

## 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. 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
  - B. Number format
  - C. Text format
  - D. Scientific notation format
  
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
  - B. 7 bytes
  - C. 48 bytes
  - D. 56 bytes
  
3. Study the following three SQL commands.

```
SELECT * FROM MEMBER
SELECT * FROM MEMBER WHERE age <= 40
SELECT * FROM MEMBER WHERE age >= 20
```

The results of the three SQL commands are the same. Which of the following is/are the possible cause(s)?
  - (1) MEMBER is empty.
  - (2) The values of the field age in MEMBER range from 20 to 40 inclusive.
  - (3) age is the only field in MEMBER.
  - A. (1) only
  - B. (3) only
  - C. (1) and (2) only
  - D. (2) and (3) only
  
4. Mary produces daily sales reports for a supermarket on a word processor, using the data and charts stored in several spreadsheet files. The data and charts are updated frequently. Which of the following is most helpful to her?
  - A. Mail merge
  - B. 'what-if' scenarios
  - C. Object linking and embedding
  - D. SQL
  
5. A code consists of 6 digits where the digit on the far right is a check digit. The check digit method used for the code is that the sum of all 6 digits is divisible by 10. Which of the following codes is valid?
  - A. 246822
  - B. 246824
  - C. 246826
  - D. 246828

6. Mary creates a compressed file containing image files stored in several folders. She uploads the compressed file to the Internet for sharing with her friends. What are the benefits of using a compressed file?
- (1) The folder structure can be maintained.
  - (2) Mary's friends can preview the images before downloading the compressed file.
  - (3) The compressed file can be protected by password.
- A. (1) and (2) only
  - B. (1) and (3) only
  - C. (2) and (3) only
  - D. (1), (2) and (3)
7. Consider the following values, P, Q and R.
- $$P = 10001000_2$$
- $$Q = 10001000_{10}$$
- $$R = 10001000_{16}$$
- Which of the following is correct?
- A.  $P > Q > R$
  - B.  $P > R > Q$
  - C.  $R > P > Q$
  - D.  $R > Q > P$
8. 1111 1111 is an 8-bit number using two's complement representation. What is its decimal value?
- A. -1
  - B. 0
  - C. 1
  - D. 255
9. Which of the following are characteristics of the Information Age?
- (1) Information is widely distributed via the Internet.
  - (2) Information can be quickly accessed by the public.
  - (3) All company information on the Internet is correct.
- A. (1) and (2) only
  - B. (1) and (3) only
  - C. (2) and (3) only
  - D. (1), (2) and (3)
10. When editing numerical data in a spreadsheet, which of the following statements is correct?
- A. Only relevant numerical data will be updated automatically.
  - B. Only relevant charts with the numerical data will be updated automatically.
  - C. Only relevant data in a single worksheet will be updated automatically.
  - D. Relevant data in multiple worksheets will be updated automatically.

11. Which of the following items can be included in a portable document format (PDF) file?

- (1) Hyperlinks
  - (2) Photos
  - (3) Formatted text
- A. (1) and (2) only  
B. (1) and (3) only  
C. (2) and (3) only  
D. (1), (2) and (3)

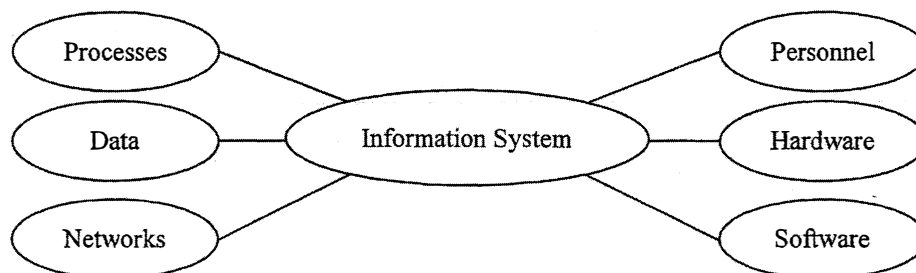
12. Peter uses a word processor to produce the rundown of a music performance, as shown below:

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

13. The following figure illustrates the components of an information system.



Which of the following matches is **not** correct ?

- | <u>Component</u> | <u>Example</u>                  |
|------------------|---------------------------------|
| A. Personnel     | Chief Information Officer (CIO) |
| B. Software      | Operating system                |
| C. Data          | FTP                             |
| D. Networks      | WAN                             |

Answer Question 14 and 15 with reference to the following passage.

Mary uses presentation software to create a self-running slide show with verbal commentary. She uploads the slide show to her web site so that the public can view it.

14. Which of the following must Mary do when creating the slide show?
- A. Set the timing of each slide.
  - B. Create hyperlinks in the slides.
  - C. Create animation effects in the slides.
  - D. Insert background music in the slides.
15. When Mary chooses the file format for the slide show, which of the following is important?
- A. Encryption support
  - B. Cross-platform
  - C. Object Linking and Embedding (OLE)
  - D. SQL support
16. Which of the following is/are the advantage(s) of using Unicode over Big-5 code?
- (1) Unicode is cross-platform.
  - (2) Unicode has a bigger character set.
  - (3) New characters can be defined in Unicode.
- A. (1) only
  - B. (2) only
  - C. (1) and (3) only
  - D. (2) and (3) only
17. A booking system consists of several booking counters in different locations in a city. Customers can buy tickets for theatres through one of the booking counters. Which of the following best describes the booking system?
- A. Real-time system
  - B. Batch processing system
  - C. Distributed processing system
  - D. Parallel processing system
18. Peter finds that when editing video files, the performance of his home computer is better than that of his office computer. Which of the following is/are the possible cause(s) for this?
- (1) The read/write access speed of a hard disk
  - (2) The storage size of ROM
  - (3) CPU's clock rate
- A. (1) only
  - B. (2) only
  - C. (1) and (3) only
  - D. (2) and (3) only

19. Which of the following functions will an operating system usually provide?
- (1) Control of processes
  - (2) Allocation of memory
  - (3) Record of network traffic
- A. (1) and (2) only  
B. (1) and (3) only  
C. (2) and (3) only  
D. (1), (2) and (3)
20. The clock rate of a CPU is 2 GHz. Which of the following statements is correct?
- A. The CPU executes  $2 \times 10^9$  instructions in a second.  
B. The CPU performs  $2 \times 10^9$  clock cycles in a second.  
C. The cache memory of the CPU transfers  $2 \times 10^9$  instructions in a second.  
D. The ALU of the CPU takes  $2 \times 10^9$  clock cycles for an instruction.
21. Peter upgrades a server by replacing the hard disk with a solid-state disk (SSD). Which of the following properties of SSD benefit(s) the upgrade?
- (1) Higher data transfer rate
  - (2) Lower power consumption
  - (3) Smaller storage capacity
- A. (2) only  
B. (3) only  
C. (1) and (2) only  
D. (1) and (3) only
22. When a personal computer is turned on, it loads data from the ROM and checks that all major components are functioning properly. ROM **cannot** be replaced by RAM in this process because
- A. the storage size of RAM is smaller.  
B. RAM is volatile.  
C. the data transfer rate of RAM is lower.  
D. RAM is random access.
23. The Internet of Things (IoT) refers to the networks formed by devices which can collect and exchange data. The networks are usually connected to the Internet. Which of the following items should the devices usually have?
- A. an IP address  
B. a CPU with a high processing power  
C. a DNS  
D. a large storage capacity

24. Peter watches a webcasting video at home using streaming technology and finds that the video does not play smoothly. Which of the following are the possible causes?
- (1) Duration of the video
  - (2) Method of Internet access
  - (3) Bandwidth of the Internet connection
- A. (1) and (2) only
  - B. (1) and (3) only
  - C. (2) and (3) only
  - D. (1), (2) and (3)
25. The Hong Kong Special Administrative Region Government has set up GovWiFi to provide free wireless Internet access and citizens can opt to use the unencrypted connection or the encrypted connection. Which of the following statements is correct?
- A. Citizens can only enjoy Internet access at designated spots.
  - B. Citizens cannot access online banking web sites through the unencrypted connection.
  - C. Citizens' devices can be protected from computer viruses through the encrypted connection.
  - D. Citizens will have priority to book the Government leisure facilities through GovWiFi.
26. Mr Li considers some communication links for building a network in a company and compares their effective data transfer rates. Which of the following comparisons is correct?
- A. Cat 6 (twisted pair) < Satellite < Fibre optics
  - B. Satellite < Cat 6 (twisted pair) < Fibre optics
  - C. Cat 6 (twisted pair) < Fibre optics < Satellite
  - D. Satellite < Fibre optics < Cat 6 (twisted pair)
27. Peter plans to upload the background music of his school web site but the web site has limited storage space. Which of the following file formats is appropriate?
- A. WAV
  - B. AVI
  - C. MPEG2
  - D. MP3
28. When placing a table in a web page, which of the following is **not** a table setting?
- A. Number of cells
  - B. Formulas in cells
  - C. Colour of cells
  - D. Width of the table



29. A simple web page is shown below.



Which of the following is the HTML code of the web page?

A. 

```
<HTML>
  <HEAD></HEAD>
    <BODY>Hello!</BODY>
</HTML>
```

B. 

```
Program HTML;
BEGIN
  WRITE('Hello!');
END.
```

C. 

```
<HTML>
  <MAIN>Hello!</MAIN>
</HTML>
```

D. 

```
<PROGRAM>
<BEGIN>Hello!</END>
</PROGRAM>
```

30. Which of the following pseudocodes produce the same result?

(1) IF P < 3 AND Q > 25 THEN  
    R ← R + 1

(2) IF Q > 25 THEN  
    IF P < 3 THEN  
        R ← R + 1

(3) IF P < 3 THEN  
    IF Q > 25 THEN  
        R ← R + 1

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

31. What is the output of the following algorithm?

```
S ← 0
For J from 1 to 5
  Output J
  S ← S + J
Output S
```

- A. 12345  
B. 1234515  
C. 5432115  
D. 5432121



32. NUM is an integer array. What is the output of the following algorithm?

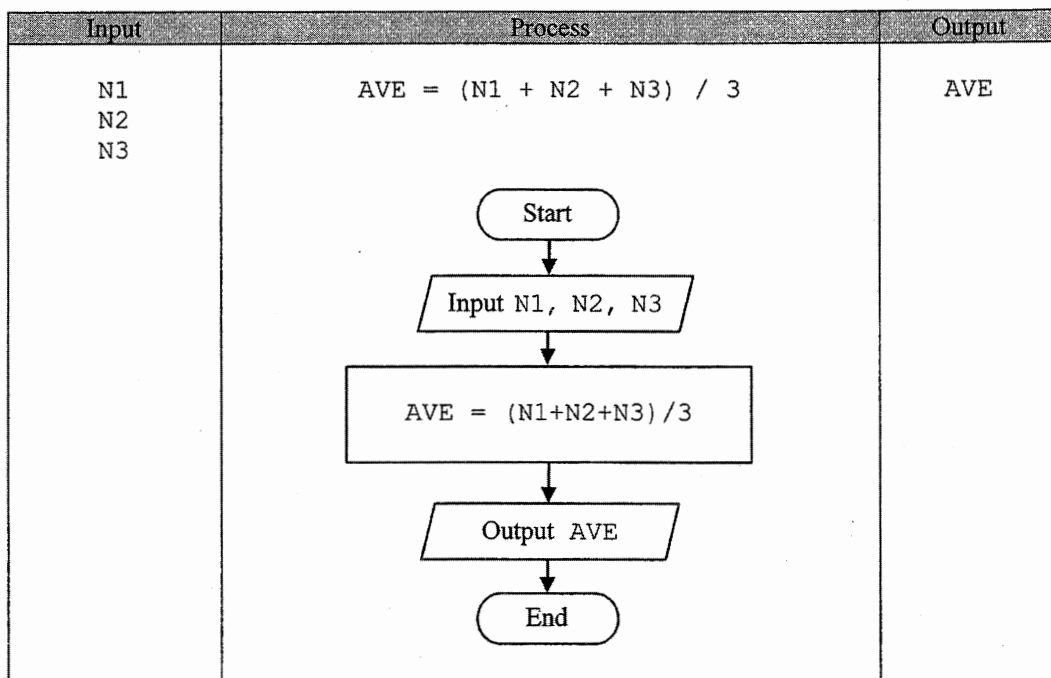
```

K ← 0
While K ≤ 100 do
    NUM[K] ← K × K
    K ← K + 1
Output (NUM[3] + NUM[4])

```

- A. 7
- B. 25
- C. 49
- D. 100

33. Study the problem shown in the Input-Process-Output (IPO) cycle below.

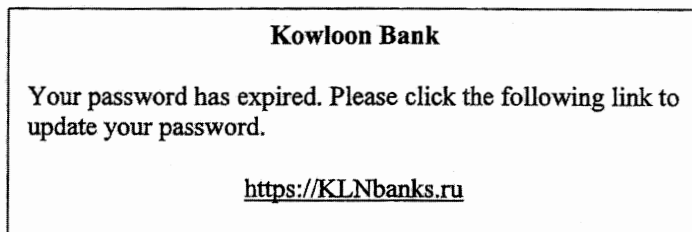


Which of the following statements is **not** correct?

- A. The IPO cycle illustrates the data type and data structure.
  - B. The problem shown is to find the average of three numbers.
  - C. The IPO cycle illustrates a solution to the problem.
  - D. The control structure of the flowchart shown in the 'Process' is a sequence.
34. A bank has a secure room which only a few staff members can enter. Which of the following security measures is the most secure one for controlling access?
- A. password
  - B. smart card
  - C. fingerprint
  - D. key

Answer Question 35 and 36 with reference to the following passage.

Cathy receives an anonymous email about changing the password of her online banking account, as shown below. She clicks the hyperlink in the email and a malicious web site is displayed.



35. Which of the following security issues is/are mainly involved in the instance?

- (1) Eavesdropping
- (2) Intrusion
- (3) Phishing

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

36. Which of the following actions can help Cathy ensure that she is browsing a trusted web site?

- A. Ensure that the domain name does not contain '.ru'.
- B. Verify the digital certificates of the web site.
- C. Follow hyperlinks in emails sent by friends instead of anonymously.
- D. Enable a firewall before browsing the Internet.

37. What is the aim of the following policy?

"The Government helps families in need acquire computers and Internet access, and delivers personal support and training to them so children and parents can tap the online world's potential."

- A. Promoting the freedom of information on the Internet
- B. Supporting e-government services
- C. Promoting the change in the nature of work
- D. Bridging the digital divide

38. Peter is a student and does the following actions. Which of them are illegal?

- (1) Uses a BT program to share his homework.
- (2) Uses a BT program to download copyrighted songs for his own use.
- (3) Buys copyrighted software and makes copies for his best friends only.

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

39. Mary downloads three types of programs, P, Q and R from the Internet. She can use P for a trial period, changes the source code of Q and only uses some functions in R. Which type(s) of program is/are shareware?
- A. P only  
B. Q only  
C. P and R only  
D. Q and R only
40. Betty buys a voice recognition dictionary mobile application to check meanings of words. When she installs the application in her mobile device, it shows the following request.

Setting		
This application is allowed to access your mobile device:		
Microphone	<input checked="" type="checkbox"/> Yes	No
Location	<input checked="" type="checkbox"/> Yes	No
Contact list	<input checked="" type="checkbox"/> Yes	No
<input type="button" value="Agree"/>		<input type="button" value="Cancel"/>

Which of the following settings should Betty allow?

- (1) Microphone  
(2) Location  
(3) Contact list
- A. (1) only  
B. (2) only  
C. (1) and (3) only  
D. (2) and (3) only

**END OF PAPER**

Candidate Number

This paper must be answered in English

- (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. Amy is going to produce a centenary photo album for a school. The alumni of the school provide a lot of old photos to her for the album. She plans to use a scanner to digitise all the photos.

(a) Give **two** benefits of digitising the photos.

---

---

---

---

(2 marks)

(b) Amy can save the photos in JPG, BMP or GIF format.

(i) Give one advantage of JPG over BMP.

---

(ii) Give one advantage of JPG over GIF.

---

(2 marks)

(c) (i) Give **two** settings of the scanner that will affect the quality of the scanned photos.

---

---

(ii) Amy realises that she does not need optical character recognition (OCR) software to process the scanned photos. Why not?

---

---

(3 marks)

Amy scans over 10,000 photos and stores them in a hard disk. She wants to organise the photos well.

(d) Suggest **two** ways for Amy to organise and manage the photo files so that she can easily search for the photos of a particular school activity.

---

---

---

---

(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.

(e) Amy plans to use publishing software to process the photos. She can use freeware X or commercial software Y to do so.

(i) Amy wants to use the trial version of Y. She has used the hyperlink posted in an online discussion forum to download a seed file and then obtained the software through a BT program. Give two potential problems that Amy might encounter.

---

---

---

---

---

(ii) Although the functions of X and Y are similar, Amy decides to use Y. Give a reason to support her decision.

---

---

(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.



2. Charles receives many emails through an email server in a company every day.

(a) Give two email protocols that can be used for receiving emails and state their major difference.

---



---



---



---

(3 marks)

One day, Charles receives a spam mail below:

Hi,

Congratulations! You have won a lottery. Please click on the following URL and log in to your bank account to collect your money.

<http://lottery.ibank.pl>

Mr Peter Chan  
Customer Service Manager

(b) If Charles clicks on the URL, what will the DNS do subsequently?

---



---



---

(1 mark)

(c) Although Charles clicks on the URL, he does not input his bank account information. Give two potential threats that he might encounter.

---



---



---



---

(2 marks)

Answers written in the margins will not be marked.



The email server can identify spam mail by matching strings in a data file. The array ST stores the strings in the data file, as shown below:

```
ST[1] ← "CONGRATULATIONS"
ST[2] ← "LOTTERY"
.....
ST[1000] ← "WINNER"
.....
```

The following two algorithms, ALG1 and ALG2, check whether the string stored in the variable check\_ST is included in the data file. They produce the same result. N is a variable for storing the total number of strings in the data file.

ALG1	ALG2
Input check_ST FOUND ← -1 For I from 1 to N If check_ST = ST[I] then FOUND ← I	Input check_ST FOUND ← -1 I ← 1 While (I ≤ N) and (FOUND = -1) If check_ST = ST[I] then FOUND ← I I ← I + 1

- (d) (i) Suppose that the string in check\_ST is "LOTTERY". After executing the algorithms, what is the value of FOUND?

- (ii) Give two test values of check\_ST to verify the algorithms effectively and describe your answer briefly.

- (iii) In the case of (d)(i), will ALG1 or ALG2 be more efficient? Explain briefly.

- (iv) What is the benefit of using an array to store the strings?

(6 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. Eva works in a trading company. She needs to acquire accounting software for her colleagues to use over the network in the company. She has three solutions:

Solution P: Buy and install standalone accounting software.

Solution Q: Subscribe to the cloud services of an accounting software provider.

Solution R: Develop a new accounting system.

- (a) Compare Solution P and Solution Q and give **two** benefits of each solution.

Solution P: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Solution Q: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(4 marks)

Eva wants to use Solution R.

- (b) (i) When purchasing a server, Eva considers the items in the following table. Give a function of each of the second and third items.

Item	Function
Hard disk	Store program data and user data.
Memory cache	
Bus system	

- (ii) Give **two** major hardware items that Eva should also consider.

\_\_\_\_\_

\_\_\_\_\_

(4 marks)

Answers written in the margins will not be marked.

- (c) Eva wants some designs built into the accounting system that can reduce the health hazards arising from prolonged use of the system. Describe **two** examples of such designs.

---

---

---

---

(2 marks)

- (d) Give **two** drawbacks of Solution R.

---

---

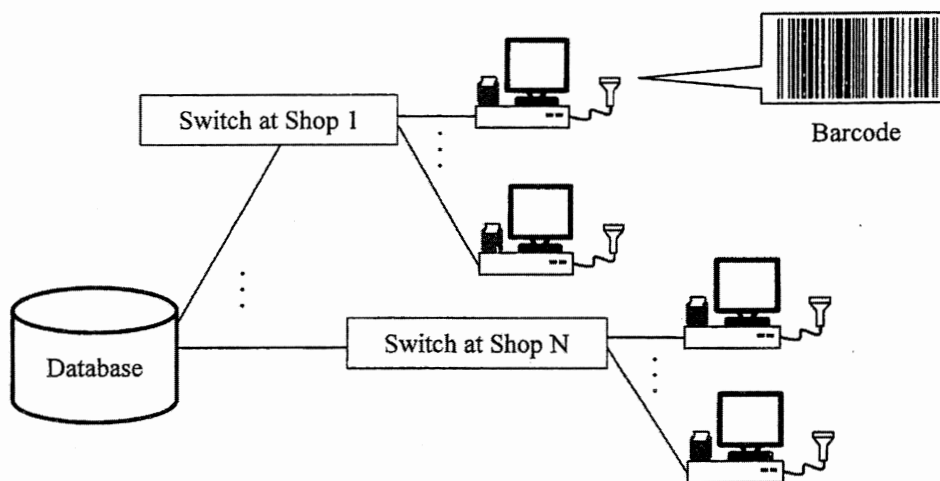
---

---

(2 marks)

Answers written in the margins will not be marked.

4. Mary is the IT manager of a toy shop chain. She sets up a point-of-sale (POS) system so that each shop has terminals with barcode readers and printers.



- (a) (i) What does a barcode represent?

---

- (ii) After a barcode printed on a toy is scanned, what essential information will be retrieved from the POS system?

---

---

- (iii) Which part of the POS system stores the essential information in (a)(ii)?

---

- (iv) Mary chooses thermal printers instead of dot-matrix printers for the POS system. Give two reasons to support her choice.

---

---

---

(5 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.

- (b) Mary produces a spreadsheet to summarise the daily net profit, as shown below:

	A	B	C
1	Profit target	50,000	
2	Date	Daily net profit	Remark
3	1-1-2016	30,500	0
4	2-1-2016	-10,200	0
5	3-1-2016	82,800	1
⋮	⋮	⋮	⋮
42	9-2-2016	5,800	0

- (i) In Column C, the value '1' indicates that the daily net profit is higher than or equal to the profit target value in B1, and the value '0' indicates that it is lower. Mary enters a formula in C3 and then copies it into C4 to C42. Write down the formula in C3.

- (ii) Mary wants to use a chart to illustrate the daily net profit. Suggest an appropriate chart Mary can use by giving the following information.

Select data range: \_\_\_\_\_

Choose chart type: \_\_\_\_\_

Set two chart properties: \_\_\_\_\_

(5 marks)

- (c) Mary uses spreadsheet software to analyse the daily net profit of the shops. She stores the daily net profit for February 2016 in a spreadsheet, as shown below:

	A	B	C	D
1	Store	Store manager	Net profit	Date
2	Central	John Lee	4,500	1-2-2016
3	Wan Chai	Kit Chan	-1,200	1-2-2016
⋮	⋮	⋮	⋮	⋮
291	Lai King	Joe Wong	-800	29-2-2016

Mary uses a pivot table to summarise the data in the spreadsheet and illustrate some summary information. Outline the pivot table with appropriate column and row headings.

(3 marks)

Answers written in the margins will not be marked.

5. Amy and Billy work in a company. Read their conversation and answer the questions below.

**Amy:** A new wearable device is very popular in the market. It is like a watch and it can communicate with a smartphone. We can develop a mobile health application for this device.

**Billy:** I am concerned about the storage capacity of the device and the transmission media. It should support Bluetooth and Wi-Fi.

(a) (i) What kind of memory storage should be used in the device? Why?

---

---

---

(ii) Give one benefit of using each of the following wireless transmission media.

Bluetooth: \_\_\_\_\_

Wi-Fi: \_\_\_\_\_

(iii) Other than storage capacity and transmission medium, give **two** major design considerations of the wearable device.

---

---

---

(6 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.



**Amy:** Before we write the program code of the mobile health application, I need to design a database table, CR, to record customers' heart beat rates.

**Billy:** The device has 8 GB storage.

CR

Field name	Type	Size (bytes)	Description
CUSTNO	Character	6	Customer number
HBR	Integer	4	Heart beat rate
PDATE	Date/Time	4	Recorded date and time

- (b) (i) Suppose that only 1 MB storage is reserved for storing CR in the device. What is the maximum number of records in the device?

---



---

- (ii) Billy does not suggest CUSTNO as the primary key for CR. Why not?

---



---

- (iii) Suggest a primary key for CR.

---

(3 marks)

- (c) Billy executes a SQL command on CR with eight records, as shown below.

CUSTNO	HBR	PDATE
10001	48	21-11-2015 12:20
10001	44	1-2-2016 10:10
10001	60	1-2-2016 16:50
10001	44	3-3-2016 11:54
10001	60	25-3-2016 13:58
10001	48	1-4-2016 14:36
10002	75	19-3-2016 17:05
10002	60	28-3-2016 12:11

```
SELECT HBR, MIN(PDATE) FROM CR
WHERE HBR < 50
GROUP BY HBR
```

What is the output?

(2 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