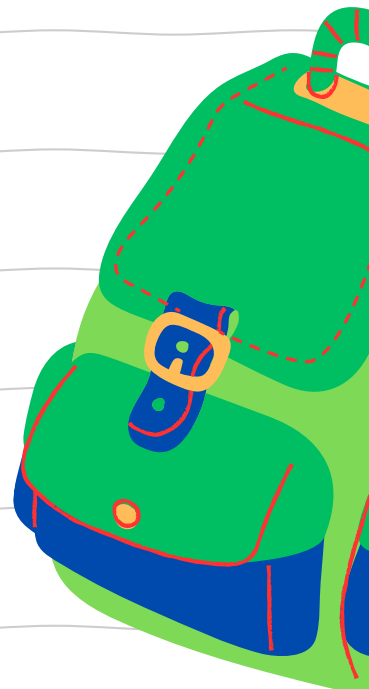


MATRIC EXAM REVISIONS

INFORMATION TECHNOLOGY
PAPER 2 (2018)



QUESTION PAPER





basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

INFORMATION TECHNOLOGY P2

NOVEMBER 2018

MARKS: 150

TIME: 3 hours

This question paper consists of 16 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX sections:

SECTION A: Short Questions	(15)
SECTION B: System Technologies	(23)
SECTION C: Communication and Network Technologies	(21)
SECTION D: Data and Information Management	(25)
SECTION E: Solution Development	(29)
SECTION F: Integrated Scenario	(37)
2. Read ALL the questions carefully.
3. Answer ALL the questions.
4. The mark allocation generally gives an indication of the number of facts/reasons required.
5. Number the answers correctly according to the numbering system used in this question paper.
6. Write neatly and legibly.

SECTION A: SHORT QUESTIONS**QUESTION 1**

1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question numbers (1.1.1 to 1.1.5) in the ANSWER BOOK, e.g. 1.1.6 D.

1.1.1 A type of malware that is disguised as a useful program is known as a ...

A virus.
B rootkit.
C worm.
D trojan horse. (1)

1.1.2 Software that may be used for free but with a time and functionality limit:

A EULA
B Shareware
C Proprietary software
D Freeware (1)

1.1.3 Which ONE is NOT a duty of a system analyst?

A Analyses the software requirements of the client
B Collaborates with the client and the programmer to develop a system
C Creates a list of specifications for the software developer
D Writes code for the software solution (1)

1.1.4 What will be the value of **iAnswer** when the following statement is executed?

```
iAnswer := 2 + 5 * 7 div 2 - sqr(4);
```

A 3
B 8
C 1
D 0 (2)

1.1.5 Which formula is represented in the segment of code below?

```
for k := 2 to p do  
begin  
n := n * n;  
end;
```

A $n * p$
B n^p
C p^n
D p^p (2)

- 1.2 Give ONE word/term for EACH of the following descriptions. Write only the word/term next to the question numbers (1.2.1 to 1.2.8) in the ANSWER BOOK.
- 1.2.1 Part of the ROM where information with regard to the setup of the computer can be saved (1)
- 1.2.2 Security based on the measurement and identification of unique physical characteristics of a person, e.g. fingerprints (1)
- 1.2.3 Digital code, attached to an e-mail, used to identify and validate the sender of an electronic message (1)
- 1.2.4 Software that allows the user to perform maintenance tasks on a computer (1)
- 1.2.5 The method that is used in object-oriented programming to instantiate an object (1)
- 1.2.6 The steps followed to prevent anomalies from occurring in a database (1)
- 1.2.7 A tool used to identify logical errors by working through the program manually step by step and recording the result of each step in a table (1)
- 1.2.8 Compressing data by losing some insignificant portions of the data (1)
- TOTAL SECTION A: 15**

SECTION B: SYSTEM TECHNOLOGIES**QUESTION 2**

A chain of fast-food restaurants is opening a new branch in the local shopping mall. The IT infrastructure of the mall is modern.

- 2.1 Tablet computers will be used to place orders directly on the system in the new restaurant.
- Give TWO reasons why the use of tablet computers is appropriate for this purpose. (2)
- 2.2 The mall server will store all the records.
- 2.2.1 Name TWO hardware components for which the specifications will be of a higher level in the server, as opposed to those for a standard PC. (2)
- 2.2.2 State TWO types of actions that will be performed by a disk clean-up when clearing space on the server's hard disk drive. (2)
- 2.3 Many restaurants owners are considering an upgrade of their computer systems.
- 2.3.1 State TWO important differences between *standard RAM* and *cache memory* in a computer system. (2)
- 2.3.2 What is the function of the device driver that is installed when adding a new printer? (2)
- 2.3.3 What is the purpose of the product key or activation code that is often required when installing new software? (1)
- 2.3.4 The operating system indicated that updates were available.
- (a) State ONE advantage of ensuring that the operating system is updated regularly. (1)
- (b) State ONE disadvantage of allowing the operating system to update automatically. (1)
- 2.3.5 Virtual memory can enhance the performance of the computer.
- (a) When will virtual memory be used by the operating system? (1)
- (b) Explain the basic concepts of how *virtual memory* works. (2)

2.4 Safeguarding of the data is vital.

- 2.4.1 Give ONE reason why a hard disk drive could fail. (1)
- 2.4.2 Suggest ONE device that could protect data from being corrupted during a power failure. (1)
- 2.4.3 Explain the difference between *making a backup* and *archiving data*. (3)
- 2.4.4 Explain the role of a *firewall* as a means of data protection. (2)

TOTAL SECTION B: 23

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES**QUESTION 3**

- 3.1 Sharing resources is an important benefit of using networks.
State TWO other benefits of having a computer network in a company. (2)
- 3.2 In laptop computers NICs are used to provide both Wi-Fi connection and an Ethernet port.
- 3.2.1 Explain the function of an NIC when providing network connectivity. (2)
- 3.2.2 What medium is used to send and receive data in a Wi-Fi network? (1)
- 3.3 Communication performance in cabled and wireless networks is often compared.
- 3.3.1 Name a type of network cable that has a very low level of attenuation of signal. (1)
- 3.3.2 Explain how poor signal strength can be addressed when setting up wireless communication networks. (2)
- 3.3.3 Give TWO reasons why companies providing wireless internet access prefer to use WiMAX instead of Wi-Fi. (2)
- 3.4 Web 3.0 is often referred to as the 'Semantic Web'.
- 3.4.1 Explain what is meant by the term *Semantic Web*. (2)
- 3.4.2 What is the purpose of metadata in the Semantic Web? (1)
- 3.5 E-mail remains a popular means of communication.
- 3.5.1 Which protocol is used to download e-mail? (1)
- 3.5.2 Differentiate between *notifications* and *push technology* in terms of the way e-mail is handled on a mobile device. (2)
- 3.5.3 Explain how a cloud-based service can be used to make large files available to an e-mail recipient, without attaching the files to the e-mail. (2)
- 3.5.4 Phishing is a technique often used by cyber criminals.
- (a) Explain the term *phishing*. (2)
- (b) Give ONE example of phishing. (1)

TOTAL SECTION C: 21

SECTION D: DATA AND INFORMATION MANAGEMENT**QUESTION 4**

Some restaurants use a database and an efficient database management system for their administration, orders and point of sale (POS).

- 4.1 Name ONE possible role of a database in the POS system of a restaurant. (1)
- 4.2 The job card below contains information about a waiter in a restaurant for a specific week.

Weekly Job Card for Waiters			Job Card No.: JC10012
Initial and Surname	K Nel	Waiter ID	W001
Permanent Appointment	<input checked="" type="checkbox"/>		
Start of Week:	1 October 2018		
	Hours worked:		
	Normal hours worked:		27.5 hours
	Overtime hours worked:		6 hours
	Total hours worked:		33.5 hours

- 4.2.1 A database with the following **tblWaiter** table has been designed:

tblWaiter		
	Field Name	Data Type
PK	WaiterID	4.2.1(a)
	Initial and Surname	Text
	Permanent Appointment	4.2.1(b)

Use the information provided on the job card to suggest a suitable data type for EACH of the following fields:

- (a) WaiterID (1)
- (b) Permanent Appointment (1)
- 4.2.2 A report with an alphabetical list of waiters, sorted according to their surnames, is required.

Evaluate the structure of the **tblWaiter** table and state the problem that will arise when attempting to generate the report. (1)

4.2.3 A second table, **tblJobCard**, needs to be created to save the remaining information on the job card.

The table below represents a **tblJobCard** table for the waiters. Redraw this table in your ANSWER BOOK.

tblJobCard	
	Field Name
PK	
	NormalHoursWorked
:	:
:	:

Use the information on the weekly job card (on the previous page) and complete the **tblJobCard** table in your ANSWER BOOK as follows:

- (a) Identify and add the field name of a suitable primary key (PK).
- (b) List other field names that must appear in the **tblJobCard** table in addition to the NormalHoursWorked field.
- (c) Identify and add an applicable foreign key (FK). Use the abbreviation FK in the first column.

NOTE:

- Each job card record must relate to a waiter.
- Follow the rules for normalisation. (6)

4.2.4 Draw a simple entity-relationship diagram (ERD) to show the relationship between the **tblWaiter** table and **tblJobCard** table. (3)

4.3 The physical integrity of data is just as important as the logical integrity.

4.3.1 Identify ONE issue that could threaten the physical integrity of data in general. (1)

4.3.2 State TWO database design aspects that will ensure logical integrity. (2)

4.4 An advertisement for a database administrator for a restaurant must be placed in the local newspaper.

State THREE primary responsibilities of a database administrator. (3)

- 4.5 State TWO benefits of having a DBMS installed on a server. (2)
- 4.6 A restaurant group uses a distributed database system.
- 4.6.1 Suggest ONE reason why a distributed database system would require sophisticated security when compared to a database system stored on a single computer. (1)
- 4.6.2 What is the benefit of working on a distributed database rather than on a single-server database, from a user's perspective? (1)
- 4.6.3 Briefly explain how *data synchronisation* is done when using a partitioning model in a distributed database. (2)

TOTAL SECTION D: 25

SECTION E: SOLUTION DEVELOPMENT**QUESTION 5**

The manager of a restaurant approached a novice programmer to improve an outdated program used for reservations.

- 5.1 Answer the questions below on general aspects and concepts related to programming.
- 5.1.1 State TWO guidelines for writing clear and readable source code. (2)
- 5.1.2 Define the concept of an *algorithm* in programming. (2)
- 5.1.3 Debugging is an integral part of programming.
- (a) Explain what is meant by *debugging* a program. (2)
- (b) (i) What is a *runtime error*? (1)
- (ii) Give an example of a type of error that will lead to a runtime error. (1)
- 5.1.4 Looping is a common programming structure.
- Compare the structure and execution of a WHILE...DO loop and a REPEAT...UNTIL loop. (2)
- 5.1.5 Identify the data types for variables X and Y when executing the following two instructions:
- X := 5 mod 2;**
- AND
- Y := 5 mod 2 = 0;** (2)

5.2 Bookings are saved in a text file called **Bookings.txt**.

```
procedure TForm1.btnReadFromFileClick(Sender: TObject);
Var
  tFile: TextFile;
  sLine: String;
begin
  AssignFile(tFile, 'Bookings.txt');
  Reset(tFile);
  while not eof(tFile) do
    readln(tFile, sLine);
end;

procedure TForm1.btnAddToFileClick(Sender: TObject);
Var
  tFile: TextFile;
  sLine: String;
begin
  AssignFile(tFile, 'Bookings.txt');
  Append(tFile);
  writeln(tFile, 'Mrs A Smith#19:30');
  CloseFile(tFile);
end;
```

5.2.1 Explain the purpose of the following line of code:

AssignFile(tFile, 'Bookings.txt'); (2)

5.2.2 State the effect of replacing **Append(tFile)** with **Rewrite(tFile)** in the procedure above. (2)

5.2.3 The user needs to save data to a text file.

When a button was clicked to write the data to the text file, an Input/Output file error occurred.



Give a possible reason why the I/O error occurred. (1)

5.3 The algorithm below is used to test the validity of a pin code.

Line	Algorithm_Validate_Pin
1	Input PIN
2	$c \leftarrow 0$
3	$x \leftarrow \text{PIN}$
4	Repeat
5	$x \leftarrow x / 10$
6	$c \leftarrow c + 1$
7	Until $x < 1$
8	If $c \neq 5$ then
9	Display 'Error in PIN'
10	Else
11	Display 'PIN Accepted'

5.3.1 Copy the trace table below into your ANSWER BOOK and complete it to determine the output value if 623 is entered as the pin value.

Pin	x	c	Is $x < 1$?	Is $c \neq 5$?	Display
623	623	0			

(6)

5.3.2 Analyse the completed trace table and state what the requirement is for the pin to be valid.

(1)

5.4 An algorithm is required to display a pattern, based on the number that was entered indicating the number of lines to be displayed.

Example: If the value 6 is entered, the pattern below must be displayed:

```

1
12
123
1234
12345
123456
    
```

Complete the algorithm from line 3 below to display the pattern based on any input value.

Line	Algorithm_Display_Pattern
1	Input number
2	Loop counter $\leftarrow 1$ to number
3	...

(5)

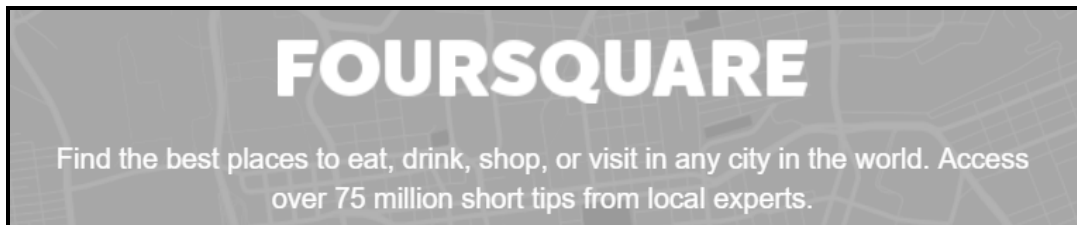
TOTAL SECTION E: 29

SECTION F: INTEGRATED SCENARIO**QUESTION 6**

The days when restaurants could rely exclusively on good food, an enjoyable ambience and word-of-mouth advertising are quickly coming to an end. More and more restaurants realise that they must use consumer-facing connected technologies, such as websites, social networks and mobile apps, to stay competitive. The manager at a local restaurant decided to implement these technologies.

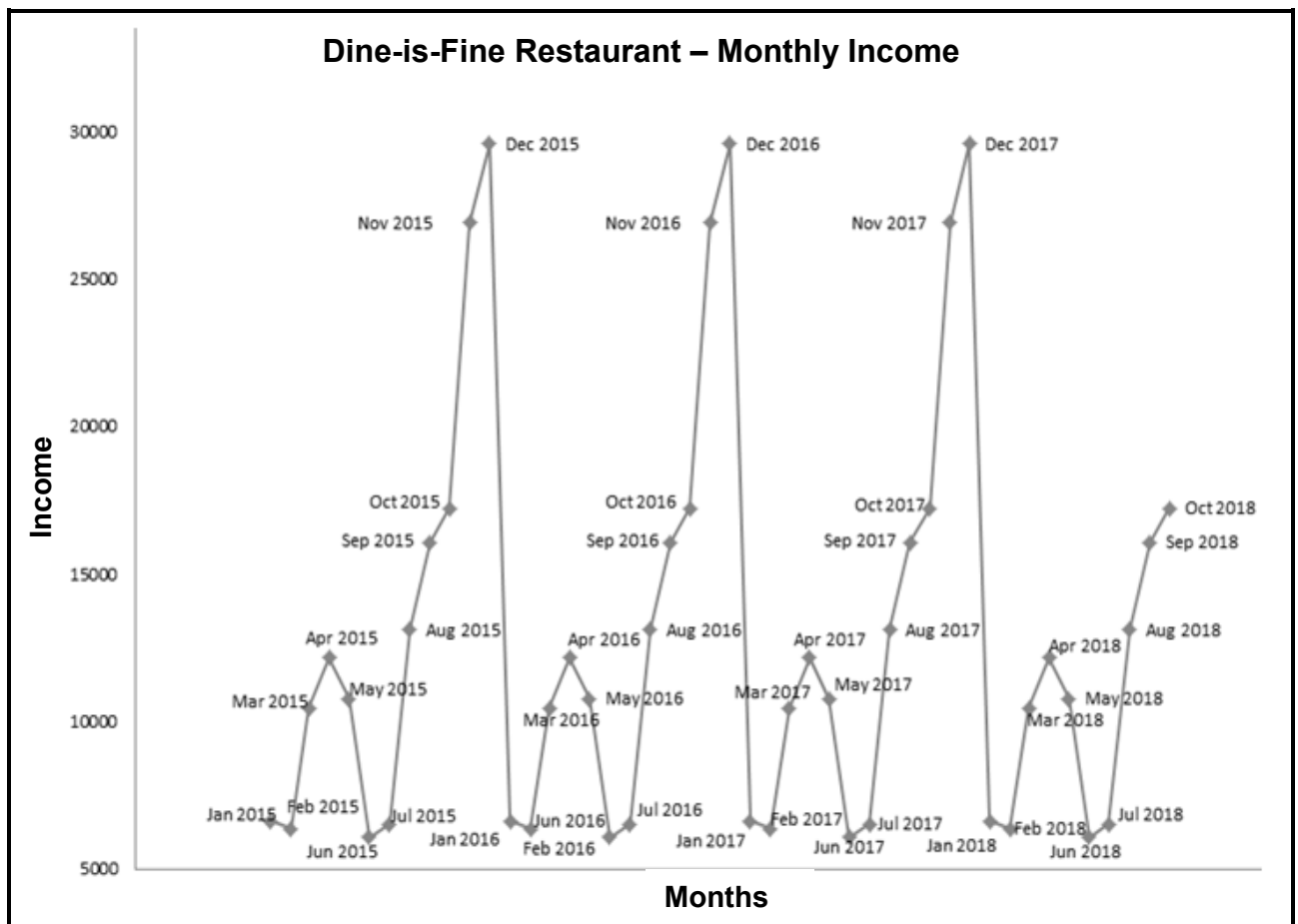
- 6.1 The restaurant created an unsecured hotspot for their guests.
- 6.1.1 What is a *hotspot*? (2)
- 6.1.2 Name the threat for a guest when using an unsecure hotspot. (1)
- 6.1.3 The use of BitTorrent has been blocked on the network by the firewall.
- (a) What is *BitTorrent*? (1)
- (b) Give TWO reasons why the restaurant owner insists that BitTorrent be blocked. (2)
- 6.2 The hotspot in the restaurant is used by business people to connect to their company's VPN.
- 6.2.1 Write out the abbreviation *VPN*. (1)
- 6.2.2 Briefly explain what a *VPN* is. (2)
- 6.3 The restaurant upgraded their website.
- 6.3.1 The URL for a page on the website for this restaurant is given below.
- <http://www.mydinnersite.com/product.asp?id=12345>
- (a) Is this a static or dynamic web page? Motivate your answer. (2)
- (b) How would the URL change to indicate that it is a mobile site? (2)

- 6.3.2 A paragraph on the home page of the website encourages users to use less power.
- (a) Give TWO hints for saving power when using computing devices. (2)
 - (b) Suggest ONE environmentally friendly way in which the restaurant could dispose of its old electronic equipment. (1)
- 6.3.3 Name the technique that is used to ensure that the restaurant's website is placed as high as possible on a list of search results. (1)
- 6.4 Cybercrimes, such as DDoS, are common phenomena in cyberspace today.
- 6.4.1 Briefly explain what a DDoS attack on the restaurant's website might entail.
- NOTE:** NO marks will be allocated for writing out the acronym. (2)
- 6.4.2 Suggest TWO measures that the restaurant could implement to prevent cybercrime. (2)
- 6.5 The restaurant encourages their guests to download the Foursquare app to their mobile devices.



- 6.5.1 Explain what a *connected app* is. (2)
- 6.5.2 Give TWO reasons why an app is more popular than conventional web pages when using certain websites. (2)
- 6.5.3
- (a) What type of technology makes location-based services, such as Foursquare, possible? (1)
 - (b) State TWO benefits of a check-in service, such as Foursquare, from a restaurant's perspective. (2)

6.6 The process of data mining of data in a data warehouse produced the graph below of the monthly income of the restaurant.

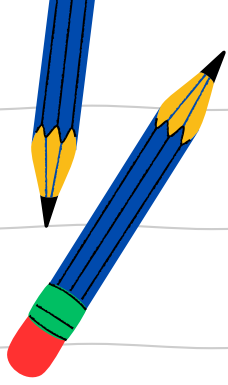


- 6.6.1 Explain the purpose of a data warehouse. (2)
- 6.6.2 State TWO roles that people play in the data-mining process. (2)
- 6.6.3 What is the purpose of data mining in this context? (2)

6.7 An application program for a specific task is required. Both a desktop package and an online application have the functions needed. Both packages involve additional cost.

- 6.7.1 State TWO advantages of using the online application. (2)
- 6.7.2 Give ONE reason why the desktop package could be regarded as the preferred choice. (1)

TOTAL SECTION F: 37
GRAND TOTAL: 150

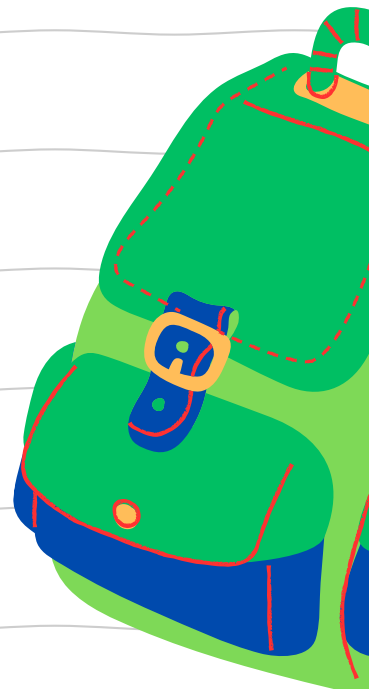


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ANSWER PAPER





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GRADE 12

INFORMATION TECHNOLOGY P2

NOVEMBER 2018

MARKING GUIDELINES

MARKS: 150

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)
- 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 (1)
- 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 (1)
- 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 (1)
- 2.3.5 (a) When RAM fills up/is full ✓ (1)
- 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)

2.4	2.4.1	<p><i>Any ONE: ✓</i></p> <ul style="list-style-type: none"> • Physical damage • Power surge <p>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</p> <p>Do not accept: Any example or mention of data being damaged</p>	(1)
	2.4.2	UPS/Invertor ✓	(1)
	2.4.3	<p><i>Backup:</i> A duplicate copy ✓ of a file is created on another device/for use when the original copy is damaged or lost ✓</p> <p><i>Archiving: ✓</i> Less frequently used/outdated/older files (can be compressed) and stored where they can be retrieved when necessary</p>	(3)
	2.4.4	Monitors communication with computer/system and the internet/other networks✓ and blocks unauthorised communication✓ by software/malware	(2)
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
- (2)
- 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.
- (1)
- 3.5 3.5.1 POP3 ✓
- (1)
- 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
- (2)
- 3.5.3 A link/folder ✓ is shared ✓ with another user.
- Concepts for making large files available:**
- Folder/Link provided
 - Storage shared
- (2)
- 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
- (2)
- 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
- (1)

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

	tblJobCard	
PK	JobCardNr	✓(a)
	NormalHoursWorked	
	WeekStartDate	✓(b)
	HoursOvertime	✓(b)
FK	WaiterID	✓(b)

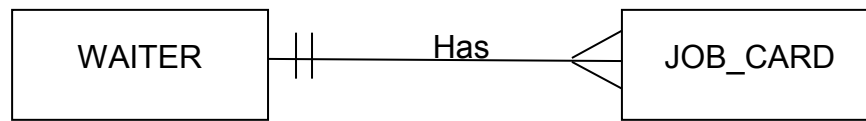
(b) ✓ TotalHours is NOT included

(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



Mark allocation

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

(3)

4.3 4.3.1 *Any ONE issue that threatens physical integrity* ✓

- Power failure
- Natural disasters
- Mechanical failure of hardware
- Theft of devices

(1)

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

(2)

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.

(3)

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✓

(2)

- 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 5.1.1 *Any TWO guidelines for readable code: ✓✓*
- Commenting of code
 - Descriptive variable names
 - Modularity
 - Indentation
 - Open lines between sections
 - Collapsible regions (2)
- 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 (2)
- 5.1.3 (a) Debugging is the technique/process of finding ✓ and resolving ✓ defects/problems/errors/bugs. (2)
- 5.1.3 (b)(i) A runtime error is an error that causes termination or break in the running of a program. ✓
- Do not accept: Prevents from running (1)
- 5.1.3 (b) (ii) *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. (1)
- 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 | ✓ |
- (2)
- 5.1.5 Statement 1: variable X := 5 mod 2;
Integer/Real/Any number type ✓
- Statement 2: variable Y := 5 mod 2 = 0;
Boolean ✓ (2)

5.2 5.2.1 Creates a link between the external/physical/textfile file ✓ and file variable/logical file ✓ in the program (2)

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 (2)

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
- WriteIn-statement does not refer to the text file (example: writeIn(sline))
- The executable file is not in the same directory/folder as the text file
- The file was closed

(1)

5.3 5.3.1

PIN	x	c	Is x < 1?	Is c <>5?	Display
623	623	0			
	62.3✓				
		1✓			
			False✓		
	6.23✓				
		2✓			
			False✓		
	0.623✓				
		3✓			
			True✓		
				True✓	
					Error in PIN ✓
No extra details ✓					

(12/2 = 6)

5.3.2 Any ONE of: ✓

- c = 5
- The user must enter a pin number which contains 5 digits.

(1)

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

Line	Algorithm_Display_Pattern
1	Input number
2	Loop counter \leftarrow 1 to number
3	output \leftarrow " ✓
4	Loop counter2 ✓ \leftarrow 1 to counter ✓
5	output \leftarrow output + counter2 ✓
6	EndLoop counter2
7	Display output ✓
8	EndLoop counter

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

Line	Algorithm_Display_Pattern
1	Input number
2	Loop counter \leftarrow 1 to number
3	Loop counter2 \leftarrow 1 to counter
4	Display counter2 (one character)
5	EndLoop counter2
6	Move to next line
7	EndLoop counter

Accept any other valid algorithm

(5)

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

OR

- M prefix

(2)

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

(2)

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

(1)

6.3.3 SEO/Search (engine) optimisation ✓

(1)

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

(2)

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

(2)

- 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