Marking Schemes

Paper 1 (Section A)

Question No.	Key	Question No.	Key
1.	B (56)	21.	B (54)
2.	B (83)	22.	C (43)
3.	D (86)	23.	A (85)
4.	A (78)	24.	D (62)
5.	C (87)	25.	B (54)
6.	D (53)	26.	C (27)
7.	D (32)	27.	D (53)
8.	A (85)	28.	A (40)
9.	C (50)	29.	A (37)
10.	C (88)	30.	A (72)
11.	A (37)	31.	B (72)
12.	C (21)	32.	B (19)
13.	A (29)	33.	B (35)
14.	D (64)	34.	C (73)
15.	B (42)	35.	C (40)
16.	A (39)	36.	D (89)
17.	C (63)	37.	A (62)
18.	D (75)	38.	B (73)
19.	A (71)	39.	A (92)
20.	B (77)	40.	D (88)

Note: ***Figures in brackets indicate the percentages of candidates choosing the correct answers.***

General Notes on Marking

1. This document was prepared for markers' reference. It should not be regarded as a set of model answers. Candidates and teachers who were not involved in the marking process are advised to interpret its content with care.

2. The following symbols are used:

×	This symbol indicates a wrong or unacceptable answer.
▒	Shaded words, figures or ideas are not essential for the candidate to be awarded the point.
/	A single slash indicates an acceptable alternative within an answer.
+	A plus sign indicates that there are two pieces of information and the second part will be awarded points only when the first part is correct.

3. In questions asking for a specified number of reasons or examples etc. and a candidate gives more than the required number, the extra answers should not be marked. For instance, in a question asking candidates to provide two examples, and if a candidate gives three answers, only the first two should be marked.

Paper 1 (Section B)

				Marks
1.	(a)	(i)	Advantage: It is easy to control / set up the printer.	1
			Disadvantage: The printer can be used only when the desktop computer is on. / The desktop computer runs slower when the printer is printing.	1
		(ii)	(1) data of the document	1
			(2) printer's firmware / startup program	1
	(b)	(i)	WiFi network through the wireless router Bluetooth USB cable	1×2
		(ii)	data transfer rate / maximum length of a cable segment	1
	(c)		X ⇨ LAN	1
			Y ⇨ WAN	1
	(d)	(i)	DNS resolves domain names into IP addresses for the purpose of locating network services and devices worldwide.	1
		(ii)	Yes, John does not need it because his network is just a LAN / setup of a DNS is complicated and his SOHO network is a simple network / ISP can provide this service for him.	1
2.	(a)		smaller file size/ supported by many browsers	1
	(b)	(i)	POP3, IMAP	1×2
		(ii)	Add Alan's email address in the trust (non-spam) list of the email client program.	1
		(iii)	Alan and Betty	1
	(c)	(i)	It has a higher data transfer rate. / It consumes less electricity. / It is smaller in size. / It has a better shock resistance. / It is lighter. / It is more durable.	1×2
		(ii)	Yes, copyright ownership does not require any registration or declaration.	1 + 1
	(d)	(i)	It can store more data. / It has a higher error correction capability. / It can be scanned in different orientation. / It can be made up of more types of data (e.g. Kanji)	1
		(ii)	It is faster to input the URL into a mobile device for accessing the web site. / It can reduce typing errors.	1
		(iii)	It can store a phone number or contact information. / It can store product information.	1

			Marks
3.	(a)	improper viewing angle of the monitor / improper height of the monitor / distance from the monitor to his eyes too close / insufficient light / close to the window without curtain	1×2
	(b) (i)	Charles would download some software that the sources come from unidentified individual users; the software might be privacy copies.	1
	(ii)	Charles can share working files with other colleagues efficiently.	1
	(c)	Charles' computer is infected with new computer virus in anonymous files when using BT program. Charles deactivates his anti-virus software. Charles does not regularly update the definition database of the anti-virus software.	1×2
	(d) (i)	$2^{14} < 20{,}000 < 2^{15}$ 15 bits are needed.	1 1
	(ii)	Other than the Chinese characters, there are characters of other languages such as Japanese.	1
	(e)	He accesses the email account without authorization. He steals the coupon.	1 1
	(f)	No, SSL is used to secure the data transmission. (encryption)	1+1
4.	(a) (i)	`TRANID`	1
	(ii)	`DUEDATE` – It should not be earlier than `LOANDATE`. `FINE` – It should be a non-negative number.	1 1
	(b) (i)	20101001 3 20102002 1	1 1
	(c) (i)	`=IF(D2>10,"Y","N")`	1
	(ii)	`=SUMIF($C$2:$C$160,$G3,$D$2:$D$160)` ① or ① ① all correct	1, 1
	(d) (i)	The content in `A1` of the worksheet in the spreadsheet is deleted.	1
	(ii)	There is no change in the spreadsheet.	1
	(e)	The hyperlinks involve Sarah's local files. The file sizes of the multimedia elements are too large. Some videos cannot be played because some codec is missing.	1×2

Marks

5. (a)
```
0                                                    1
<=                                                   1
TOTAL + T[I]                                         1
```

(b) (i) `>=` 1

(ii) Yes, it is because the first comparison in the `while` loop (`T[1] >= T[1]`) is redundant. 1

(c)
```
Execute ALG1     (or ALG2)                           1
Execute ALG2     (or ALG1)                           1
PAYMENT ← TOTAL - T[M]                               1
```

(d) (i) Single-user system: As the system is used to find the 20 members, one single user should be sufficient to generate the list of the members. 1 + 1

(ii) Batch processing system: As the system will generate the list based on the monthly total amounts, it should be a batch processing system to perform the tasks in one batch each month. 1 + 1

Paper 2A

Marks

1 (a)
```
select BTITLE
from BOOK
order by SID DESC
```
1
1

(b)
```
select BTITLE
from BOOK, BORROWNG
where BOOK.BID = BORROWING.BID and
not RET and
BTITLE like 'P%'
```
1
1
1

(c)
```
select SUM(VB)                          ①
from BOOK, STUDENT
where STUDENT.SID = BOOK.SID        } ①
and SNAME = 'MARY'
```
2

(d)
```
select SNAME from STUDENT, BORROWING
where STUDENT.SID = BORROWING.SID and
year(bdate) = 2012
group by STUDENT.SID
having count(*) > 25
```
1
1
1
1

(e) (i) List the names of the students who have not shared any book 1

(ii)
```
Select SNAME from STUDENT S
left outer join BOOK b
on s.SID = b.SID
where b.BID is null          (any field in BOOK)
```
1
1
1

(iii) MINUS (EXCEPT) 1

2. (a) EMPLOYEE(EID, Employee Name, Project number) 2
Primary key: EID Foreign key: Project number

PROJECT(Project number, Project Name) 2
Primary key: Project number Foreign key: Nil

(b) (i) EID + SDATE 1

(ii) It stores meta-data that describes MES. 1

(c) (i) Use login name and password. 1

(ii) Delete 1

(iii) Some users can only access the views so that they would access limited data, fields and records. 1

(d) (i) - Referential integrity 1
- MES has foreign keys related to EMPLOYEE. 1

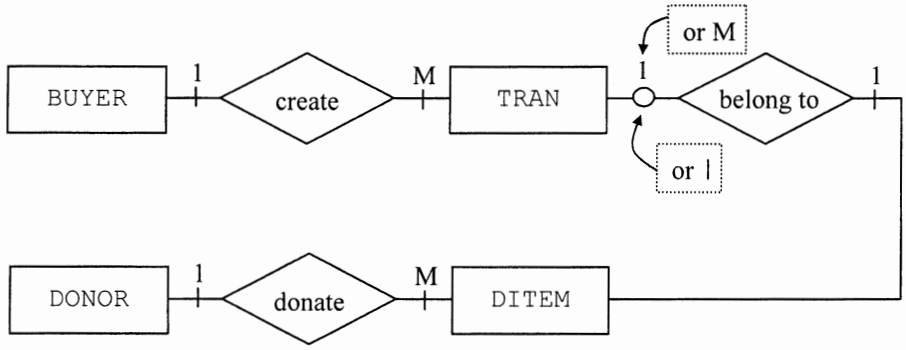
(ii) Add another field (e.g. ERASE) such that it marks whether the message is sent or received by employee who has left. 2

			Marks
3.	(a)	The filtering is simpler	1
		but the efficiency is low when a large amount of data is involved.	1
	(b)	`Insert into`	1
		`PLANT (DDATE, NAME, EMAIL, AR, GYEAR, TYPE, AMOUNT)`	
		`Values ('20/03/2013', 'Lo Sam',`	1
		`'slo@hkedcity.net','127','2001','A',888)`	1
	(c) (i)	56	2
	(ii)	It requires less storage size as each integer could occupy less than 3 bytes, the size of `AREA`.	1
	(iii)	It is very difficult to validate the data such as having '1's in the number.	1
	(d) (i)	system requirements specification	1
		deliverables	1
	(ii)	- record purpose	1
		- maintenance in future	1
	(iii)	Tom should conduct data conversion before the data migration to make sure	1
		that data consistency is held. (or data preparation)	1

Marks

4. (a) Database administrator / designer 1

(b) 6



Entity ①, ①
Relationship ①, ①
Cardinality ①, ①

(c) Advantage: Simplify the design. / A buyer could be a donor as well. (save storage) 1
Disadvantage: The SQL performance may be poorer as the table size is larger. / An extra field is required to distinguish between buyer and donor. / It cannot identify buyer/donor. 1

(d) (i) The bidding history of all buyers with names is shown. 1

(ii)
```
select AMOUNT, BDATE
from BID                    }
order by bdate  (or amount)
```
1
1

(e)
```
SELECT MNAME FROM BUYER, BID
WHERE BUYER.MID = BID.MID AND
AMOUNT = (select max(AMOUNT)                    ①
          from BID where DID = 'D123')
```
1
1

or in

(f) Mary can use data mining to analysis the relation to buyers who bid items. When a buyer makes a bid, the web site can display a list of items in which the buyer may be interested. 2

Paper 2B

				Marks
1.	(a)	(i)	TCP port number	1
		(ii)	Network mask: 255.255.255.0 Default gateway: 192.168.10.3	1 1
	(b)	(i)	Connect another network.	1
		(ii)	It provides a secure channel for Vicky to connect to the network.	1
		(iii)	It automates the assignment of IP addresses.	1
	(c)	(i)	Use WPA2 encryption method. Use a longer encryption key. Hide SSID.	1×2
		(ii)	The MAC address is different. She should add the MAC address of the network card in the new tablet in the Access Control List.	1 1
	(d)		Router can select a channel with less collision.	2
	(e)		Stability – It will not be influenced by the environment such as obstacles to the connection. Security – Data packets will not easily be collected.	2 2
2.	(a)	(i)	Visual image	1
		(ii)	bit stream of visual image	1
		(iii)	IP camera	1
		(iv)	Monitor	1
	(b)	(i)	The IP cameras capture the images and send them in one way only.	1
		(ii)	Advantage: The time for transmission is shorter. Disadvantage: There are more overheads for the transmission.	1 1
	(c)	(i)	Replace the other CAT5 cables with optical fibres. Upgrade the switch with a higher throughput capacity.	1, 1
		(ii)	While the IP cameras are capturing images, viewers can control the movement of the cameras. The data are sent in both ways.	2
	(d)	(i)	TCP. The completeness of the video data is the key and all data should be received.	1+1
		(ii)	UDP. Timely transmission is the key and some data loss is acceptable.	1+1

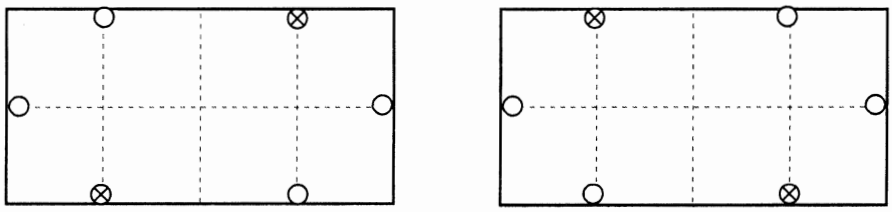
Marks

3. (a) (i) Simulate the network access by 100 mobile devices to test whether the information of the current exhibition can be accessed and measure the corresponding response times. 1 1

(ii) User manual should be given and visitors need to set up their devices to connect to the Intranet. 1
The museum should have sufficient support service for 100 visitors during the peak hours. 1

(b) (i) They cannot find the network in some areas. (insufficient network coverage) 1×3
They cannot access the Intranet as the other APs are fully connected. (maximum number of connections)
The throughput of the connections is low. (low throughput)

(ii) 1 1



It can have a better coverage.

(c) network management 1×2
Health problems
installation cost

(d) (i) It is an outdoor area between the halls and the server. / It is difficult to install cables. 1

(ii) It manages the connections between the APs in the hall and Y. 1, 1
① ①

Marks

4. (a) The access control can be well managed. (network management) / 1×2
The effective network bandwidth is higher. /
The level of security is higher. /
Some areas (e.g. basement and rooms with medical equipment)
that the mobile network is not applicable can be covered by the WiFi network.

(b) Manage the distribution of the medical data in an efficient way. (distribution) 1
Manage the access rights of the data. (security) 1

(c) (i) If circuit switching were used, the communication channel by a user will be occupied till the end of the transmission. Even though no actual communication is taking place, the channel remains reserved and protected from other users. Hence only one doctor's messaging device can receive patient's medical data at a time. 2

(mechanism ① + application ①)

(ii) Data is divided into packets with headers and trailers which contain the package information. Packets from different messaging devices can be sent through the network at the same time but in different order. The receiving ends can reorder the packets received according to the information stored in the header and trailer. 2

Different routes ①
Divide and reassemble ①

(d) (i) The storage size needed can be expanded or trimmed down easily. (flexibility) 1×2
The maintenance of the file servers is provided by the third parties.

(ii) If there is no Internet access, the Cloud storage cannot be accessed. / 1×2
The throughput is questionable. /
There might be some data security issue during the data transmission through the Internet. /
There might be some privacy issue when the data is stored in the host and managed by their staff.

(e) (i) Bluetooth/ultra-wideband (UWB) 1

(ii) The communication range is smaller. / 1×2
There are ad hoc network connections. /
It involves an individual person only. /
Usually there is one single server only.

Paper 2C

Marks

1. (a) (i) No installation is needed. / Movies can be watched using a browser. / cross platform (with explanation) — 1

download, streaming, watch online ×

(ii) It is easier to deliver the updated version. / cross platform (with explanation) — 1

Better management of customer or movie records, kept from being downloaded ×

(b) Advantage: It is compatible with many common video players. / No extra Codec is needed / It has a better quality (least compression needed). — 1

No codec is needed. ×

Disadvantage: The file size is large. / It does not support streaming. — 1

(c) (i) It has a shorter waiting time. — 1

Save time ×

(ii) It has a graphics display card with poor computation power. / There is not enough memory. (hardware) — 1
not up-to-date, not good enough ×

The network bandwidth of the customer's computer is not sufficient. / The server is busy. / The network traffic is busy. (network) — 1

(d) $60 \times 1024 \times 1024 \times 8 / 200$ or $60 \times 8 / 200$ — 1
$= 2516582.4$ bit/s or 2.4 Mbps (2.5Mbps) — 1

(e) (i) MP4, MKV, AVI (H264, AVCHD), WMV, FLV, MOV — 1×2

codec, FFmpeg, DivX, Xvid, x264, mpeg ×

(ii) Number of lines scanned per second (height ①) — 2

Resolution, number of pixels scanned per second/ each frame/ in the width ×

(iii) In progressive video, all lines in each frame are refreshed one by one. — 1
update line by line ×

In interlace video, every other lines in each frame are refreshed. — 1
change one after another / after layer ×

				Marks
2.	(a)		PNG: Yes, No JPG: Yes, Yes BMP: No, No	1 1 1
	(b)	(i)	The browsers interpret some HTML codes differently. / The browsers have different padding or margin setting.	1
		(ii)	table / frame / CSS / image / layer	1x2
	(c)	(i)	Search engines use this data when adding pages to their search index. / Peter wants to increase the chance of being searched by search engines. / Define character encoding scheme.	1
		(ii)	description of the web page / keywords / title / author / copyright / creation date / character encoding / refresh web page / re-direction (any other valid usage)	1x2
	(d)		$5184 \times 3456 \times \underline{24 \text{ bits}}$ = 51 / 51.3 / 51.26 MB	1 1
	(e)		Frame rate / resolution / File format / transition effect / audio / sub-titles	1x3

				Marks
3.	(a)	(i)	It prevents software robots from reading the text. / It ensures that the response is made by human being. / It prevents registration or posting automatically generated by software. (prevent hacker's attack / prevent copy & paste ×)	1
		(ii)	It can be read by Braille reader / screen reading software. (blind people can use alternative text ×)	1
		(iii)	Output the information in audio format. (sound validation ×)	1
	(b)		Use client-side scripting (JavaScript) on Username (or other input fields) to check blank input.	1 + 1
			Use server-side scripting (Database) on Username and password to validate the customer.	1 + 1
	(c)		Drawback 1: User may not input codes of song correctly.	1 + 1
			Solution 1: Insert the code automatically when clicking a song in the list. / Add an 'add to cart' button in every row of song. / Add a check box next to the song. (Use pull down menu ×)	
			Drawback 2: User cannot delete or amend any selection, as the selected songs are not displayed. / User cannot review what they have bought.	1 + 1
			Solution 2: Add a table to display the selected songs and allow amendments to be made. (Add a reset / undo button ×)	
			Other possible answers: songs are not in (alphabetical) order → add sorting function / searching function	
			(Drawback: Each time users can only input one code. / The text field is too short. / 'Keep shopping' button is useless. / Each time users can only buy one song. / The total amount is not calculated automatically. Solution: Add a quantity field. / Add a singer field. ×)	
	(d)	(i)	In one second, 44,100 samples are taken. (44.1 × 1024 ×)	1
		(ii)	16 bits of data is used to represent each sample. / The sample size is 16 bits.	1
		(iii)	It is a kind of humanisation that it produces sound heard from various directions as in natural hearing. / Use two channels (left and right) to record sound.	1
			The song is livelier when it is played. / The recorded song close to real one. (waveform) (better quality / good sound / record sound clearly / two sound tracks ×)	1
	(e)		Phase	1
			Amplitude / loudness (file type / file format / compression method / duration / length ×)	1

Marks

4. (a) (i) Some activities have lengthy names. The entire names can clearly be viewed. / The width / display size is smaller. It suits mobile phone/devices. 1+1

(ii) If there are many different activities, the design can fix the length of the list of the activities shown for selection. / The selected activities are shown clearly. 2

(iii) Show a dialog box to confirm the selection. 1

(b) (i) Add a 'Deselect' / 'Reset' button to de-select all chosen items and users can simply re-select the items from the beginning. / Reduce the time for reloading. 1+1

(ii) Running the script by the Submit button: 3

```
n ← 0
i ← 0
For each i,
    if act[i] is selected (or equals 1),
      n ← n + 1
```

Condition (if statement) ①
Increment `n` value by 1 in if statement ①
Looping concept ①

Running the script by event-driven:
When the `i`-th check box is clicked,

```
    if act[i] is not selected/ =0,
      n ← n + 1
    else
      n ← n - 1
```

Description of the event ①
Condition of the increment of `n` ①
Condition of the decrement of `n` ①

(c) (i)
```
if i > 1
swap P[i-1] and P[i]
```

```
temp ← P[i-1]
P[i-1] ← P[i]
P[i] ← temp
```

1
1

(ii)
```
if P[i+1] is not null / P[i] is not the last
swap P[i] and P[i+1]
```

```
temp ← P[i+1]
P[i+1] ← P[i]
P[i] ← temp
```

1
1

Paper 2D

Marks

1. (a) (i) (1)

After first pass

X[1]	X[2]	X[3]	X[4]	X[5]	X[6]
5	2	3	1	4	6

1

After second pass

X[1]	X[2]	X[3]	X[4]	X[5]	X[6]
2	3	1	4	5	6

1

(2)

X[1]	X[2]	X[3]	X[4]	X[5]	X[6]
1	2	3	4	5	6

2

(3) 25 1

(ii) Agree. The result is the same and the algorithm becomes more efficient since fewer comparisons are involved. 1

(iii) (1) `X[ n-1 ]` or `X[ 5 ]` 1

(2) for `i` from 1 to 2 do Steps 2 to 6 2

(b) (i) (1)

X[1]
1

X[12]
12

1, 1

(ii) 12 1

(iii) If `(i<>0) and ((j=0) or (P[i] < Q[j]))`
then `X[k] ← P[i]` and `i ← i - 1`
else `X[k] ← Q[j]` and `j ← j - 1`

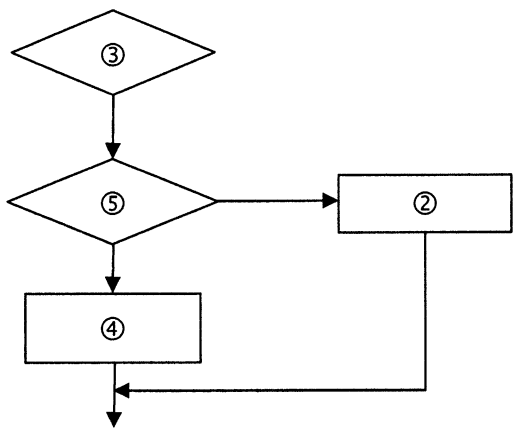
If `(j<>0) and ((i=0) or (P[i] > Q[j]))`
then `X[k] ← Q[j]` and `j ← j - 1`
else `X[k] ← P[i]` and `i ← i - 1`

3

① ( ) or ( )
② Correct conditions
③ All correct

2. (a) Compiler 1
It is because a compiler can optimize the machine code such that CAL can run faster. 1

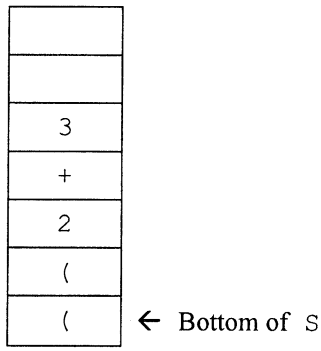
(b) 1×4



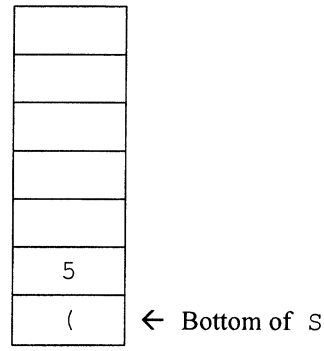
Marks

2. (c)

When `i` is changed from `5` to `6`



When `i` is changed from `6` to `7`



2, 2

(d) `5` 2

(e) Set A: valid data 1
Set B: Invalid data 1
Set C: Extreme cases / boundary cases 1

3. (a) (i) 9 1

(ii) Task 2 depends on the result of Task 1. (finish-to-start) 1

(b) A mistake may be made in testing or other stages above. 1, 1
Mr Li should check each stage one by one starting from Testing, Implementation, Design and so on. 1

(c) (i) Design 1

(ii) 1×5

Username/password	©
Auction item information	1
Biding entry	5
Create auction	3
Authentication	2
User information	4

(d) (i) 3

[Pascal version]

```
function myRAND:integer;
begin
  randomize;
  myRAND := random(1000)+1;
end;
```

[C version]

```
int myRAND() {
  srand(time(NULL));
  return rand()%1000 + 1;
}
```

[Visual Basic version]

```
FUNCTION myRAND() as Integer
  Randomize
  myRAND = 1000*RND + 1
END FUNCTION
```

[JAVA version]

```
static int myRAND() {
  Random dice = new Random();
  return = dice.nextInt(1000) + 1;
}
```

(ii) greater than 1000 1

(iii) smaller than 1000 and not a factor of 1000 1

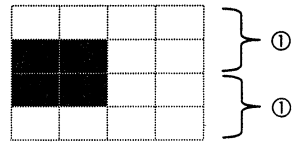
Marks

4. (a)

Method 2

0	4
1	2
0	2
1	2
0	6

Image



2

(b) (i) Best case: All are black / white pixels. 1
Worst case: Black and white pixels are alternatively located. 1

(ii) The representation is simple. / The computation is faster. 1

(c) (i) 1×5

[Pascal version]
0
P[1] / BD[1,1]
current
1
1

[Visual Basic version]
0
P(1) / BD(1,1)
current
1
1

[C version]
0
P[1] / BD[1][1]
current
1
1

[JAVA version]
0
P[1] / BD[1][1]
current
1
1

(ii) Agree. The digits are either 0 or 1 and are alternatively arranged in sequence. There is no need to store them. 2

(d) Object-oriented language: 1
A class can be written and maintained (debugged) independently of other classes. /
The details of the internal implementation can be hidden. (information hiding)
The classes can be reused. (Reusability)

Procedural language: 1
It is easy to trace the program logic / write the source code with fewer restrictions.