These marking guidelines consist of 17 pages.
SECTION A: SHORT QUESTIONS

QUESTION 1

1.1 1.1.1 D ✓ (1)
1.1.2 B ✓ (1)
1.1.3 D ✓ (1)
1.1.4 A ✓✓ (2)
1.1.5 Faulty question – no possible answer

1.2 1.2.1 CMOS ✓ (Also accept: BIOS, Firmware) (1)
1.2.2 Biometrics/Bio authentication/Any specific correct example such as Voice recognition, Face/Iris/Fingerprint-scanning ✓
   Do not accept: Digital fingerprint, only fingerprint/face/iris (1)
1.2.3 Digital signature ✓ (1)
1.2.4 Utility ✓ software (1)
1.2.5 Constructor ✓ (1)
1.2.6 Normalisation ✓ (1)
1.2.7 Trace table ✓
   Also accept: watch facility of the built-in debugger, debugger (1)
1.2.8 Lossy ✓ compression (1)

TOTAL SECTION A: 13
SECTION B: SYSTEM TECHNOLOGIES

QUESTION 2

2.1 Any TWO ✓ ✓
- Portable/could walk around to the tables and take orders
- Small in size/easy to fit into hand
- No cabling/Wireless/Can link to system using Wi-Fi
- Touch screens make selecting options quick/easy to use
- Saves time/quicker order taking/billing

There must be a reference to a feature of a tablet relating to placing orders
Do not accept: any reference to cost/cheaper
Do not accept: general answer applicable to any device
Do not accept: answers related to the software/GUI (2)

2.2 2.2.1 Any TWO hardware components ✓ ✓
- CPU/Processor
- Hard drive/storage
- Memory/RAM
- Motherboard (2)

2.2.2 Any TWO actions for disk cleanup ✓ ✓
- Deletes the temporary internet files
- Empties the recycle bin
- Deletes any other temporary files
- Deletes downloaded files
- Debug dump files
- Delete setup log files
- Delete system error memory dump files
- Delete unused/unnecessary/unwanted files (2)

2.3 2.3.1 Any TWO comparisons between cache and RAM+ ✓ ✓
- Cache is faster than RAM
- Cache has smaller capacity than RAM
- Cache stores recently used instructions/has a pre-fetch unit while RAM stores the whole program
- Cache found on CPU and RAM on motherboard
- Cache is more expensive per MB than RAM
- Cache is SRAM/static and RAM is DRAM/dynamic
- It is easier to upgrade RAM (2)
2.3.2 The device driver facilitates communication ✓ between the computer and the printer/hardware ✓

OR
The device driver allows the operating system/computer to communicate/control/manage the hardware/printer

OR
The device driver converts the basic instructions of the operating system/computer to messages that can be interpreted by the hardware component.

Concepts:
• Communication/converting instructions
• Hardware/printer

2.3.3 To license the use of the software/prevent illegal copies of software from being used ✓

OR
Make all/licensed features of the software available

2.3.4 (a) Any ONE advantage of installing updates:

• Always have latest functions/features
• Bugs and problems are resolved
• Security loopholes are fixed
• Increase performance/work faster

2.3.4 (b) Any ONE disadvantage of installing updates automatically:

• Unexpected/unplanned use of data
• A hastily released update may cause more problems than it fixes/lose existing/familiar/pre-set features
• Unwanted features/preferences
• Slows system down (due to background processes)
• Unwanted restart/inconvenient timing of update

2.3.5 (a) When RAM fills up/is full ✓

2.3.5 (b) The operating system makes use of hard drive space ✓ as extra RAM ✓

OR
• Uses (dedicated) area on HDD/storage
• Moves unused data to HDD/virtual memory where it will easily be accessible again
2.4  

2.4.1  Any ONE: ✓

- Physical damage
- Power surge

Also accept examples of physical damage such as dropping a PC can cause a hard drive head crash while transporting/Spilling water on motherboard or HDD with PC case open

Do not accept: Any example or mention of data being damaged

2.4.2  UPS/Invertor ✓

2.4.3  Backup:
A duplicate copy ✓ of a file is created on another device/for use when the original copy is damaged or lost ✓

Archiving: ✓
Less frequently used/outdated/older files (can be compressed) and stored where they can be retrieved when necessary

2.4.4  Monitors communication with computer/system and the internet/other networks ✓ and blocks unauthorised communication ✓ by software/malware

TOTAL SECTION B:  23
SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

3.1 Any TWO advantages of networks ✓ ✓

- Fast and efficient communication
- Centralisation of data/data always up to date
- Transfer of files between devices
- Leisure/LAN computing games/Watching movies
- Increased control and security (2)

3.2 3.2.1 An NIC is used to encode or 'convert' the data so that the data can be transmitted over a specific medium and it decodes the data that is received.

Concepts:
- Decode/Encode ✓
- Making communication between devices possible ✓ over a network (2)

3.2.2 Radio waves ✓ (1)

3.3 3.3.1 Fibre Optic cables ✓ (1)

3.3.2 A reason and explanation for addressing poor signal strength: ✓ ✓

A device/technique with a valid explanation

Also accept: Any TWO of the following-
- Provide sufficient/multiple access points
- Interference by structures should be limited by strategically placing access points/line of sight
- Use a repeater/booster/amplifier/device/router to increase signal strength/WiMax
- Limit the noise by making use of different frequencies (2)

3.3.3 Any TWO reasons for using WiMax: ✓ ✓

- Greater range
- Faster/faster communication
- Provides higher bandwidth/data transfer
- Better security (2)
3.4  3.4.1 The Semantic Web refers to a web where the content has been optimised for computers and devices to filter content intelligently to be able to navigate without human intervention or involvement.

**Concepts:** Any TWO for Semantic web ✓ ✓
- Content optimised
- Filter content intelligently
- Without human involvement

3.4.2 *Any ONE reason for using metadata:* ✓
- To supply additional data on which specific searches are done.
- Searching is optimised
- Improved results

Accept any explanation that metadata is used to improve results on specific searches.

3.5  3.5.1 POP3 ✓

3.5.2 Notification – The user is notified ✓ by a sound or message that a new e-mail has arrived
Push Technology – The user receives the e-mail ✓/is notified and the e-mail is automatically downloaded to the device

3.5.3 A link/folder ✓ is shared ✓ with another user.

**Concepts for making large files available:**
- Folder/Link provided
- Storage shared

3.5.4 (a) Phishing is a technique to obtain personal/sensitive information ✓ from a user that appears to be from a legitimate institution in order to trick the user into providing information. ✓

**Concepts of phishing:**
- Provide information about self
- Appears to be legitimate/tricking you

3.5.4 (b) *Any ONE example of phishing:* ✓
- Request to confirm bank details
- Request to provide pin number for bank cards
- Request to confirm user name and provide password
- Request personal information

**TOTAL SECTION C:** 21
SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

4.1 Any ONE example of the role of a database in a POS ✓

- When a transaction takes place, the database is updated to increase or reduce the stock items/items available/Relevant data obtained at POS is stored for the restaurant
- Customers details are updated as they pay for meals
- Accounting information is updated as customers pay
- Obtain the (latest) item information/prices from the database
- Can do calculations/generate statistics

OR

Any other valid example to do with data in a sales environment (1)

4.2 4.2.1(a) Any ONE ✓

- String
- Text (1)

4.2.1(b) Any ONE ✓

- Boolean
- YesNo
- True/False (1)

4.2.2 The table will be sorted according to initial and not surname. ✓

OR

The waiter's initial and surname are captured in one field/Initials captured as the first section of the initial and surname field. (1)

4.2.3

<table>
<thead>
<tr>
<th>tblJobCard</th>
</tr>
</thead>
<tbody>
<tr>
<td>PK JobCardNr ✓(a)</td>
</tr>
<tr>
<td>NormalHoursWorked</td>
</tr>
<tr>
<td>WeekStartDate ✓(b)</td>
</tr>
<tr>
<td>HoursOvertime ✓(b)</td>
</tr>
<tr>
<td>FK WaiterID ✓(b)</td>
</tr>
</tbody>
</table>

(b) ✓ TotalHours is NOT included
(c) ✓ FK correctly identified

NOTE:
The field names may differ from those in the above table (6)
4.2.4 One Waiter has many Job cards

![ER Diagram](image)

Mark allocation
- Correct ER diagram format
- One (Waiter) to many (Job_Card) relationship
- Placing entities in correct relationship/order

4.3

4.3.1 Any ONE issue that threatens physical integrity ✓
- Power failure
- Natural disasters
- Mechanical failure of hardware
- Theft of devices

4.3.2 Any TWO aspects to ensure logical integrity: ✓ ✓
- Data validation/validation rules
- Each record has a unique primary key
- Normalisation rules applied
- Ensuring referential integrity/Foreign key must refer to an existing record in the other table
- Verification of data

4.4 Any THREE responsibilities of a database administrator: ✓ ✓ ✓
- Design the database
- Security of the database/access rights
- Backup and restoration plans and policies/updating software
- Monitoring the performance of the database
- Manage/maintain the database.

4.5 TWO benefits of having a server DBMS:

Managing simultaneous multiple connections to the database to execute the transactions/It will allow a large number of users to connect simultaneously to a database

**Concepts:**
- Multiple connections/users ✓
- Simultaneous access ✓
4.6 4.6.1 Any ONE reason for security: ✓
- Data is transmitted across networks
- Multiple servers are used/Many systems are used
- Create security exposure on multiple fronts/many users
  (1)

4.6.2 Any ONE benefit of working with a distributed database: ✓
- Faster performance /less congestion
- Less downtime
- If connection is interrupted, database is not damaged/corrupted
  (1)

4.6.3 Partitioning:
Each site manages its own part of the database ✓ and uploads data to a central database in a scheduled batch process. ✓

Concepts:
- Local data
- Uploaded to central database
  (2)

TOTAL SECTION D: 25
SECTION E: SOLUTION DEVELOPMENT

QUESTION 5

5.1.1 Any TWO guidelines for readable code: ✓ ✓

- Commenting of code
- Descriptive variable names
- Modularity
- Indentation
- Open lines between sections
- Collapsible regions

5.1.2 An algorithm is a possible solution to a problem ✓ which contains a set of steps/instructions ✓

Concepts:
- Set of steps/instructions
- To perform a task/solve problem

5.1.3 Debugging is the technique/process of finding ✓ and resolving ✓ defects/problems/errors/bugs.

5.1.3 (a) A runtime error is an error that causes termination or break in the running of a program. ✓

Do not accept: Prevents from running

5.1.3 (b)(i) Any ONE example of runtime error: ✓

- Division by 0
- Data type mismatch/typing in a word instead of a number
- Reference to an index in an array that is not part of the declaration
- Attempting to access a resource/file that is not available.

Also accept other valid examples.

5.1.4 WHILE…DO | REPEAT…UNTIL

| Executed while condition is true | Executed until condition is true ✓ |
| The statements may not be executed at all depending on the condition | Executed at least once irrespective of condition ✓ |

5.1.5 Statement 1: variable X := 5 mod 2;

Integer/Real/Any number type ✓

Statement 2: variable Y := 5 mod 2 = 0;

Boolean ✓
5.2 5.2.1 Creates a link between the external/physical/textfile file ✓ and file variable/logical file ✓ in the program

5.2.2 Any ONE reason for replacing append with rewrite ✓

- The file will be emptied/ the contents will be removed
  OR
- Rewrite statement will replace/overwrite the current contents of
  the text file with Mrs Smith.

Do not accept: create a new file

5.2.3 Any ONE reason for I/O Error: ✓

- The file was not closed in during a previous procedure/The file buffer was not cleared/The file is corrupt
- The file was not correctly assigned
- Append or rewrite was not used to open the file/Reset was used to open the file
- Writeln-statement does not refer to the text file (example: writeln(sline))
- The executable file is not in the same directory/folder as the text file
- The file was closed

5.3 5.3.1

<table>
<thead>
<tr>
<th>PIN</th>
<th>x</th>
<th>c</th>
<th>Is x &lt; 1?</th>
<th>Is c &lt;&gt;5?</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>623</td>
<td>623</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>62.3✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1✓</td>
<td></td>
<td>False✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.23✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2✓</td>
<td></td>
<td>False✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.623✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3✓</td>
<td></td>
<td>True✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>True✓</td>
<td></td>
<td>Error in PIN ✓</td>
<td></td>
<td>(12/2 = 6)</td>
</tr>
</tbody>
</table>

No extra details ✓

5.3.2 Any ONE of: ✓

- c = 5
- The user must enter a pin number which contains 5 digits.
5.4 **Marking Concepts:**
1 mark – Inner loop
1 mark – Loop to correct counter
1 mark – Formulate a display
1 mark – Display in correct position
1 mark – Reset display variable/ move to next line

<table>
<thead>
<tr>
<th>Line</th>
<th>Algorithm_Display_Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Input number</td>
</tr>
<tr>
<td>2</td>
<td>Loop counter ← 1 to number</td>
</tr>
<tr>
<td>3</td>
<td>output ← &quot;✓</td>
</tr>
<tr>
<td>4</td>
<td>Loop counter2 ← 1 to counter ✓</td>
</tr>
<tr>
<td>5</td>
<td>output ← output + counter2 ✓</td>
</tr>
<tr>
<td>6</td>
<td>EndLoop counter2</td>
</tr>
<tr>
<td>7</td>
<td>Display output ✓</td>
</tr>
<tr>
<td>8</td>
<td>EndLoop counter</td>
</tr>
</tbody>
</table>

Concepts:
1 mark – Clear output variable in correct position
1 mark – Inner loop correct position
1 mark – Inner loop (counter2) from 1 to outer loop counter
1 mark – Add inner loop counter to output string
1 mark – Display output string outside inner loop, inside outer loop

**ALTERNATE SOLUTION**

<table>
<thead>
<tr>
<th>Line</th>
<th>Algorithm_Display_Pattern</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Input number</td>
</tr>
<tr>
<td>2</td>
<td>Loop counter ← 1 to number</td>
</tr>
<tr>
<td>3</td>
<td>Loop counter2 ← 1 to counter</td>
</tr>
<tr>
<td>4</td>
<td>Display counter2 (one character)</td>
</tr>
<tr>
<td>5</td>
<td>EndLoop counter2</td>
</tr>
<tr>
<td>6</td>
<td>Move to next line</td>
</tr>
<tr>
<td>7</td>
<td>EndLoop counter</td>
</tr>
</tbody>
</table>

Accept any other valid algorithm

**TOTAL SECTION E:** 29
SECTION F: INTEGRATED SCENARIO

QUESTION 6

6.1 6.1.1 An area where wireless/Wi-Fi/ Internet access is available/connected/shared ✓ (2)

6.1.2 Un-encrypted data/files that are sent can be intercepted ✓

OR

Any other acceptable example of personal information being exposed/hacking/threat of malware/viruses (1)

6.1.3(a) A peer-to-peer protocol/network ✓ for downloading files from the internet

OR

A file sharing software (1)

6.1.3(b) Any TWO reasons to block BitTorrent ✓ ✓
  • Security issues
  • To prevent piracy of software
  • Data use/Data cap
  • Congestion/Slow down performance of network (2)

6.2 6.2.1 Virtual Private Network ✓ (1)

6.2.2 Allows users to log into a network via the internet with the same security of a LAN.

Concepts: Any TWO ✓ ✓
  • Log in via Internet
  • Remotely
  • Secured network/connection (2)

6.3 6.3.1 (a) Dynamic page ✓

Any ONE motivation: ✓
  • Additional parameters are included that provide information to the software on the server in order to generate a dynamic page.
  • ASP (Active Server Pages) are dynamic in nature. (2)
6.3.1 (b) Any ONE for a mobi website ✓ ✓
- Ends with .mobi
- M prefix

6.3.2 (a) Any TWO hints to use less power ✓ ✓
- Turn off devices when not in use
- Change screen settings to dim
- Use automatic app that puts apps to sleep
- Close unnecessary apps
- Turn off Wi-Fi when not in use
- Turn off Bluetooth/GPS when not in use

6.3.2 (b) Any ONE way to reduce impact on environment ✓
- Send old equipment to e-cycler/for recycling
- Donate useful equipment to others
- Re-use parts, that is still usable, in other computers

6.3.3 SEO/Search (engine) optimisation ✓

6.4 6.4.1 DDoS:
Many bot computers are used to bombard the servers hosting the restaurants website with a large number of requests ✓, the servers are over loaded and cannot respond so the website becomes unavailable ✓

Concepts:
- High number of requests/overloaded with requests
- Website becomes unavailable

6.4.2 Any TWO measures to prevent cybercrime ✓ ✓
- Install and update anti-virus software
- Use a firewall
- Use a strong password
- Make sure software is updated regularly
- Be aware of trends in cybercrime/Training of staff to be vigilant
- Not answering to phishing mail
- Make use of encryption
- Human verification/Captcha
6.5 6.5.1 The app is connected to the Internet. ✓
The front end of the app is installed on the device, and the data is accessible/stored in the cloud/web server. ✓ (2)

6.5.2 Any TWO reasons for the popularity of apps: ✓ ✓

- Interface is easier to navigate
- Has a dedicated purpose
- Apps knows where to find data/do not have to enter URL’s
- All the interface data already installed on your device/ speeds up responsiveness/use less data
- Can fetch data in the background
- Give notifications
- Can work with syncing device/online storage
- Can use additional sensors like GPS (2)

6.5.3(a) GPS ✓ (1)

6.5.3(b) Any TWO benefits of a check-in service: ✓ ✓

- Users will know if friends visit restaurant and can join them
- Profiling of customers
- Advertising specific deals/Marketing strategy
- When some-one is near restaurant invite them
- Easily reached for online orders
- Invisible data capture
- Feedback from customers (2)

6.6 6.6.1 The purpose of a data warehouse is to provide storage for large amounts of data ✓ and tools to access the data ✓ for data mining purposes.

Concepts:
- Large amount of data stored
- Using the data (2)

6.6.2 Any TWO roles played by people in data-mining process ✓ ✓

- Select/gather/prepare data sets
- Interpret/reporting
- Verify data mining results
- Develop data mining software/algorithms

Also accept: specific examples (2)
6.6.3 To identify hidden trends that can be used to make management decisions for example purchasing more stock for the months with high customer volumes.

**Concepts:**
- Identifying trends/patterns ✓
- Using information in a practical way in the restaurant context ✓

**Also accept:** Valid examples and explanation of the use of the data in the restaurant context (2)

6.7 6.7.1 Any TWO advantages for using an online application ✓ ✓

- Don’t need local powerful resources/processing done elsewhere
- Is not installed on system/saves hard disk space
- Always the latest version available/automatically updated
- Run in the browser
- Can be used on any device
- Can be used from anywhere where there is Internet access
- Automatic online backup of data

**Do not accept:** Functionality or Cost. (2)

6.7.2 Do not need internet access ✓ to use the software. (1)

**TOTAL SECTION F:** 37
**GRAND TOTAL:** 150