolling for community recreation and sports programmes
  - (2) Applying for admission to universities in Hong Kong
  - (3) Renewing borrowed public library books
- A. (1) only
  - B. (2) only
  - C. (1) and (3) only
  - D. (2) and (3) only

21. Mary wants to buy a keyboard for her tablet computer. Which of the following connections is/are commonly used for keyboards?
- (1) Fibre optics  
(2) USB cable  
(3) Bluetooth
- A. (1) only  
B. (2) only  
C. (1) and (3) only  
D. (2) and (3) only
22. Bank customers can withdraw cash from their accounts through Automated Teller Machines (ATMs). Which of the following systems best describe(s) this operation?
- (1) Interactive system  
(2) Real-time system  
(3) Batch processing system
- A. (2) only  
B. (3) only  
C. (1) and (2) only  
D. (1) and (3) only
23. Which of the following is the major function of a switch in a school computer network?
- A. Facilitates data transmission between computers.  
B. Prevents unauthorised access.  
C. Increases the network bandwidth.  
D. Provides email services for users.
24. Which of the following is/are the advantage(s) of setting up a wireless network to replace a wired network?
- (1) Increased network speed.  
(2) Enhanced network security.  
(3) Increased mobility of computers.
- A. (1) only  
B. (3) only  
C. (1) and (2) only  
D. (2) and (3) only
25. Amy wants to buy a colour laser printer for use at home. What specifications should she consider?
- (1) Brightness (lm)  
(2) Printing speed (ppm)  
(3) Resolution (dpi)
- A. (1) and (2) only  
B. (1) and (3) only  
C. (2) and (3) only  
D. (1), (2) and (3)

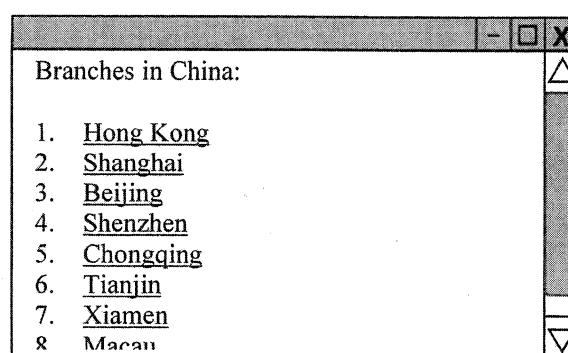
26. Peter is going to set up a web site for his new company so that customers can access his web site through any one of the following links:

web.goodcompany.hk  
www.goodcompany.hk  
www.goodcompany.com.hk  
www.goodcompany.com  
web.goodcompany.com

How many domain names does he need to register?

- A. 1
- B. 2
- C. 3
- D. 4

27. A web page of a company displays its eight branches in China, as shown below:



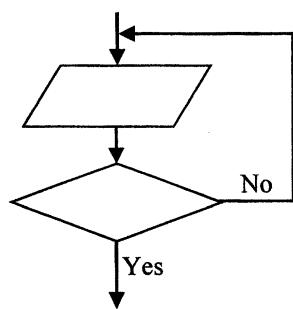
Which of the following modifications can let users clearly view all the branches without using the scroll bar on the right hand side?

- (1) Reduces the font size.
  - (2) Decreases the character spacing.
  - (3) Uses a table with multiple columns.
- A. (1) and (2) only
  - B. (1) and (3) only
  - C. (2) and (3) only
  - D. (1), (2) and (3)

28. A web page displays some images. In addition to the names of the image files, what other information will be included in the HTML code of the web page?

- (1) The paths of the image files
  - (2) The size of the image files
  - (3) The IP address of the server that stores the HTML file
- A. (1) only
  - B. (2) only
  - C. (1) and (3) only
  - D. (2) and (3) only

29. The following segment of a flowchart is used to represent a task in a cinema ticket booking system. What is the task?



- A. Prints a ticket.
  - B. Calculates a ticket price.
  - C. Displays a 'welcome' message.
  - D. Validates the number of tickets entered.
30. The problem-solving procedures for developing a computer system are listed below. What is the correct order of the procedures?

- (1) Tests the system.
- (2) Defines the problem.
- (3) Designs the algorithm.
- (4) Writes the program codes.

- A. (2) → (4) → (3) → (1)
- B. (2) → (3) → (4) → (1)
- C. (3) → (2) → (4) → (1)
- D. (3) → (4) → (2) → (1)

31. What is the output of the following algorithm?

```
K ← 0
For N from 1 to 3
    K ← K + N × N
Output K
```

- A. 3
- B. 9
- C. 14
- D. 30

32. Study the following statement:

```
If NOT ( X > 30 OR ( Y AND Z ) )
    Then output '****'
```

For which of the following combinations of the values X, Y and Z will '****' be displayed?

- |    | X  | Y     | Z     |
|----|----|-------|-------|
| A. | 20 | TRUE  | TRUE  |
| B. | 30 | FALSE | FALSE |
| C. | 40 | FALSE | FALSE |
| D. | 50 | FALSE | TRUE  |

33. A is an array with  $A[1]$ ,  $A[2]$  , ...,  $A[N]$  storing N non-zero values. What is the purpose of the following algorithm?

```
Input P
K ← P
While K <= N-1 do
    A[K] ← A[K+1]
    K ← K+1
N ← N-1
```

- A. Removes the P-th value in A.
  - B. Increases the value of P by 1.
  - C. Swaps the values of  $A[K]$  and  $A[K+1]$  for  $K \leq N-1$ .
  - D. Calculates the sum of the values in A.
34. Which of the following is/are security measure(s) an online bank can use to authenticate customers' identities?

- (1) Antivirus software
  - (2) Security token
  - (3) Digital watermark
- A. (1) only
  - B. (2) only
  - C. (1) and (3) only
  - D. (2) and (3) only

35. Which of the following may have security risks?
- (1) Using a public computer in a coffee shop to log on to an online bank
  - (2) Using the Wi-Fi network provided by a shopping centre to check email
  - (3) Using a public computer to check the digital certificate of a web site
- A. (1) and (2) only
  - B. (1) and (3) only
  - C. (2) and (3) only
  - D. (1), (2) and (3)

36. Which of the following behaviours may infringe intellectual property rights?
- (1) Sending an email with a virus to a friend
  - (2) Hacking into an online bank account
  - (3) Posting a scanned newspaper on a personal web site
  - (4) Uploading a video of a TV programme to the Internet
- A. (1) and (2) only
  - B. (1) and (4) only
  - C. (2) and (3) only
  - D. (3) and (4) only

37. What changes have been brought about by the emergence of the Information Age?
- (1) More office space is needed.
  - (2) New ICT-related jobs appear and change the job market.
  - (3) There are more opportunities to acquire information and to learn new things.
- A. (1) and (2) only  
B. (1) and (3) only  
C. (2) and (3) only  
D. (1), (2) and (3)
38. Ransomware is malware that encrypts victims' computer files and demands a ransom payment to restore them. How can we minimise the impact of ransomware?
- (1) Creates backups of computer files regularly.
  - (2) Do not open anonymous or phishing email.
  - (3) Do not download pirated copies of computer software through p2p software.
- A. (1) and (2) only  
B. (1) and (3) only  
C. (2) and (3) only  
D. (1), (2) and (3)
39. What are the major reasons for applying ergonomic design principles to computers in the work environment?
- (1) Prevents repetitive strain injury.
  - (2) Saves on costs of setting up computers.
  - (3) Provides a customised, adjustable setup for meeting different people's needs.
- A. (1) and (2) only  
B. (1) and (3) only  
C. (2) and (3) only  
D. (1), (2) and (3)
40. The World Health Organization (WHO) states that 15% of the world's population have disabilities. What can we do for these people to improve the access to ICT significantly?
- A. Gives persons with disabilities notebook computers.
  - B. Sets up free computer centres for persons with disabilities to access the Internet.
  - C. Develops appropriate tools for persons with disabilities to access ICT.
  - D. Provides free ICT training for persons with disabilities.

**END OF PAPER**

Please stick the barcode label here.

Candidate Number

**INFORMATION AND COMMUNICATION TECHNOLOGY**  
**PAPER 1 (SECTION B)**  
**Question-Answer Book**

8.30 am – 10.30 am

(2 hours for both Sections A and B)

This paper must be answered in English

**INSTRUCTIONS**

- (1) After the announcement of the start of the examination, you should first write your Candidate Number in the space provided on Page 1 and stick barcode labels in the spaces provided on Pages 1, 3 and 5.
- (2) **ANSWER ALL QUESTIONS.** Write your answers in the spaces provided in this Question-Answer book. Do not write in the margins. Answers written in the margins will not be marked.
- (3) Supplementary answer sheets will be supplied on request. Write your Candidate Number, mark the question number box and stick a barcode label on each sheet, and fasten them with string **INSIDE** this book.
- (4) No extra time will be given to candidates for sticking on the barcode labels or filling in the question number boxes after the 'Time is up' announcement.
- (5) The last page of this Question-Answer book contains a list of SQL commands and spreadsheet functions which you may find useful.



**Answer all questions.**

1. WAPP company develops an instant messaging application. Mary uses the application in her tablet computer to communicate with her friends.

- (a) The application provides an encryption function so that all messages can be encrypted before sending. Give a benefit and a drawback of this function.

Benefit: _____  
_____

Drawback: _____  
_____

(2 marks)

- (b) The application allows users to send messages with symbols such as ☺ and 🎉. However, the symbols are not represented as images in computer storage. Explain how the symbols are represented and the benefit of representing them in this way.

_____  
_____  
_____

(2 marks)

- (c) Mary uses the tablet computer to take a video and send it to her friend, Billy, through the application. She finds that the video Billy receives has a smaller file size than the original. Give two benefits of reducing the file size of the video.

_____  
_____  
_____

(2 marks)

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

Please stick the barcode label here.

- (d) Mary regularly uses the application with the tablet computer for four hours continuously every day in her workplace. Give a health problem that she may encounter and suggest a way to minimise the problem.

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(2 marks)

- (e) WAPP company requests Mary to store her data, such as contact list, previous messages and multimedia files, in its centralised servers through the application.

- (i) Give **two** possible uses of the users' data stored in the centralised servers that can benefit Mary.

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- (ii) Suggest **two** possible privacy threats posed by this request.

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(4 marks)

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

2. Peter participates in a video competition organised by Mr Wong in his school.
- (a) (i) Mr Wong requires students to submit videos in MP4 or AVI format. Give two major differences between the two video formats.

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- (ii) Mr Wong does not use system software to play the videos. Why not? Explain your answer with the functions of system software.

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(4 marks)

- (b) Peter estimates that 1-second video takes up 25 MB of storage space. Mr Wong only accepts videos with file sizes not larger than 30 GB. How long is the video that Peter could take? Show your calculation and express your answer in minutes.

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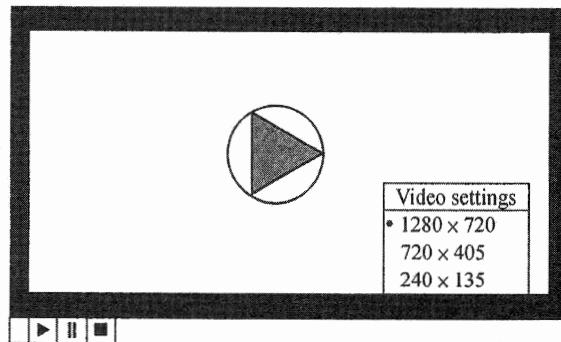
(2 marks)

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

Please stick the barcode label here.

- (c) Mr Wong will upload students' videos to a public video sharing web site. Afterwards, the students can play their videos from the web site, as shown in the figure below:



- (i) The web site uses the streaming method to deliver videos. What is the major benefit of this method? Explain briefly.

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- (ii) Why does the web site provide different options,  $1280 \times 720$ ,  $720 \times 405$  and  $240 \times 135$ , in the video settings?

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(4 marks)

- (d) Peter wants to use some videos published to the web site for his work. In order to avoid the infringement of copyright, what should Peter do? Give two examples.

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(2 marks)

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

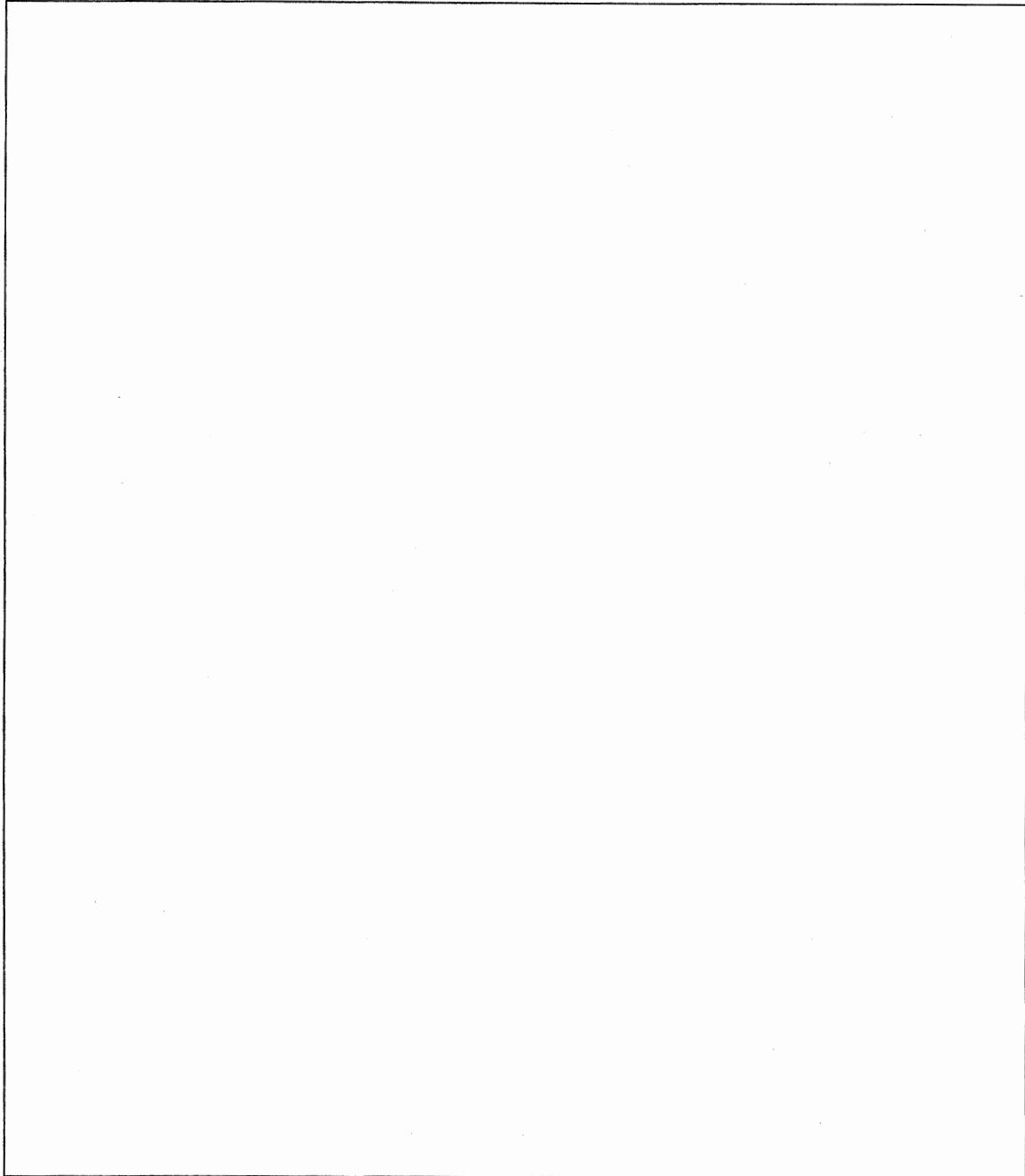
Answers written in the margins will not be marked.

3. A railway company develops a computer system that installs kiosks with touch screen display panels at stations.

(a) The kiosks should display the following train information on the display panels and help passengers look for the arrival times and platform numbers of trains.

- Train numbers, such as 3338 and 0910
- Destination, such as Shenzhen and Tianjin
- Arrival time, such as 14:30 and 08:00
- Platform numbers, such as 3 and 12

Design an interactive layout for the kiosks with annotations.



(3 marks)

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

(b) The data in the kiosks are stored in Electrically Erasable Programmable Read Only Memory (EEPROM), which is a form of flash memory.

(i) Give one difference between flash memory and RAM.

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(ii) Give one difference between flash memory and ROM.

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(2 marks)

On a certain route, there are 10 stations, A to J. The estimated travel time (hours) between any two adjacent stations is shown below. For example, the estimated travel time from station A to station B is 2 hours.



(c) What is the estimated travel time from station D to station G? _____ (1 mark)

In the computer system, the array W with  $W[1]$ ,  $W[2]$ , ...,  $W[9]$  is used to store the 9 estimated travel times respectively. That is  $W[1]=2$ ,  $W[2]=5$ , and so on.

(d) Complete the following algorithm to generate the estimated travel times from station A to station J.

$X \leftarrow$  _____

$Y \leftarrow$  _____

$T \leftarrow 0$

For i from X to Y

$T \leftarrow$  _____ + _____

Output T

(4 marks)

(e) What is the major advantage of using the variables X and Y instead of constant values in the loop?

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(2 marks)

4. John uses a database table STUDENT to store 2017 graduates' information in a school computer system.

STUDENT

Field name	Description	Example
REGNO	Registration number	20011001
CLASS	Class name	6A
CLASSNO	Class number	1
HKID	Hong Kong identity card number	A123456(3)
ENAME	English name	Wong Siu Fung
CNAME	Chinese name	王小凤
PNO	Parent's phone number	23456789

- (a) John considers creating a primary key for STUDENT so that it can be used for other database tables.

- (i) PNO may not be appropriate for use as primary key. Why not? Explain briefly.

- (ii) Suggest a primary key for STUDENT, other than HKID and REGNO.

(2 marks)

- (b) Give two kinds of validation checks on HKID that John should carry out.

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(2 marks)

- (c) (i) John cannot use ASCII to represent the data in STUDENT. Why not?

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- (ii) John needs to use Unicode instead of Big-5 code to represent the data in STUDENT. Why?

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- (iii) Compare the storage size requirements of Unicode and Big-5 code.

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(3 marks)

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

- (d) Suppose that STUDENT has the following five records.

STUDENT

REGNO	CLASS	CLASSNO	HKID	ENAME	CNAME	PNO
20011001	6A	1	A123456(3)	Wong Siu Fung	王小凤	23456789
20011002	6B	3	B234567(1)	Chan Tai Man	陳大文	29876543
20011003	6C	9	C345678(A)	Cheung Siu Keung	張小強	24567890
20011004	6B	8	D456789(8)	Lee Tai Keung	李大強	21234567
20011005	6A	2	E567890(4)	Wong Ka Ying	王嘉盈	22334455

What is the output after executing the following SQL command?

```
SELECT CLASS, COUNT(*) FROM STUDENT GROUP BY CLASS
```

(2 marks)

John uses a spreadsheet to store students' test marks in various subjects, as shown below:

	A	B	C
1	Registration Number	Subject	Test Mark
2	20011001	Chinese Language	40
3	20011001	English Language	50
4	20011002	Chinese Language	70
:	:	:	:
:	:	:	:

He wants to convert the table in the spreadsheet into the following format with a summary column:

	A	B	C	D	E	F
1	Registration Number	Chinese Language	English Language	Mathematics	Liberal Studies	Total
2	20011001	40	50	90	50	230
3	20011002	70	80	70	60	280
:	:	:	:	:	:	:
:	:	:	:	:	:	:

- (e) John attempts to use a pivot table to do the task described above. Complete the following steps for creating the pivot table.

Set _____ as the columns.

Set _____ as the rows.

Set *Test Mark* as the values with the _____ function.

(3 marks)

5. An online shopping web site provides various services for customers.
- (a) Customers carry out some Internet activities on the web site that involve the following protocols. Give an example of the Internet activities for each protocol.

HTTP: _____

SSL: _____

SMTP: _____

(3 marks)

- (b) The shopping web site sends a promotion email to a group of customers including Eva. Eva receives the email shown below:

From: no-reply@shopshop.com.hk

To:

cc:

Subject: Discount coupon

Dear Customers,

Please click the following link to collect the discount coupon:

<https://shopshop.com.hk/collect.php?ac=1234567890>

Customer Services Department

- (i) What is the major difference between 'To' and 'cc' (carbon copy) when sending emails to different recipients?

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- (ii) In this group email, Eva cannot see the email addresses of other recipients. Why not?

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- (iii) Someone claims that an IP address instead of 'shopshop.com.hk' should be used in the hyperlink in the email, as shown below:

<https://210.0.205.237/collect.php?ac=1234567890>

Give a benefit and a drawback of using an IP address in the hyperlink.

Benefit: _____  
_____

Drawback: _____  
_____

(5 marks)

- (c) Customers use usernames and passwords to log on to the web site.

- (i) Suggest two ways to make a login password more secure.

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- (ii) The web site plans to adopt tokens to strengthen security. How does a token help with customer authentication?

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(4 marks)

**END OF PAPER**

**Database (SQL commands – based on SQL-92 Standard)**

Constants	TRUE, FALSE
Operators	+, -, *, /, >, <, =, >=, <=, <>, %, _, ', AND, NOT, OR
SQL	ABSOLUTE (ABS), AVG, INT, MAX, MIN, SUM, COUNT, AT, CHAR_LENGTH (LEN), LOWER, TRIM, SPACE, SUBSTRING (SUBSTR/MID), UPPER, AS, BETWEEN, BY, ASC, DESC, DISTINCT, FROM, GROUP, HAVING, LIKE, NULL, ORDER, SELECT, WHERE

**Electronic Spreadsheet**

Constants	TRUE, FALSE
Operators	+, -, *, /, <, >, =, <>, <=, >=
Functions	ABS, INT, RAND, SQRT, ROUND, AND, NOT, OR, CHAR, CONCATENATE (&), ISBLANK, LEFT, LEN, LOWER, MID, PROPER, RIGHT, TEXT, TRIM, UPPER, VALUE, AVERAGE, COUNT, COUNTA, COUNTBLANK, COUNTIF, MAX, MIN, RANK, SUM, SUMIF, FIND, VLOOKUP, IF