Marking Schemes

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.

General Notes on Marking

1. Teachers are strongly advised to conduct their own internal standardisation procedures using the marking scheme before the actual marking begins. After standardisation, teachers should adhere to the marking scheme to ensure a uniform standard of marking within the school.

2. The marking scheme may not exhaust all possible answers for each question. Teachers should exercise their professional discretion and judgment in accepting alternative answers that are not in the marking scheme, but are correct and well- reasoned.

3. 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.

4. 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 A)

Question No.	Key	Question No.	Key
1.	B (55%)	21.	B (57%)
2.	A (70%)	22.	A (32%)
3.	D (31%)	23.	B (49%)
4.	C (76%)	24.	D (41%)
5.	A (63%)	25.	D (52%)
6.	D (51%)	26.	B (76%)
7.	B (79%)	27.	B (78%)
8.	C (60%)	28.	D (83%)
9.	C (63%)	29.	B (66%)
10.	D (35%)	30.	C (88%)
11.	C (38%)	31.	D (40%)
12.	B (62%)	32.	D (55%)
13.	A (73%)	33.	A (42%)
14.	A (62%)	34.	C (79%)
15.	D (85%)	35.	B (97%)
16.	A (53%)	36.	A (82%)
17.	A (61%)	37.	B (40%)
18.	C (53%)	38.	C (56%)
19.	C (63%)	39.	D (93%)
20.	C (62%)	40.	B (70%)

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

Paper 1 (Section B)

Marks

1. (a) (i) `=IF(D2+E2>=1, 1, 0)`
A B

2

Either A or B correct ①
All correct ①

Alternatives for A:

`D2+E2>0`	`D2+E2 = 0`
`OR(D2=1,E2=1)`	`AND(D2=0,E2=0)`
`OR(D2,E2)=TRUE (=1 ×)`	`AND(NOT(D2),NOT(E2))`

Alternatives for B:
0, 1

Not accept for B:
`"1","0"`
`'1','0'`

(ii) `=SUMIF($A$2:$A$81, A85, $F$2:$F$81)`
① ①

1 , 1

(iii) Fixed value check / Type check / Range check /
Check for 1 or 0 / Ensure the data is an integer / Check if the data is between 0 and 1

1

Not accept:
Format check / Presence check / Length check

(iv) `DATE / C1` Descending 1
`NAME / B1` Ascending 1

(b) (i) It is not unique. 1

(ii) `EID + Date` 1
Accept:
`EID , Date`
`Date + EID`

Not accept:
`EID + Date + Name`

(iii) S03 2
S04 2

1 + 1

(Order of `EID` is not important)
{Any 1 record / select + group by / where + group by + having} ① all correct ①

(iv) Data in `A84:E86` are a derived summary of the data. (Redundancy) 1
Data in `A1:F81` are raw data. (Raw data)
The total number of attended days can be derived by a SQL query. (Regeneration)

2. (a) (i) RAM > SSD > HDD — 1

(ii) RAM is volatile and SSD is non-volatile. / RAM is primary storage and SSD is secondary storage. — 1

(iii) Q has a CPU with better processing power as it has a higher clock rate. / Q has a dedicated GPU with standalone memory for better graphical processing. — 1×2

(b) (i) 5 x 1024 x 1024 x 1024 x 8 / 1000 x 1000 x 1000 x 1000 = 42.9 seconds or — 1, 1
5 x 1000 x 1000 x 1000 x 8 / 1000 x 1000 x 1000 x 1000 = 40 seconds
① ①

(ii) Real-time processing can stop the infected file from being executed immediately if it contains a virus. — 1

Batch processing can scan the virus at a particular scheduled time. — 1
(by scheduled scan / accumulate tasks and then show the results of multiple records.)

(c) A combination of uppercase letters, lowercase letters, numbers and symbols. — 1×2
Prohibiting the use of the login name in the password.

(d) Repetitive strain injuries (RSI) to his wrists / carpal tunnel syndrome / wrist pain / hand pain / finger pain — 1

A keyboard with an ergonomic design that helps to keep his hands in a natural position. / — 1
A silicone wrist rest

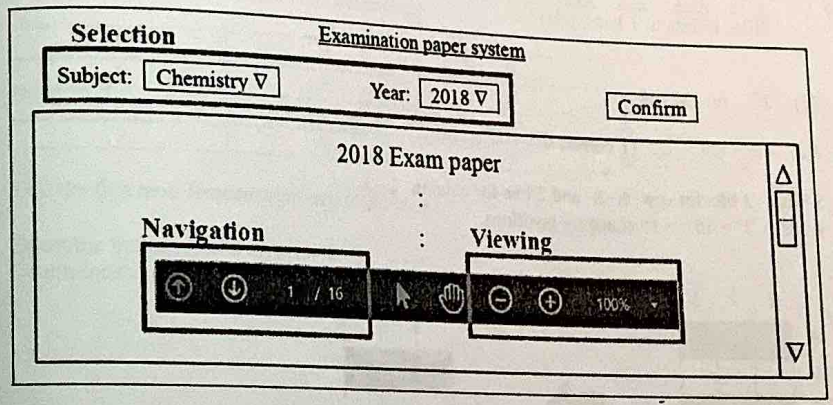
3. (a) (i) 5
1-4 (any one) — 1

(ii) The network connection is more stable / provides higher security. — 1

(b) Ada's private key — 1
Ada's public key

(c) Text can be formatted. — 1
Multimedia elements / Hyperlinks can be included in HTML format but not plain text. — 1×2
(✕ Attachment)

(d) (i)

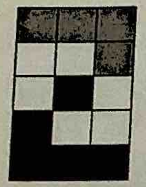


— 3

① subject and year by dropdown menu or other user-friendly selection box (any one)
① a page navigation / search feature in the view area (or thumbnails for navigation)
① a zoom in / out or full screen feature in the view area

(ii) Add a watermark / digital signature to the paper (or show the owner) — 1×2
Use a copyright notice
Encrypt the PDF with a password / Login page (access limitation)
Disable the print screen / mouse right click / download / save functions (user-side functions)

4. (a) (i)



1

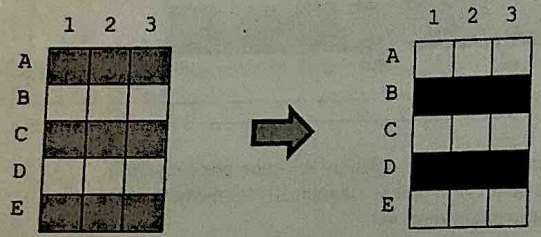
(ii) (1) 101 101 111 101 101 1 1+1
(first 15 bits ① + last bit ①)

(2) 2^{15} or 32768 1

(b) (i) A2, B1, C1, C2 (1 correct ①) 2

(ii) 5 bits: 3 bits for row A–E and 2 bits for column 1–3. / 1+1
4 bits: $2^4 = 16 >= 15$ changing positions.

(iii) 2



(Row B and D correct ①)

(c) Application software: It can let users manage / change / edit / display the image / image pattern / colour to be shown on the display. 1

System software: The driver program allows the system to communicate with / interact with / control / connect with / monitor the display. 1

5. (a) Case 1:
Check if ALG2 validates that integers in A are sorted in ascending order. 1

Case 2:
Check if ALG1 validates that all integers in A are positive. 1

(b)
```
0  5                (looping from 0 to 5 / 5 to 0)
A[i] <= 0           (condition for non-positive)
```
1
1

(c)
```
0  4                (looping from 0 to 4 / 4 to 0 / 0 to 5/ 5 to 0)
A[i] > A[i+1]       (condition for descending)
```
1
1

(d) (i)

C	M	N
1	1	3
2	2	5
2	3	5

① ① ① C,M ① N 4

(ii) Find the first most frequent number / mode in A. 2

Count the frequency of each item. ①
Determine the mode without picking the first one. ①

Paper 2A

Marks

1. (a) HKID — 1

(b)
```
SELECT SID FROM TRAN
WHERE RID = 'L502'
ORDER BY TDATE
```
① ① — 2

(c)
```
SELECT DISTINCT SNAME FROM STAFF S, ROOM R, TRAN T
WHERE S.SID = T.SID AND R.RID = T.RID
AND R.RNAME LIKE '%Lab%'
```
① ① — 2

Alternative:
```
SELECT SNAME FROM STAFF
WHERE SID IN
(SELECT SID FROM TRAN
 WHERE RID IN
   (SELECT RID FROM ROOM
    WHERE RNAME LIKE '%Lab%'))
```

(d)
```
SELECT SNAME FROM STAFF S LEFT JOIN TRAN T
ON S.SID = T.SID
WHERE T.SID IS NULL
```
(Alternative: RID / TID / TDATE) — 3

(e)
```
SELECT DISTINCT RTYPE FROM ROOM R, TRAN T
WHERE R.RID = T.RID AND RID IN (
  SELECT RID FROM TRAN GROUP BY RID
  HAVING COUNT(*) > 100)
```
Join ① GROUP BY + HAVING ① Overall ① — 3

Alternative:
```
SELECT DISTINCT RTYPE FROM ROOM
WHERE RID IN
(SELECT RID FROM TRAN
 GROUP BY RID
 HAVING COUNT(*) > 100)
```

```
SELECT DISTINCT RTYPE FROM ROOM R,
  (SELECT RID, COUNT(*) AS CNT FROM TRAN
   GROUP BY RID) t
WHERE R.RID = T.RID AND CNT > 100
```

(f)
```
ALTER TABLE
MOB CHAR(8)
```
(Alternative: CHR / VARCHAR / CHARACTER) — 1, 1

(g) List the staff from physics department who didn't enter any rooms on "28/7/2023". — 2*

2. (a) (i) CCODE + CYEAR + SID (any two ①) — 2

(ii) SNAME / MOBILE — 1, 1

(iii) CNAME is repeated for students enrolled in the same course, likes CS1001 and CS1003. SNAME / MOBILE is repeated for the students enrolled in more than one course. — 1

(b) COURSEDETAIL (CCODE , CYEAR , TEACHER)
Primary key: CCODE + CYEAR — 1

EINFO (CCODE , CYEAR , SID) — 1
Primary key: CCODE + CYEAR + SID — 1
Foreign key: CCODE references CCODE of COURSEDETAIL
CYEAR references CYEAR of COURSEDETAIL
SID references SID of STUDENT
(any two ①) — 2
① — 1

(c)

Student Enrolment

Student ID:

Student Name:

Mobile:

Enrolled courses:

Year: ▽ Courses have more than ▽ students

CID	CCODE	CNAME	TEACHER	No. of students ▽△

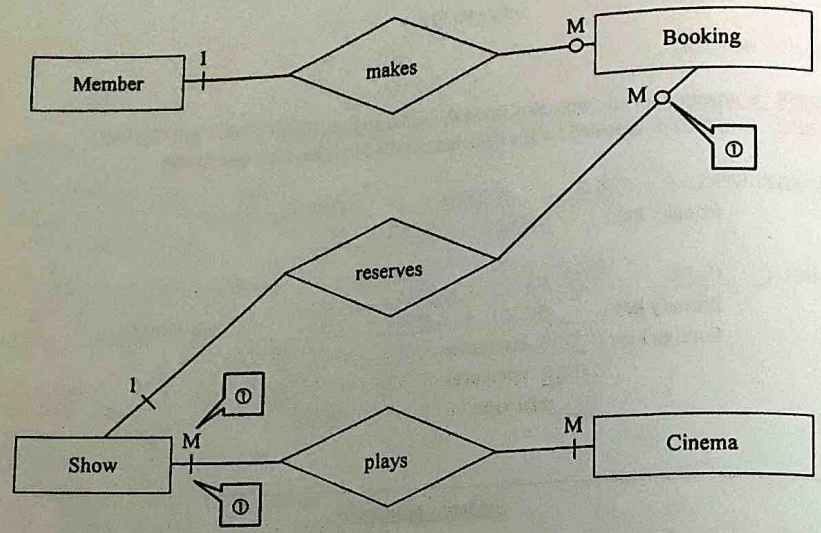
New enrolment:

Enroll	CID	CCODE	CNAME	TEACHER
☐				
☑				
☐				

Confirm Cancel — 4

Personal information ①
Previous records (sorting / filtering) ①
Enrolled in courses ①
Overall interactive design ①

3. (a)



4

Relationship (at least a correct one) ①
Reserves: 1-M ① O ①
Plays: M-M / 1 ① + ①
4 out of 5

(b) ☑ Data dictionary ☑ Database engineer 1,1

(c) (i) `DOB, MNAME` (`MNAME, DOB` ①) 2

(ii) `MEMBER` 1
`MNAME = 'Chan TM'` 1

(iii) As it involves deletion and insertion of records, it is necessary to re-create the index. 2*

(d) Problem: It will violate data privacy. 1
Solution: The company asks for customers' consent. 1

4. (a) Character / text / string
The data has a leading zero.

(b) `SQL1: 7` 1
`SQL2: 10` 1

(c) (i) Entity integrity: `SID` is the primary key of `D1`. `'012345'` is repeated in `D1`. 1,1

(ii) Domain integrity: The date of `RDATE` is invalid / out of range. 1,1

(iii) Referential integrity: The identity code of leader doesn't exist in `D1`. 1,1

(d) (i) Better security / Better data management (performance / join minimisation) (with elaboration) 2*

(ii) `D1(SID, RDATE, SNO, LEADER, District)` 1
Primary key: `SID + District`

Description of new field names: District of the service 1

(e) - Identify the data to be used
- Analyse and use the data for further action 2*

Paper 2B

Marks

1. (a) (i) TCP: guaranteed transmission (make sure that there is no loss of data through data transmission) — 1

UDP: faster transmission (size of header is smaller; data loss is acceptable) — 1

(ii) UDP
TCP
TCP — 2

Any 1 ➔ 1 mark; all correct ➔ 2 marks

(b) (i) (2) → (1 or 4) → (4 or 1) → (5) → 3 — 1,1

1 mark 1 mark

(ii) Any two tasks from 1, 3 and 5 — 1 + 1
Manage and maintain computer networks within an organisation / ensuring the smooth operation of network infrastructure / mainly routine and regular tasks.

Acceptable:
Any one task (1, 3 or 5) with a suitable explanation ➔ 1 mark

Not acceptable:
No mark if task 1, 3, or 5 are not mentioned (other tasks of Network Admin … likes backup etc.) ➔ as the question is not asking for TWO OTHER TASKS

(iii) Bandwidth / response time / latency / loading or Stress test / accessibility (authentication, coverage) — 1×2

Not acceptable:
Stress test about server capability
Security about hacking
Network Stability (with detailed description)

(c) (i) The DNS server is out of order / Connection to DNS server has failed / The domain name is not recorded in the DNS Server — 1

(ii) Round-trip time, size / number of packets sent / received / TTL / Success of connection / IP address of target device — 1×2

Not acceptable:
Response time / transmission rate / bandwidth

(d) Not to conduct illegal activities through WiFi (User's action) / — 1×2
Risk of personal data leakage and data through WiFi or network (Disclaimer / User's risk)

2. (a)

✓	✓	✓	×	①
✓	✓	×	✓	①
	①			

3

(b) (i) Synchronous transmission:
- transmission is faster
- less time delay

OR

Asynchronous transmission:
- transmission is economical /
- easier implementation
- fewer overheads

Talking about the selection of one side ➔ 1 mark — 1
Talking about the selection of one side and not the other ➔ 2 marks — 1

(ii) Half duplex mode / Full duplex mode

Suitable example — 1
Relevant explanation — 1

(c) (i) Reduce the chance of IP address conflicts (error) — 1
Reduce the workload of manual IP address assignment (workload) — 1

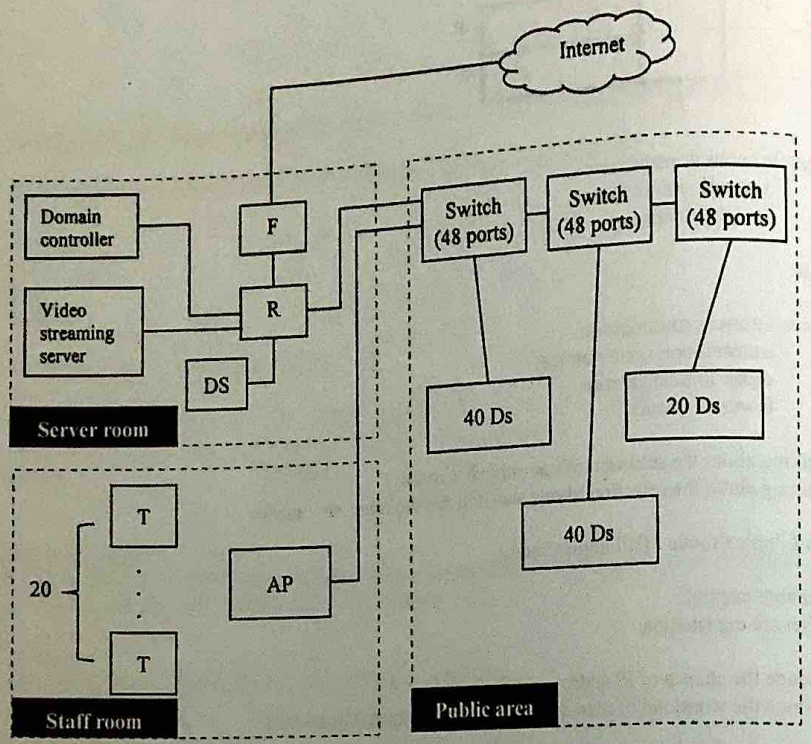
Need to talk about the advantage of DHCP but not explain what DHCP is
Simple reuse of IP address ➔ no mark

(ii) Content filtering — 1
Content caching — 1

If about security ➔ needs detailed explanation (like hiding user's IP address)

(iii) Data backup [RAID1] / — 1×2
Increase access speed / performance [RAID0] /
Accept error tolerance (resilience) / (error correction) [RAID5]

3. (a)



① → Connection Sequence: Internet > F > R > S, and number of port for R not >5 1
① → F, R & DS all in the server room 1
① → Domain controller, video streaming server & DS connecting to R / switch 1
① → AP connected to R / switch 1
① → 3 switches are well connected with consideration of amount of ports 1
① → 100 Ds are reasonably connected to switches 1

(b) Login authentication 1
User access management 1

Not acceptable: Store username and password

(c) (i) Provide steady power supply. 1
Provide temporary power supply (for shutting down computer safely) 1

Not acceptable: extra electricity supply to prevent data loss

(ii) Database server + importance of library data for library / if abnormal shut down → data crash 1+1

(d) (i) Increase security options / prevent unauthorised access 1×2
Prevent unnecessary broadcast / network signal from transferring into unrelated subnet /
Facilitate better network traffic

(ii) 126 . 1 . 127 1,1
128 . 1 . 255 1,1

4. (a) (i) No 1
Yes 1

(ii) No bottleneck / prevent the existence of single point of failure (caused by central connecting device) 1
Multiple paths (redundancy) ensure high reliability and fault tolerance / multiple channels support parallel processing / simultaneous transmission1 (caused by multiple routes) 1

(b) Less interference or more stable connection /
Higher security /
Higher bandwidth or throughput or data transfer rate (not acceptable: faster transmission speed) / 1×3
Longer transmission distance

(c) 0
1
1 2
0

3 out of 4 correct → 1 mark

(d) 000 / 011 / 110 1
001 / 100 / 010 / 111 1

(e) (i) 0 0 0 1 0 1 0 1

(ii)

1	1	0	0	0	0	0	0
0	1	1	0	0	1	0	1
1	0	0	0	1	0	0	1
1	1	0	1	0	1	0	0
1	1	1	1	1	0	1	

2

Paper 2C

Marks

1. (a) Advantage: support transparency, animation, lossless compression — 1
(✕ Smaller file size)
Disadvantage: limited colour depth up to 256 colours — 1
(✕ larger file size)

(b) (i) 1600 × 1200 × 8 (1) / 8 / 1024 (no mark if 256 is used) — 2
= 1875KB (1920 KB for 1000)

(ii) Different aspect ratios — 2
Distortion with black strips / fit to screen / image cut

(c) Compatibility (file type, file size) — 1×2
Copyright
Match with the web site, suitable for people, national security
(✕ volume, length)

(d) (i) Setting A. — 1
The video bitrate is the lowest while the bandwidth is the highest of the provided settings. — 1

(ii) Yes, the video bitrate is 2000 kbps and the bandwidth required for smooth viewing should be around 2Mbps. Thus, the buffer size should be large enough to store part of the downloaded video before viewing, so that viewer can experience smooth viewing. — 2

Increasing bandwidth can increase data transmission.

No, video viewing may still not be smooth as it depends on the bandwidth of the user's side. / network overheads

(e) 1000 frames can be recorded per second — 1
Time difference between 2 cyclists is 0.003s — 1

2. (a) Advantage: smaller file size / shorter download time
(✕ high compression rate / faster download speed) — 1

Disadvantage:
- It is worse quality. (✕ data loss)
- The quality is irreversible. — 1, 1
- Some lossy compression formats are not compatible with all devices, and some players may not support certain codecs, resulting in playback issues.
- Once the file has been compressed, there is only very limited potential for editing.

(b) (i) 11.2 x 1000 x 16 x 8 x 4 x 60 / 8 / 1024 /1024 MB — 1
= 41.02 MB
OR
11.2 x 1000 x 16 x 8 x 4 x 60 / 8 / 1000 /1000 MB — 1
= 43.008 MB

(ii) 11.2 x 1000 x 16 bits
= 179,200 bps / 179.2 kbps (✕ 175 kbps) — 1
OR
11.2 x 1000 x 16 x 8 bits — 1
= 1,433,600 bps / 1433.6 kbps (✕ 1400 kbps)

(iii) Platform B. It's because it has a higher bitrate than Platform A supported by (ii). — 1
OR
Platform A. It's because it has a higher bitrate than Platform B supported by (ii).

(c) Case 1: Client-side scripting is used to check the email address pattern / format (valid). No task shall be made by the server in this case. — 1,1
✕ email does not fulfill requirement

Case 2: Server-side scripting is used to look up the database to verify whether the email has been used with other accounts. — 1,1

(d) Progress bar — 1×2
Number in line
Estimated wait time
Last update time with status
Any effect or animation indicating the system is in progress

✕ able to browse other web pages
✕ add a refresh function

3. (a) Input controls of location (e.g. Bedroom 1, Dining room, etc.) 2×3

✓ Selecting multiple rooms / areas for setting light colour and temperature in a batch
- Using checkboxes OR
- Describing existing select list allow multiple selection

✓ Using graphical representation to show the layout of the room
× Categorising the location: Using multi-level drop-down menu for selecting location
× Drop-down menu, radio button

Input controls for light colour
✓ Showing colours visually (not existing formats: text or colour code)
- Using a colour palette for choosing colours
- Using a colour picker for choosing colours

× Categorising colours by text only (Not easy to comprehend the colours)

Input controls for temperature
✓ Simulating physical control of air-conditioner for user-friendliness
✓ Using a slider for adjusting the temperature
✓ Using a dial ( ) for adjusting the temperature
✓ Using + and – buttons for adjusting the temperature
× Drop-down menu for adjusting the temperature

Input controls for an ON / OFF button

✓ Using toggle button for ON / OFF, with status
× Using radio button for ON / OFF
× Using drop down menu for ON / OFF

Input controls for a submit button
✓ Facilitating the control
✓ Removing the submit button to apply instant actions without confirmation (with description)

No marks for
× Using existing input controls (i.e. select list)
× Textbox (not user-friendly)
× Clear all buttons (not significant)

(b) Related to the user's location, region or country: 1×2
- Showing a suitable currency in the user's location
- Showing region-specific items / popular items in the user's location
- Showing the delivery service, if applicable
- Showing pick-up stores near the user's location

(c) Login:
- Store login status to skip the login process when user visits the web site later. 1×2

Personalisation:
- Store user preferences (e.g. browsing history, frequently viewed items, etc.) to provide personalised suggestions / products / put favourite items at the beginning
- Store user browsing history to load the last visited page when user visits the web site

Shopping cart:
- Store selected items to allow users to make payments at a later time

(d) (i) `<head>, head`

(ii) Search engine: 1
- Provide keywords / descriptions / authors 1×2
- Help search engines to index / categorise / understand the web page
- Increase the chances of showing the web page in search engines

Browser:
- Provide more information so browsers learn the way to display the page
- Provide character encoding / character set to show the text
- Provide web page width to show the page

Redirection:
- Provide a URL / address so that browsers can redirect to another web page

(iii) Font style, e.g. font size, font colour, font face, font type, font family 1×2
Paragraph style
Table style, e.g. border, cell padding
Image styles, e.g. image position, image filter
Background style / background colour

Accept HTML attributes (Correct HTML codes)

(e) A sitemap may help visually impaired persons to access information with screen reader software. 1×2
A sitemap shows hyperlinks in text format (not text-only version).
A sitemap shows the structure of a web site and may help visitors to locate specific information.
A sitemap categorises the web pages in a web site.
A sitemap shows hyperlinks of all / most web pages in a web site.

4. (a) (i)
```
SHOWN[Y] = 1
N+1
IMAGE[X] = IMAGE[Y]
```
1×3

(ii)
```
for i from 1 to 16 do
    if SHOWN[i] = 0 then      (<> 1)
        ALLSHOWN ← FALSE
```
1×3

Alternative:
```
i ← 1
while i <= 16 and ALLSHOWN do
   if  SHOWN[i] = 0 then
          ALLSHOWN ← FALSE
   i ← i + 1
```

(b) (i) Backward compatibility — 1

(ii) The links no longer exist.
The links have been changed from the original sources.
Absolute paths have been used for the links.
An invalid domain name has been used for the links, e.g. a domain name being used in an internal network. — 1×2

(c) Advantage: A more stable service with support is expected. — 1
Disadvantage: There is no control to manage the server software, settings, versions, etc. — 1

(d) Using MFA / 2FA
Setting up a mechanism to disable accounts for which there have been several invalid login attempts.
Using passwordless authentication
Captcha
1×2

(e) Use a QR code instead.
Use URL shortener services.
Register another domain.
1×2

1. (a) (i)
```
first = 6, size = 3
first = 0, size = 2
```
Marks: 1, 1

1

(ii)
```
(first + size) mod 7  or  remainder of (first + size) ÷ 7
size + 1
(first + 1) mod 7  or  remainder of (first + 1) ÷ 7
```
1
1
1

(iii) Size
```
>= 7  or   > 6
curr - 7  or  curr mod 7  or  remainder of (curr ÷ 7)
```
1
1
1

(b) (i)
```
ft
curr <> -1
Next[curr]
```
1
1
1

(ii)

i	0	1	2	3	4
Song[i]	ABC	Bus	Run	Stars	Smile
Next[i]	4	3	1	0	-1

1

(iii)
```
ft
new_pos
```
1
1

2. (a) (i) 5 7 5 at the top left ① 2
5 5 other 3 ①

(ii) `bsearch(tar)` returns `-1` when `tar` is not in `T`. 1

(b) (i) 1 3 4 / 3 3 4 `left` and `right` in 2nd pass ① 3
`left` and `right` in 3rd pass ①
`pos` in 2nd and 3rd pass ①

(ii) `left: 3` 1
`right: 2` 1

(iii) (1) `left` 1

(2) `N-newsearch(p)+1` ① `N-newsearch(p)` (N=7 ✓) 2

(c) (i) Any two of the following points: 1×2

- No translation needed: Compiled programs generally tend to run faster than interpreted programs. The code is translated into machine language beforehand, eliminating the need for on-the-fly interpretation during runtime.
- Optimisation opportunity: Since compilers generate optimised machine code, compiled programs can be more efficient in terms of memory usage and CPU utilisation compared to interpreted programs.
- Source code not revealed to end user: Compiling source code into machine code can provide an additional layer of security as the original source code is not directly accessible to end-users. This can help protect intellectual property and prevent unauthorised modifications.
- Error checking: Compilers perform rigorous static analysis during the compilation process, detecting various types of errors, such as syntax errors, type errors and other potential issues. This allows programmers to catch errors early on and ensure code correctness.

(ii) Linker: The linker is responsible for combining / linking multiple object files and / or libraries together to create a single executable or shared library. 1

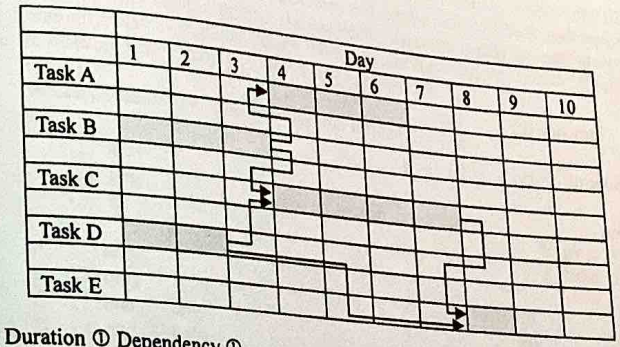
Loader: When the executable file is about to be run, the loader loads the executable file into the memory. 1

3. (a) (i) 29 18
18 29 1,1

(ii) Bubble sort (comparison-based sorting) 1

(b)
```
j > 0      or      j <> 0
A[i]
i ← i - 1
B[j]
j ← j - 1
```
1×5

(c) (i)



3

Task C: Duration ① Dependency ①
Task E: Duration & Dependency ①

(ii) 7 1

(iii) Alice should carry out the unit test first because 2*

Early detection of errors: Unit tests are performed early in the development process and are used to test individual code units. By conducting unit tests early on, errors and defects in the code can be detected and addressed sooner. This helps to reduce issues and fix costs in later stages.

Quick feedback loop: Unit tests provide a fast feedback loop, allowing developers to quickly verify the correctness of their implementations. This helps to rapidly identify and address issues, ensuring that the code functions as intended before proceeding to user acceptance testing.

Isolation of issues: Unit tests focus on testing small, isolated units of code. This allows developers to pinpoint and resolve issues within specific code segments or functions. Addressing these issues early on reduces the likelihood of cascading failures in the overall system.

4. (a)

c	a	z
f	e	d
h	b	g

z ①
a, f, e ① 2

(b)
```
BD[x-1,y]                                    1
BD[x-1,y] ← 'z'                              1
BD[x,y] ← BD[x,y+1]                          1
y ← y + 1                                    1
```

(c) (i) 1 2 3 (any one ①) 2

(ii) the remainder of `(topH + 2) ÷ 4` 2

Alternatives:
```
(topH+2) mod 4
(topH-2) mod 4

topH + 2        ①
topH - 2        ①
```

(iii) 0 1

(iv)
```
pop(History)                                 1
2                                            1
topT                                         1
topH                                         1
```

* Marking criteria
② Illustrate a comprehensive and logical answer
① Illustrate a relevant answer