

HONG KONG EXAMINATIONS AND ASSESSMENT AUTHORITY
HONG KONG DIPLOMA OF SECONDARY EDUCATION EXAMINATION 2024

INFORMATION AND COMMUNICATION TECHNOLOGY PAPER 1

8:30 am – 10:30 am (2 hours)

This paper must be answered in English

GENERAL INSTRUCTIONS

1. There are two sections, A and B, in this Paper.
2. Section A consists of multiple-choice questions in this question paper. Section B contains conventional questions printed separately in the Question-Answer Book.
3. Answers to Section A should be marked on the Multiple-choice Answer Sheet. Answers to Section B should be written in the spaces provided in the Question-Answer Book. **The Answer Sheet for Section A and the Question-Answer Book for Section B must be handed in separately at the end of the examination.**

INSTRUCTIONS FOR SECTION A (MULTIPLE-CHOICE QUESTIONS)

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 SECTION A**' 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

Section A
There are 40 questions in this section. Choose the most suitable answers.

1. What is the range of 8-bit two's complement?

- A. -2^7 to 2^7
- B. -2^7 to $2^7 - 1$
- C. $-2^7 + 1$ to 2^7
- D. $-2^7 + 1$ to $2^7 - 1$

2. A teacher sends notes in PDF format instead of in DOCX format to students. Why?

- (1) The layout of the notes can be viewed the same across different operating systems.
- (2) DOCX files might contain viruses.
- (3) Hyperlinks to web sites can be included.

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

3. Which of the following is/are image file format(s)?

- (1) mov
- (2) png
- (3) ai

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

4. The spreadsheet below records school equipment.

	A	B	C	D
1	Model	Type	Quantity	Location
2	Printer A	Printer	5	Room 101
3	Scanner model 1	Scanner	2	Room 106
4	3D printer X	Printer	1	Computer lab
5	Printer A	Printer	1	Room 401
6	PC model Q	Computer	40	Computer lab
:	:	:	:	:

Which of the following can help display the total number of devices of the same type?

- A. Multiple worksheets
- B. Sorting
- C. Pivot table
- D. What-if analysis

5. A text file contains English, traditional Chinese and simplified Chinese characters. Which of the following character sets should be used?

- (1) UTF-8
- (2) ASCII
- (3) GB code

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

6. The MAC address of a network card consists of 6 groups of 2-digit hexadecimal numbers, as shown in the following example:

00:0A:95:9D:67:16

How many possible addresses can be represented by this format?

- A. 2^6
- B. 2^{12}
- C. 2^{24}
- D. 2^{48}

7. Which of the following is correct?

- A. Object linking is used to adjust the layout of database reports.
- B. The queries in databases are used to extract information from databases.
- C. The reports in databases are used to help users store data.
- D. Object embedding is used to execute application programs.

8. What is the advantage of using a form to input data into a database?

- A. The storage size for the data is smaller.
- B. The data filtering is faster.
- C. It facilitates the data input.
- D. The execution of SQL is faster.

9. What are the advantages of using a web-based presentation tool to create a presentation?

- (1) The file size of the presentation is smaller than that created by presentation software.
- (2) Users can collaborate with each other to work on the same presentation simultaneously.
- (3) The most up-to-date functions can be provided for creating the presentation.

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

Peter considers using the 'table of contents' function in word processing. Why?

10. Peter considers using the 'table of contents' function in word processing. Why?
 (1) It automatically generates hyperlinks of headings.
 (2) It increases the readability of documents.
 (3) It facilitates updates to the page numbers.
- A. (1) and (2) only
 B. (1) and (3) only
 C. (2) and (3) only
 D. (1), (2) and (3)

Answer Questions 11 and 12 with reference to the following spreadsheet.

	A	B
1	Choice	Point
2	P	3
3	P	3
4	Q	3
5	Q	0
6	P	0
7	Q	0

11. What are the results of the following two formulas?

$$=COUNT(B2:B7) \quad =RANK(3, B2:B7)$$

- A. 3 1
 B. 3 2
 C. 6 1
 D. 6 2

12. The spreadsheet is converted to a database table ABC. Which of the following SQL statements generate the same result?

- (1) SELECT COUNT(*) FROM ABC WHERE Choice <> 'Q' GROUP BY Choice
 (2) SELECT SUM(Point) FROM ABC WHERE Choice <> 'Q'
 (3) SELECT COUNT(*) FROM ABC WHERE Choice = 'P'

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

13. Which of the following member information in a sport club can be defined as a Boolean data type?

- (1) VIP member
 (2) Bank account number
 (3) Education level

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

14. Which of the following additions of 8-bit numbers using two's complement representation will result in an overflow error?

- A. 1001 1100 + 1100 1110
 B. 1001 1100 + 1111 1011
 C. 0010 0110 + 1111 0110
 D. 0010 0110 + 1110 1100

15. Which of the following is not commonly used for connecting to a home-use laser printer?

- A. Bluetooth
 B. USB cable
 C. WiFi
 D. Fibre optics

16. Eva experiences power failure when working on word processing on a desktop computer. Some of her working data can be restored. Why?

- (1) The working data is saved in the hard disk.
 (2) The working data is saved in the RAM.
 (3) The working data is saved in the ROM.

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

17. Driver programs P and Q are used in video conferencing and printing respectively. Which of the following descriptions is reasonable?

- A. P allows the operating system and web cameras to interact with each other.
 B. Q can be executed in different operating systems.
 C. P controls the number of concurrent users.
 D. Q controls the user rights for using printers.

18. Amy finds that her computer is infected by ransomware. What should she do immediately?

- A. Execute an anti-virus program to scan for and clean viruses.
 B. Install a firewall to block unauthorised access.
 C. Disconnect the network connection and shut down the computer.
 D. Format the hard disk.

19. Where is a bootstrap program for starting up a computer usually stored?

- A. CPU
 B. RAM
 C. ROM
 D. SSD

20. Which of the following statements about cache memory is correct?

- A. It is a type of ROM.
- B. It can only be found in the CPU.
- C. It stores frequently-used data and instructions.
- D. The data access rate of cache memory is lower than that of RAM.

21. Which of the following are the functions of an operating system?

- (1) Interact with devices and facilitate input/output operations.
- (2) Play video files.
- (3) Facilitate a computer to connect to a network.

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

22. Which of the following temporarily hold the data or instructions?

- (1) Accumulator
- (2) Instruction register
- (3) Memory address register

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

23. Ms Ng has registered *abc.edu.hk* as the domain name for a school. Which of the following URLs use?

- (1) <http://abc.hk>
- (2) <http://hk.abc.edu.hk>
- (3) <http://hk.abc.edu>

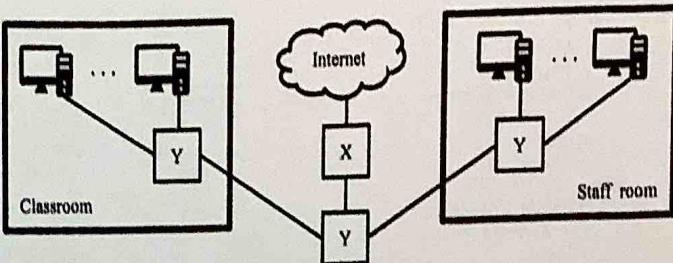
- A. (1) only
- B. (2) only
- C. (1) and (3) only
- D. (2) and (3) only

24. Which of the following protocols is/are usually involved in audio streaming services?

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

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

25. In the following network diagram, what is the major function of X?



- A. To connect a server to multiple workstations.
- B. To control the access rights of connected devices.
- C. To connect multiple computers together.
- D. To connect multiple networks together.

26. Greg develops a web site for friends to browse. Which of the following should he be concerned about?

- (1) The file sizes of multimedia elements used
- (2) The storage capacity of friends' computers
- (3) The user-friendliness of web pages

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

27. In the following algorithm, the final value of S is greater than 15. What is the smallest possible input value of N?

```
input N
S ← 0
for i from 3 to N do
    S ← S + i
```

- A. 5
- B. 6
- C. 7
- D. 8

28. What is the output of the following algorithm?

```
P ← 9  
Q ← 7  
R ← 4  
if P > Q+R then  
    if Q > 2*R then  
        X ← 10  
    else  
        X ← 20  
else  
    if Q > 2*R then  
        X ← 30  
    else  
        X ← 40  
output X
```

- A. 10
- B. 20
- C. 30
- D. 40

29. What is the output of the following algorithm?

```
M ← 1  
repeat  
    M ← M + 1  
until NOT (M <> 3)  
output M
```

- A. 2
- B. 3
- C. 4
- D. There is no output.

30. What is the output of the following algorithm?

```
S ← 0  
N ← 1  
repeat  
    S ← S + N  
    N ← N + 2  
until N > 6  
output S
```

- A. 3
- B. 4
- C. 9
- D. 16

Answer Questions 31 and 32 with reference to the following algorithm that searches for a value in an array A.

```
i ← 1  
FLAG ← FALSE  
input N  
while (i <= 10) [Missing part] FLAG do  
    if A[i] = N then  
        FLAG ← TRUE  
    else  
        i ← i + 1  
if FLAG then  
    output i  
else  
    output 'Not found'
```

31. What is the missing part above?

- A. OR
- B. AND
- C. OR NOT
- D. AND NOT

32. What is the purpose of using the variable FLAG?

- A. To store the location of the found value.
- B. To store the number of matchings.
- C. To act as an index.
- D. To control the loop.

33. Which of the following are the advantages of using modularity in writing programs?

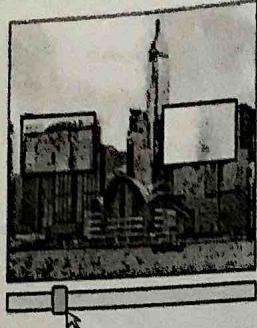
- (1) Some modules can be reused.
- (2) It is easier to debug programs.
- (3) It is faster to define a problem.

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

34. Which of the following is used to filter incoming and outgoing network traffic?

- A. Spyware
- B. Security token
- C. Firewall
- D. Digital signature

35. What is/are the purpose(s) of the task shown on the following screen when logging in to an online store?



- (1) To check that the login information is correct.
- (2) To verify that the login is done by a human.
- (3) To make sure that the login device is equipped with a touch screen.

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

36. When Tom registers a user account on a web site, he receives an email from the web site with a code for him to input. What is/are the purpose(s) of the code?

- (1) To verify his identity.
- (2) To ensure that the email is not a spam email.
- (3) To ensure that the web site and his account are protected by SSL.

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

37. Mary is a photographer and shares her photos with Peter and John. Which of the following will probably violate her intellectual property rights?

- (1) Mary shares the photos with Peter and John via Bit Torrent (BT).
- (2) Peter sells the photos to an advertising company.
- (3) Peter edits the photos using illegally copied software.

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

38. Which of the following statements about open source software is/are correct?

- (1) Everyone can use and modify the source code.
- (2) The software developers are responsible for providing software updates.
- (3) Everyone can rename and redistribute the software.

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

39. What ergonomic improvement should be made when using the computer below?



- A. Installing a trackball.
- B. Installing a touch screen.
- C. Using a smaller table.
- D. Installing armrests on the chair.

40. Which of the following are the major functions of PKI?

- (1) To ensure the integrity of data transmitted over the Internet.
- (2) To support a longer password.
- (3) To support data encryption.

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

END OF SECTION A

INFORMATION AND COMMUNICATION TECHNOLOGY
PAPER 1
SECTION B: Question-Answer Book

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, 5 and 7.
- (2) Refer to the general instructions on the cover of the Question Paper for Section A.
- (3) **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.
- (4) 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.
- (5) 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.
- (6) The last page of this Question-Answer book contains SQL commands and spreadsheet functions which you may find useful.

Candidate Number



Answer all questions.

1. A company uses a spreadsheet to store the attendance records of 4 staff members, as shown in the following example. If the staff enter and exit the office using their smart cards, the value 1 will be shown in Column D and Column E respectively, and 0 if otherwise.

	A	B	C	D	E	F
1	EID	NAME	DATE	SIGNIN	SIGNOUT	ATTENDED
2	S02	Ann	2024-02-28	1	1	1
3	S04	David	2024-02-28	0	1	1
4	S03	Susan	2024-02-28	1	0	1
5	S01	Tom	2024-02-28	0	0	0
6	S02	Ann	2024-02-27	0	0	0
7	S04	David	2024-02-27	1	0	1
8	S03	Susan	2024-02-27	0	1	1
9	S01	Tom	2024-02-27	1	0	1
⋮	⋮	⋮	⋮	⋮	⋮	⋮
81	S01	Tom	2024-02-03	0	0	0
82						
83	Summary					
84	EID	TOTAL		EID	TOTAL	
85	S01	17		S03	19	
86	S02	18		S04	18	
87						

Answers written in the margins will not be marked.

- (a) A staff member is considered to have attended if the corresponding value in either Column D or Column E is 1. In such cases, the value 1 will be shown in Column F. Otherwise, the value will be 0.

- (i) A formula is entered into F2 and then copied to F3:F81. Complete the formula in F2 below.

=IF(_____, _____, _____)

(2 marks)

- (ii) To calculate the total number of attended days of individual staff members, a formula =SUMIF(A2:A81, "S01", F2:F81) is entered into B85 and then copied to B86, E85 and E86. The result in B85 is correct but the results in B86, E85 and E86 are wrong. Correct the formula in B85 below.

=SUMIF(_____, _____, _____)

(2 marks)

- (iii) Besides verifying that fields are non-empty, describe a suitable validation for the data in D2:D81.

(1 mark)

Answers written in the margins will not be marked.

(iv) A1:F1 are column names and the records in A2:F81 have been already sorted. State the sort options below:

	Column name	Order (Ascending / Descending)
First sort by		
Then sort by		

(2 marks)

(b) Data in A1:F81 are converted to a database table ATTEND.

(i) Explain briefly why NAME cannot be a key field.

(1 mark)

(ii) State the primary key for ATTEND.

(1 mark)

(iii) Based on the first 8 given records on the spreadsheet, what is the output after executing the following SQL statement?

```
SELECT EID, COUNT(*) FROM ATTEND
WHERE SIGNIN + SIGNOUT = 1
GROUP BY EID HAVING COUNT(*) > 1
```

(2 marks)

(iv) Explain briefly why it is not necessary to convert and include data in A84:E86 in ATTEND.

(1 mark)

2. Tom plans to buy a new computer for video editing. There are two computers, P and Q, with the following specifications:

	P	Q
CPU	8 Cores, 3.6 GHz	8 Cores, 4.4 GHz
RAM	16 GB	16 GB
Secondary storage	1TB solid state drive (SSD)	4TB hard disk drive (HDD)
Graphics Processing Unit (GPU)	Integrated with CPU	Standalone (16 GB memory)
Network interface card	100 Mbps LAN	1 Gbps LAN
Port	2 × USB 3.0	4 × USB 3.0

(a) (i) Arrange the storage devices, SSD, HDD and RAM, in descending order by their data transfer rates.

_____ > _____ > _____

(1 mark)

(ii) Other than data transfer rate and storage capacity, describe a functional difference between RAM and SSD.

(1 mark)

(iii) Tom argues that Q is better for 4K video rendering. Give two reasons to support his argument.

(2 marks)

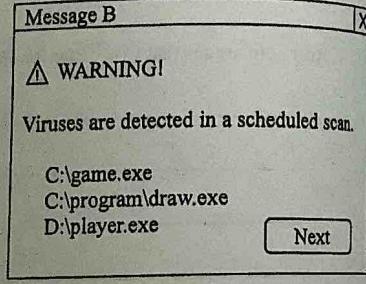
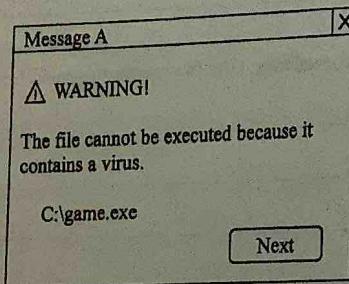
Answers written in the margins will not be marked.

(b) Finally, Tom buys Q and connects it to a LAN.

(i) Estimate the time required to receive a 5 GB video file from the LAN. Show your calculation.

(2 marks)

(ii) Tom reads that the anti-virus software in the computer displays the following messages on two different occasions.



Answers written in the margins will not be marked.

Which mode (batch processing or real time processing) best describes the virus scanning on each occasion? Explain briefly.

Message A: _____

Message B: _____

(2 marks)

Answers written in the margins will not be marked.

(c) When Tom tries to change his password in an online system, his new password does not fulfill three password requirements of the system, as shown below. Fill in the remaining two requirements.

Change password

Login name: Tom

Old Password: 

New Password: Tom1133 

Confirm New Password: Tom1133 

Confirm

Password requirements are NOT fulfilled

Password requirements

1. Minimum of 10 characters

2. _____

3. _____

(2 marks)

(d) Tom spends a lot of time using a keyboard in his work. Give a potential health hazard of this, and state a corresponding measure to protect his health, other than taking regular breaks.

(2 marks)

Answers written in the margins will not be marked.

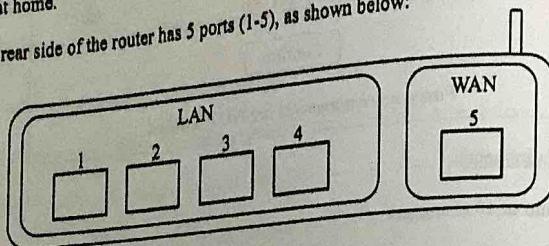
Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

3.

Ada uses wired connections to connect an all-in-one wireless router to her desktop computer and a broadband modem at home.

(a) The rear side of the router has 5 ports (1-5), as shown below:



(i) For each of the following devices, suggest a port to be used for connection.

Broadband modem: _____

Desktop computer: _____

(2 marks)

Answers written in the margins will not be marked.

(ii) Other than bandwidth, state an advantage of using a wired connection over a wireless connection between the router and the computer.

(1 mark)

Answers written in the margins will not be marked.

(b) Ada plans to send an important message to Bob through the Internet. Public Key Infrastructure (PKI) is used to guarantee the message originated from Ada. Ada and Bob have their own pairs of public and private keys (i.e. Ada's public key, Ada's private key, Bob's public key and Bob's private key). State the appropriate keys used in the transmission.

Ada uses _____ to sign the message.

Then, Bob uses _____ to verify the message.

(2 marks)

Answers written in the margins will not be marked.

(c) Ada often sends emails. Give two benefits of sending emails in HTML format instead of plain text format.

(2 marks)

Answers written in the margins will not be marked.

(d) Ada works in a school. She develops an online system for students to view examination papers in PDF format. Students can input a subject and a year to select a past paper, as shown below:

Examination paper system

Subject:	Chemistry	Year:	2018	Confirm
----------	-----------	-------	------	---------

Chemistry
2018 Exam Paper

(i) Redesign the layout of the web page to improve the user-friendliness for the following:

- selecting a past paper
- navigating PDF documents
- viewing PDF documents

Annotate your design.

Examination paper system

(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.

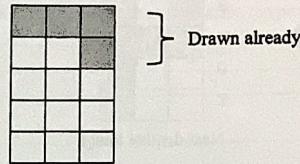
(ii) Suggest two measures to protect the copyright of the past papers.

Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

4. A display board consists of 5×3 black-and-white dots. Bit patterns are used for representing the display image where 1 and 0 represent a black dot and a white dot respectively.

- (a) (i) Complete the following display image represented by the bit pattern 111 001 010 100 111. The first two rows have been drawn already.



(1 mark)

- (ii) An even parity bit is added at the end of the original bit pattern.

- (1) Write the bit pattern (16 bits) representing the following display image.



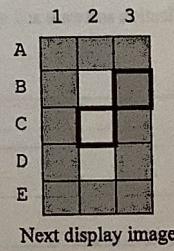
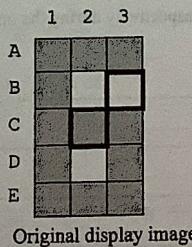
(2 marks)

- (2) How many different images can be shown by this display board? _____

(1 mark)

- (b) When a display image is changed, some dots are toggled (i.e. from black to white or from white to black). These dots are then recorded.

In the following example, the dots to be toggled are B3 and C2.



Answers written in the margins will not be marked.

Answers written in the margins will not be marked.

(i) State the dots to be toggled below.

	1	2	3
A			
B			
C			
D			
E			



A	1	2	3
B			
C			
D			
E			

Next display image

Original display image

(2 marks)
(ii) How many bits are required to record the position (e.g. B3) of one dot? Explain briefly.(2 marks)
(iii) Draw the next display image below that requires the maximum number of bits to record the dots be toggled.

	1	2	3
A			
B			
C			
D			
E			



A	1	2	3
B			
C			
D			
E			

Next display image

Answers written in the margins will not be marked.

(c) Suggest a function of application software and system software respectively during the operation of the display board.

Application software: _____

System software: _____

(2 marks)

5. Array A stores 6 integers. The algorithms ALG1 and ALG2 validate the following requirements (I) and (II) respectively.

- (I) All integers in A are positive.
 (II) Integers in A are sorted in ascending order.

(a) Referring to the requirements above, describe the purposes of using the following invalid test data:

Case 1:	A[0]	A[1]	A[2]	A[3]	A[4]	A[5]
	3	3	5	5	8	5

Purpose: _____

Case 2:	A[0]	A[1]	A[2]	A[3]	A[4]	A[5]
	-1	-1	3	5	5	8

Purpose: _____ (2 marks)

(b) ALG1 outputs TRUE if all integers in A are positive, FALSE if otherwise. Complete the pseudocode for ALG1 below.

```

P ← TRUE
for i from [ ] to [ ] do
  if [ ] then
    P ← FALSE
  output P
  
```

(2 marks)

(c) ALG2 outputs TRUE if all integers in A are sorted in ascending order, FALSE if otherwise. Complete the pseudocode for ALG2 below.

```

S ← TRUE
for i from [ ] to [ ] do
  if [ ] then
    S ← FALSE
  output S
  
```

(2 marks)

(d) Below is the algorithm ALG3.

<u>Line number</u>	<u>Content</u>
1	$C \leftarrow 1$
2	$M \leftarrow 1$
3	$N \leftarrow A[0]$
4	for i from 1 to 5 do
5	if $A[i-1] = A[i]$ then
6	$C \leftarrow C + 1$
7	else
8	$C \leftarrow 1$
9	if $C > M$ then
10	$M \leftarrow C$
11	$N \leftarrow A[i]$
12	output N

(i) Suppose that the initial content of A is:

$A[0]$	$A[1]$	$A[2]$	$A[3]$	$A[4]$	$A[5]$
3	5	5	5	8	8

What are the contents of C , M and N after completing the first, second and last iterations of loop (Lines 4 to 11)?

	C	M	N
First iteration			
Second iteration			
Last iteration			

(4 marks)

(ii) What is the purpose of ALG3?

(2 marks)

END OF PAPER

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

Constants	TRUE, FALSE
Operators	+, -, *, /, >, <, =, \geq , \leq , \neq , %, _, ', 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	+, -, *, /, <, >, =, \geq , \leq , \neq
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