



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

Stanmorephysics.com

GRADE 12

INFORMATION TECHNOLOGY P2

NOVEMBER 2024

MARKS: 150

TIME: 3 hours

This question paper consists of 17 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX sections:

SECTION A:	Short Questions	(20)
SECTION B:	Systems Technologies	(25)
SECTION C:	Communication and Network Technologies	(26)
SECTION D:	Data and Information Management	(24)
SECTION E:	Solution Development	(22)
SECTION F:	Integrated Scenario	(33)

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 1.1.10) in the ANSWER BOOK, e.g. 1.1.11 D. ...

1.1.1 ... is the loss of signal strength caused by internal or external factors.

- A Electromagnetic interference
- B Eavesdropping
- C Attenuation
- D Crosstalk

(1)

1.1.2 An e-mail protocol that downloads messages to the e-mail client is known as ...

- A FTP.
- B POP3.
- C SMTP.
- D VoIP.

(1)

1.1.3 Embedded wires that allow data to travel in and out of the CPU are called ...

- A bridges.
- B arrays.
- C streams.
- D buses.

(1)

1.1.4 Which type of software will allow users access to the code of an application by default?

- A Open-source
- B Shareware
- C Proprietary software
- D Freeware

(1)

1.1.5 What is the role of a compiler in software development?

- A Compresses source code files
- B Translates source code into machine code
- C Encrypts and decrypts source code
- D Updates and adds source code

(1)



1.1.6

What is the resulting data type of the DIV operator in Delphi programming?

- A Float
- B Boolean
- C Integer
- D String

(1)

1.1.7

The following statements are given:

```
iNumber := 1;
for iRow := 1 to 4 do
  for iCol := 1 to 2 do
    inc(iNumber);
```

The value of iNumber after the execution of the provided code:

- A 7
- B 8
- C 9
- D 11

(1)

1.1.8

A distributed database with a growing list of records linked together, using cryptography, is known as ...

- A bitcoin.
- B backbone.
- C blockchain.
- D BitTorrent.

(1)

1.1.9

... is memory that loses its contents when the power is switched off.

- A EEPROM
- B RAM
- C ROM
- D SSD

(1)

1.1.10

... is a programming language that is used to define the structure and content of a web page and adds dynamic behaviour to the web page.

- A Hypertext mark-up language (HTML)
- B Extensible mark-up language (XML)
- C JavaScript
- D Structured query language (SQL)

(1)

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 1.2.5) in the ANSWER BOOK, e.g. 1.2.6 Computer.



1.2.1 An instruction given to a DBMS to reverse a transaction and restore the database back to its previous state (1)

1.2.2 A technique used by the operating system where tasks and processes are split up between the different CPU cores of a computer to be processed in parallel (1)

1.2.3 A type of printer that uses filament/thermoplastic that melts when heated and turns solid when it cools down (1)

1.2.4 A type of technology that allows a host operating system to run other operating systems on the same device at the same time (1)

1.2.5 The collecting and storage of extremely large, diverse amounts of data over time that need to be processed, using complex algorithms (1)

1.3 Indicate whether the following statements are TRUE or FALSE. Write only 'true' or 'false' next to the question numbers (1.3.1 to 1.3.5) in the ANSWER BOOK. Correct the statement if it is FALSE by writing down the correct term.

NOTE: NO marks will be awarded for FALSE without the correct term.

1.3.1 A zombie is a network of computers that are remotely controlled by malware and then used by criminals to install and run malicious software. (1)

1.3.2 Green computing is the study and design of the workplace and the equipment that is used for the comfort and safety of people. (1)

1.3.3 A hyperlink is a built-in connection to another web page, indicated as text underlined in blue, or as a graphic with a blue outline. (1)

1.3.4 A patch is a collection of updates combined into one package. (1)

1.3.5 The WHERE clause in an SQL statement is used to test a condition that uses an aggregate function. (1)

TOTAL SECTION A: 20

SECTION B: SYSTEMS TECHNOLOGIES

QUESTION 2

SCENARIO

Athletes from around the globe compete in a Global Marathon Series. The use of embedded ICT systems ensures a smooth and efficient experience for participants, organisers and spectators at a marathon.

- 2.1 The amount of memory in a computer system is crucial to ensure optimal performance.
- 2.1.1 Explain the function of primary memory (RAM) in a computer system. (2)
- 2.1.2 Discuss what *cache memory* is and how the use of cache memory contributes to the efficient functioning of a computer system. (3)
- 2.1.3 Explain why the use of virtual memory impacts negatively on the performance of a computer. (2)
- 2.2 Computers that are used to view a live marathon event are slow. It was suggested that a graphics processor unit (GPU) is installed in each of these computers.
- Name TWO key factors that determine the computational power of a GPU. (2)
- 2.3 A computer technician at the event suggested that the computer used for the event should have a modular design with up-to-date software in the BIOS.
- 2.3.1 State TWO advantages of the modular design of a computer. (2)
- 2.3.2 State TWO functions of the BIOS. (2)
- 2.3.3 Explain why the BIOS is stored on non-volatile memory. (2)
- 2.4 All the electronic devices used during a marathon event are connected to a network.
- 2.4.1 Name a hardware component in a desktop computer that enables the computer to connect to a network. (1)
- 2.4.2 Besides hardware and software, what is another requirement for connecting a local network to the internet? (1)

2.5 Cloud computing will be utilised at the marathons.

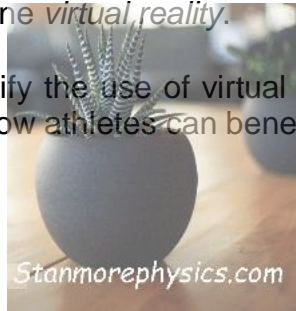
2.5.1 Define *cloud computing*. (2)

2.5.2 Motivate how the use of cloud computing will reduce the hardware requirements of the computers used during a marathon. (2)

2.6 The organisers of international marathons want to use virtual reality during the Global Marathon Series.

2.6.1 Define *virtual reality*. (2)

2.6.2 Justify the use of virtual reality by giving TWO practical examples of how athletes can benefit from using this technology. (2)



TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

The finish line of one of the marathons will be at a sports stadium. A set of networked computers will be used to help manage the marathon.

- 3.1 Networks can be classified according to topology, architecture and geographical reach.
- 3.1.1 State the name of a cabled network that covers a limited geographical area, such as a sports stadium. (1)
- 3.1.2 Define the term *bandwidth* in the context of a network. (2)
- 3.1.3 State the unit of measurement of bandwidth in a network. (1)
- 3.1.4 Each computer on the network is assigned an IP address. Discuss the purpose of an IP address. (2)
- 3.1.5 A star topology has been suggested for this network. Motivate why a star topology will be a suitable layout for this network. (2)
- 3.2 Users need to connect wirelessly to the network.
- 3.2.1 State TWO technologies that can be used to connect to a wireless network. (2)
- 3.2.2 Briefly describe how a person can connect to a wireless network from their device. (2)
- 3.2.3 A laptop's built-in wireless adaptor has been damaged. Name the peripheral device that can allow the laptop to still access the network wirelessly. (1)
- 3.3 A website has been developed for the marathon event. The website allows participants to upload images and videos and share their experiences of the marathon.
- 3.3.1 Explain why a static website will not be a suitable choice for this website. (2)
- 3.3.2 Users will be requested to accept cookies when they visit the website. Explain what a *cookie* is and state TWO ways in which it can be used to benefit the user. (3)

3.4 A ticketing system has been designed for the spectators at the event. Each ticket has an image similar to the one shown below.



3.4.1 What is this type of image called? (1)

3.4.2 Describe TWO benefits of having such an image on the spectators' tickets. (2)

3.5 The marathon can be streamed live or viewed on demand.

3.5.1 Differentiate between *live streaming* and *view on demand*. (2)

3.5.2 The server providing the streaming services has become unresponsive.

(a) State the term used for an attack that makes a website inaccessible by using a large number of computers to request data from the site at the same time. (1)

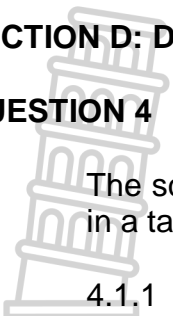
(b) Suggest TWO ways to prevent the server from becoming unresponsive in this context. (2)

TOTAL SECTION C: 26

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

4.1 The school is organising a marathon. The entries of all the athletes are saved in a table called tblAthletes.



4.1.1 Give TWO reasons why it would be more suitable to use a Google form rather than a printed entry form for the athletes to register for the marathon. (2)

4.1.2 The table below is an extract from the results of 12 500 athletes that were captured after completion of the marathon.

AthleteNum	NameAndSurname	EmailAddress	CellNumber	MarathonType	RaceTime	Position
A001	Koos Nel	NelK@gmail.com	627688255	Half-marathon	56	2
A008	John Smith	JohnS@outlook.com	728854173	Full marathon	205.55	3
A023	Andrew Khumalo	KhumaloAndrew@hotmail.com	832250170	Full marathon	215	7
A066	Herbert Kleyn	Stammorephysics.com	638827795	Half-marathon	62.5	9
A082	James Green	GreenJ@gmail.com	924171321	Half-marathon	55	1
A091	John Baloi	BaloiCleverJohn@outlook.com	849638547	Half-marathon	82	34
A098	Rose Msiza	RoseMsiza@gmail.com	764147332	Full marathon	201.19	2

(a) An alphabetical list of data, sorted according to the athletes' surnames, is required by the school.

Give a reason why this cannot be accomplished with the current design of the table and provide a solution to the anomaly. (2)

(b) The data in the **CellNumber** field is not correct due to the first digit being omitted.

Suggest a change in the design of the table to save the cellphone numbers correctly. (1)

(c) Identify a redundant field in the table and motivate why it is redundant. (2)

(d) State TWO fields from the table provided that will be used to identify the winner of the half-marathon. (2)

(e) Two characteristics of quality data are accuracy and consistency.

(i) Define the term *accuracy* and give an example using the **RaceTime** field from the table above. (2)

(ii) Define the term *consistency* and give an example using the **AthleteNum** field from the table above. (2)

4.2 Data integrity is a common term associated with database design and operations.



4.2.1 Explain what *physical data integrity* refers to. (1)

4.2.2 State TWO hardware devices that can be used to ensure the physical integrity of data. (2)

4.3 Give ONE term for EACH of the following definitions:

4.3.1 The process of refining the structure of a database to minimise redundancy and improve integrity (1)

4.3.2 A field containing unique values that could be used as the primary key, but is not currently set as the primary key (1)

4.4 Explain how metadata adds value to data. (2)

4.5 There are different types of computer systems used in knowledge intensive organisations.

Justify the use of an expert system, rather than a decision-support system, in such an organisation. (2)

4.6 A user's digital footprint is created through invisible data collection.

Give TWO examples of where a digital footprint can be used. (2)

TOTAL SECTION D: 24

SECTION E: SOLUTION DEVELOPMENT

QUESTION 5

5.1 The date of a marathon is assigned to a string variable in the format dd/mm/yyyy:

```
sDate := '15/10/2024';
```

5.1.1 Which ONE of the following options (A or B) is the correct code to extract the month from the sDate variable?

A `sMonth := copy(sDate,4,5);`

B `sMonth := copy(sDate,4,2);`

(1)

5.1.2 The variable sMonth has been declared as a string variable and has been used to extract the month correctly from the date referred to in QUESTION 5.1.

A syntax error in Line 1 of the CASE statement below will prevent the code from being executed:

```
Line 1: case sMonth of  
        // correct code to display month name  
end;
```

(a) Give a reason why a syntax error will occur in Line 1 of the above code. (1)

(b) Explain how Line 1 can be changed to make the code correct. (1)

5.2 A StringGrid component in Delphi is an effective way of presenting data in rows and columns.

Write code that will display the text "Koos Nel" in the correct cell of the StringGrid component **stgData**, as shown in the screenshot below.

	Koos Nel			

(2)

5.3 Determine the value of D in the following expression:

$$D = (C = B \text{ MOD } 5) \text{ AND NOT } E \text{ OR } (A - C = 1)$$

where

$$A = 5, B = 12, C = -4, E = \text{FALSE}$$

NOTE: Show ALL the steps.

(4)

5.4 An array named **arrNames** has been declared to store up to eight names. The array currently contains seven names. The variable **iNumElements** stores the number of names stored in the array.



1	Sammy
2	Brian
3	Claire
4	Thabiso
5	Thomas
6	Katleho
7	Dean
8	

A new name must be inserted at any index/position of array **arrNames**.

A partially completed pseudocode algorithm to do such an insertion has been provided below.

```
sName ← Input name to be inserted into array
iPosition ← Input index in array to insert the name

if (iPosition > 8) OR (iPosition < 1)
    Display error message
else

    // write pseudocode to complete this part of the
    algorithm
```

Complete the pseudocode using a **loop** to insert the name at the position that was entered, without losing any of the names currently stored in the array.

Example of output when the name 'Ezio' is inserted at index/position 2 of the array:

1	Sammy
2	Ezio
3	Brian
4	Claire
5	Thabiso
6	Thomas
7	Katleho
8	Dean

(7)

5.5 The following code is an extract of an object class **Runner_U.pas**:

```
type
TRunner = class(TObject)
private
  fRunnerNO: integer;
  fName: String;
  fQualify: boolean;
  fNumMarathons: integer;
public
  constructor Create(iRunnerNO: integer; sName: String;
    iNumMarathons: integer);
  procedure setQualify(bQualify: boolean);
  function getName: String;
  function toString: String;
end;
```

Answer the following questions based on the code above:

- 5.5.1 Which keyword in the class definition above indicates that the attributes are not accessible outside the class? (1)
- 5.5.2 Which method will be called to instantiate the Runner object? (1)
- 5.5.3 The code provided shows some methods that describe the behaviour of the Runner object.
 - (a) One of the accessor methods has already been declared.
Write the declaration of any other accessor method that can be added to the class. (2)
 - (b) Identify a mutator method in the code above and explain the purpose of a mutator method. (2)

TOTAL SECTION E: 22

SECTION F: INTEGRATED SCENARIO

QUESTION 6

In preparation for a marathon, the organising committee has implemented an integrated information and communications technology (ICT) system to streamline various aspects of the event.

- 6.1 A website has been developed for athletes to register for the marathon.
- 6.1.1 Name **TWO** ways to determine whether a website is secure or not. (2)
- 6.1.2 Describe how data is encrypted and decrypted using SSL. (4)
- 6.2 The organisers of the marathon issue an RFID tag to each athlete.
- 6.2.1 Explain how an RFID tag can be used to determine the time it took the athlete to complete the marathon. (2)
- 6.2.2 A few of the athletes are doubtful about the use of RFID tags.
Briefly discuss how athletes can benefit from using RFID technology. (2)
- 6.3 Study the properties and features of the TechGlow Pro and Fitflex Ultra wearable devices below and answer the questions that follow.

TECHGLOW PRO

Sleek design: Slim and stylish to seamlessly integrate into your daily wardrobe

Advanced fitness tracking: Monitors heart rate, sleep patterns, steps and calories burned with precision

Immersive display: Crystal clear, touch-sensitive OLED screen for instant access to your health metrics

Smartphone compatibility: Syncs effortlessly with your smartphone for calls, messages and app notifications on the go.

Long-lasting battery: Enjoy extended use without worrying about frequent recharges

FITFLEX ULTRA

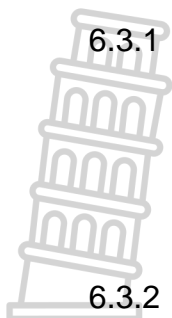
Durable and waterproof: Built tough to withstand any workout, and waterproof for swimming and rainy runs

Multi-sport functionality: Ideal for various activities with specialised tracking modes like running, cycling and even yoga!

GPS connectivity: Accurately analyse your outdoor workouts with integrated GPS

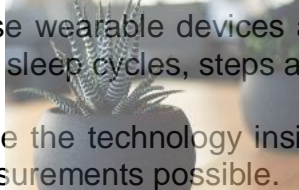
Health at your fingertips: Keep an eye on your health with real-time data on your heart rate, blood oxygen and stress levels

Customisable bands: Personalise your FitFlex Ultra with interchangeable bands to match your style



- 6.3.1 The FitFlex Ultra has GPS connectivity.
- (a) Discuss how GPS technology works. (2)
- (b) State TWO ethical issues related to wearing a device with GPS technology. (2)

- 6.3.2 The TechGlow Pro device is compatible with a smartphone.
- State which wireless technology will make this connection possible. (1)

- 6.3.3 These wearable devices are able to measure items such as heart rate, sleep cycles, steps and calories burned.
- 
- Name the technology inside wearable devices that make all these measurements possible. (1)

- 6.3.4 These wearable devices have limited processing power, but have access to the internet.
- Describe how the power of distributed computing can supplement the processing power of the wearable devices. (4)

- 6.4 The organisers of the marathon have decided to create a wiki website.
- 6.4.1 State TWO advantages of a wiki site. (2)
- 6.4.2 Explain how content providers can improve the quality of the contributions made to a wiki site. (2)

- 6.5 The advancements in mobile computing has made the internet and information easily accessible to everyone.
- Explain the term *information overload* and motivate why it could pose a challenge to some individuals. Give a well-explained example as part of your answer. (4)

- 6.6 It is the responsibility of the marathon organisers to ensure that the marathon statistics and other information are kept safe.
- 6.6.1 Explain the term *spoofing*. (2)
- 6.6.2 Ransomware is malware that encrypts files until a ransom amount has been paid.
- Why do criminals prefer the ransom amount to be paid in cryptocurrency? (1)

6.7 Software updates should always be downloaded and installed on a device to ensure that an application has the latest features.

What are TWO possible disadvantages of enabling automatic updates for software applications on a device? (2)

TOTAL SECTION F: 33
GRAND TOTAL: 150





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GRADE 12

INFORMATION TECHNOLOGY P2

MARKING GUIDELINES

NOVEMBER 2024

MARKS: 150

These marking guidelines consist of 16 pages.

SECTION A: SHORT QUESTIONS

QUESTION 1

- 1.1 1.1.1 C ✓ Attenuation (1)
- 1.1.2 B ✓ POP3 (1)
- 1.1.3 D ✓ Buses (1)
- 1.1.4 A ✓ Open-source (1)
- 1.1.5 B ✓ Translate source code into machine code (1)
- 1.1.6 C ✓ Integer (1)
- 1.1.7 C ✓ 9 (1)
- 1.1.8 C ✓ Blockchain (1)
- 1.1.9 B ✓ RAM (1)
- 1.1.10 C ✓ JavaScript (1)
- 1.2 1.2.1 Rollback ✓ (1)
- 1.2.2 Multiprocessing ✓ (1)
- 1.2.3 3D printer ✓ (1)
- 1.2.4 Virtualisation ✓ (1)
- 1.2.5 Big data/Data warehouse ✓ (1)
- 1.3 1.3.1 FALSE: Botnet ✓ (1)
- 1.3.2 FALSE: Ergonomics ✓ (1)
- 1.3.3 TRUE ✓ (1)
- 1.3.4 FALSE: Service pack ✓ (1)
- 1.3.5 FALSE: HAVING ✓ (1)

TOTAL SECTION A: 20

SECTION B: SYSTEMS TECHNOLOGIES

QUESTION 2

2.1 2.1.1 *Explain the function of primary memory (RAM):*

Primary memory is used to store data temporarily ✓ that is actively being used by the computer's CPU. ✓

Any TWO concepts:

- RAM provides temporary storage
 - for data that is actively/currently being used by the computer's CPU
 - making it easily accessible for quick processing
- (2)

2.1.2 *Discuss what cache memory is and how the use of cache memory contributes to the efficient functioning of a computer system:*

Cache memory is (a small amount of) high-speed memory. ✓

Any TWO concepts: ✓✓

- Cache memory is located close to/on the CPU
 - Stores frequently/previously accessed data and instructions
 - Prevents a slower medium from slowing down a faster medium/ faster access to data/prevents bottlenecking
- (3)

2.1.3 *Any TWO reasons why the use of virtual memory impacts negatively on the performance of a computer: ✓✓*


Accessing/Using secondary storage (1) is slower. (1)

Concepts:

- Virtual memory is accessed from storage
 - swapping of data between virtual memory and RAM / slower access
- (2)

2.2 *Any TWO key factors that determine the computational power of a GPU: ✓✓*

- Memory size/Amount of VRAM
 - Memory type/bandwidth
 - Clock speed/GPU processing speed
 - Number of cores
 - Type or generation processor
- (2)

- 2.3  2.3.1 *Any TWO advantages of the modular design of a computer: ✓✓*
- Easy to repair
 - Easy to upgrade
 - Customise specifications
 - Cheaper to replace a single part vs replacing an entire system (2)
- 2.3.2 *Any TWO functions of the BIOS: ✓✓*
- Controls hardware at the lowest level
 - Checks that rest of hardware is present and working (POST)
 - Find operating system (OS) and loads it
 - Provides options for the user to configure (CMOS setup)
 - Locates the software and drivers that interface with the OS once running
 - Responsible for boot process / Store start up instructions (one mark only for the entire question) (2)
- 2.3.3 *Explain why the BIOS is stored on non-volatile memory:*
- So that it can retain data even when the computer is powered off. ✓ To save the changes made to the instructions/settings that can be reloaded/affected during the next execution. ✓
- Any TWO concepts:*
- Retaining data even when the computer is powered off
 - Saving the changes made to the instructions/settings
 - To be reloaded/affected during the next execution (2)
- 2.4 2.4.1 Network Interface Controller/Card (NIC) ✓ (1)
- 2.4.2 Internet Service Provider (ISP) ✓ (1)
- 2.5 2.5.1 *Define cloud computing:*
- Cloud computing refers to the use of shared resources ✓ that are offered as services over the Internet/online. ✓
- OR**
- Cloud computing refers to the process in which services on the internet (1) are used to store, manage and process data. (1) (2)



2.5.2

Motivate how the use of cloud computing will reduce the hardware requirements of the computers used during a marathon:

Any ONE: ✓✓

- Cost saving of hardware (1) as most of the processing is done in the cloud, lower hardware specifications. (1)
 - No / fewer local resources (e.g. storage space) required (1) as storage is managed in the cloud (1)
 - No dedicated back-up servers needed (1) as cloud offers backup and recovery services (1)
- (2)

2.6

2.6.1

Define virtual reality:

Virtual reality is an artificial environment ✓ that is created with software. ✓

Any TWO concepts.

- Artificial/simulated environment
 - Created with software / computer generated
 - Appears as 3D space / interacted with via VR equipment
- (2)

2.6.2

Justify the use of virtual reality by giving TWO practical examples of how athletes can benefit from using this technology:

Any TWO: ✓✓

- Athletes could engage in interactive training modules specifically designed for marathon preparation.
- Athletes from around the world can participate in the Global Marathon Series without physically travelling to the event location. Participants could engage in virtual marathons.
- Creating opponents to compete against
- Simulating the real course/environment for preparation

ACCEPT any relevant and correct answer. (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

3.1 3.1.1 LAN ✓ (1)

3.1.2 *Define the term bandwidth:*

Bandwidth refers to the amount of data ✓ that can be sent over a network in a specific amount of time. ✓ (2)

3.1.3 *Any ONE unit of measurement of bandwidth in a network: ✓*

- Bps
- Kbps
- Mbps
- Gbps

Accept a / instead of p
Example: Mb/s (1)

3.1.4 *Discuss the purpose of an IP address:*

Uniquely identify the device ✓ on the network to allow communication ✓ on the network between the devices. (2)

3.1.5 *Motivate why STAR topology will be a suitable layout: ✓✓*

- If a connection between the device and switch fails (1), the other devices can still access the network. (1)
- Each device is easier to troubleshoot (1) as it is connected via its own dedicated cable. (1)
- Devices can be added or removed easily (1) by simply connecting or disconnecting them from an available port on the switch. (1)
- Direct access (1) due to data not having to travel through other devices. (1) (2)

3.2 3.2.1 *Any TWO wireless technologies: ✓✓*

- WiFi
- Bluetooth
- Satellite
- Cellular (GPRS/Edge/3G/4G/5G)
- WiMAX

Do NOT accept hardware devices. (2)



3.2.2 *Briefly describe how a person can connect to a wireless network from their device:*

A wireless device can connect to the wireless network by selecting the name of the wireless network ✓ and typing in the correct password. ✓

Any TWO concepts:

- Move the device in range of an access point / Switch WiFi on
 - Select the name of the wireless network
 - Type in the correct password
- (2)

3.2.3 A USB WiFi Adaptor ✓ (1)

3.3 3.3.1 *Explain why a static website will not be a suitable choice for this website:*

A static website stays the same/is not updated regularly ✓ and does not allow the end-user to upload content to the website ✓.

Any TWO concepts:

- A website that stays the same/is not updated regularly
 - Does not allow the end-user to upload content to the website
 - No interactivity
- (2)

3.3.2 *Explain what a cookie is:*

A cookie is a small text file saved on a user's device from the web ✓ to track the user's activities/ preferences/settings and browsing history of websites visited.

Any TWO ways in which it can be used to benefit the user: ✓✓

- Enhances the browsing experience of a user by autocompleting/applying user preferences
 - Saves time when navigating through websites
 - When the user revisits the website, it recalls the user's profile and applies the user's preferences automatically
 - Generates personalised adverts
 - Creates recommendations for users based on the user's previous browsing history
- (3)

3.4 3.4.1 QR (Quick Response) Code ✓ (1)



3.4.2 Describe TWO benefits of using a QR code: ✓✓

- Contactless – no need to touch or physical contact
- Better security – very difficult to copy since each code is different per ticket and is not human readable.
- Easy organisation – the gate will open only when the correct code has been presented, which makes management of queues easier/faster access
- The ticket is saved on the user's phone and doesn't need to be printed, save paper / cannot easily be lost
- Links to more data/information

(2)

3.5 3.5.1 Live streaming: broadcasting of content in real time ✓
(as it happens).

Viewing on demand: the content is pre-recorded / can be accessed at any time. ✓

(2)

3.5.2 (a) DDoS ✓ Distributed Denial of Service (1)

(b) Suggest TWO ways to prevent the server from becoming unresponsive: ✓✓

- Increase the bandwidth to the server
- Upgrade the networking infrastructure
- Implement a queuing system to access the website
- Manage server resources
- Security solutions
- Access restriction
- Bot prevention
- Attack surface reduction
- Traffic management

NOTE: Accept any TWO relevant and correct examples of the above. (2)

TOTAL SECTION C: 26

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

4.1 4.1.1 Any TWO reasons why it would be more suitable to use a Google form: ✓✓

- Takes less space/less paperwork
- Easy to retrieve information
- Easy to print reports and statistics
- Information will be available electronically to use in any application
- Easier to distribute to a larger group of people
- Saves time if not necessary to record manually
- More environmentally friendly (greener solution)
- Minimise human error / data is more reliable
- Entries can be done from any location

(2)

4.1.2 (a) Any ONE reason why it cannot sort. ✓

- Multiple values in a field
- Can't be sorted on surname as it is the second value in the field

Solution: ✓

Separate the name and surname into two separate fields.

(2)

(b) The CellNumber field must have the data type text/string. ✓

(1)

(c) The Position field ✓ – that can be determined/calculated/derived using the data in the table. ✓

(2)

(d) Marathon type ✓

AND

RaceTime / Position ✓

(2)

(e) (i) *Accuracy:* the data needs to be precise ✓
for example, the RaceTime 205.55 is not the same as the RaceTime 205.98 ✓

(2)

(ii) *Consistency:* the data in one part of a database should have the same format/not contradict/differ from the data in another part of a database ✓ for example if AthleteNum starts with the letter "A" it should be applied in the same throughout the database. ✓

(2)

4.2



4.2.1

Explain what physical data integrity refers to:

Physical data integrity refers to guarding against issues such as power failure, natural disasters, theft of hardware, etc. ✓

OR

Physical data integrity is the protection of data accuracy and completeness while it is stored, retrieved, and transmitted. (1)

(1)

4.2.2

Any *TWO* hardware devices that can be used to ensure the physical integrity of data.: ✓✓

- UPS (Uninterruptible Power Supply)
- RAID
- Access control devices (Biometric, security doors, etc.)
- Electronic locks
- Inverter and battery
- External storage devices
- Power surge protecting devices

(2)

4.3

4.3.1

Normalisation ✓

(1)

4.3.2

Alternate key ✓

(1)

4.4

Explain any *TWO* ways that metadata adds value to data: ✓✓

- Provides context and additional information that makes information easier to find/interpret/manage.
- Helps users understand the origin, purpose, and characteristics of data.
- Helps to make informed decisions about the data and its relevance.
- Helps to organise electronic resources, provide digital identification, and archive and preserve resources.

(2)

4.5

Justify the use of an expert system, rather than a decision-support system, in such an organisation:

A **DS system** does not give a solution but rather provides the user with information to use in their own decision making. ✓

An **expert system** will provide you with a fixed number of possible solutions gathered from experts in a certain field. ✓

(2)

4.6 Any TWO examples of where a digital footprint can be used.: ✓✓



- Companies often use this information to find out more about employees before hiring them
- Data collected about the user is sold for advertising purposes
- Cybercriminals can use the information the user shares, for online identity theft and phishing
- Context aware search optimisation
- Companies use info to buy popular stock

Accept any other relevant and correct answer.



(2)

TOTAL SECTION D: 24

SECTION E: SOLUTION DEVELOPMENT

QUESTION 5

5.1 5.1.1 B ✓ sMonth := copy(sDate,4,2) (1)

5.1.2 (a) Any ONE reason why a syntax error will occur: ✓

- Only ordinal values can be used in a CASE statement (1)
- The string variable sMonth cannot be used (1)

(b) Convert the sMonth value to an integer ✓ (1)

5.2 stgData.Cells[1,3] := 'Koos Nel' ✓; (2)

5.3 (-4 = 12 MOD 5) AND NOT FALSE ✓ OR (5 - (-4) = 1) ✓
FALSE AND TRUE OR FALSE ✓
FALSE OR FALSE ✓
FALSE ✓ (4)

5.4 loop iLoop from iNumElements ✓ downTo iPosition ✓
arrNames[iLoop + 1] ✓ ← arrNames [iLoop] ✓

arrNames [iPosition] ✓ ← sName ✓

iNumElements ← iNumElements + 1 ✓

Concepts:

Moving data one up from the last index to iPosition [4]

- Use of a loop from the correct lower (1) to upper index (1)
- Correct referencing of index below iPosition (1)
- Correct movement of names one place up (1)

Replace value at arrNames[iPosition] (1) with new name (1)

Increment iNumElements (1) (7)

5.5 5.5.1 Private ✓ (1)



5.5.2 The constructor/create ✓ method (1)

5.5.3 (a) Any ONE accessor method for fNumMarathons, fRunnerNO, fQualify:

- Function and function name ✓
- Correct datatype ✓

Examples: //

Function getNumMarathons (1): Integer (1)

Function getRunnerNO (1): Integer (1)

Function getQualify/isQualify(1) : Boolean(1) (2)

(b) setQualify ✓
To change/set the value of the attribute/class variable. ✓ (2)

TOTAL SECTION E: 22

SECTION F: INTEGRATED SCENARIO

QUESTION 6

6.1 6.1.1 Any TWO ways to determine whether a website is secure or not: ✓✓

- https
- security symbol
- Address bar will be a green colour
- View the SSL/digital certificate

(2)

6.1.2 Describe how data can be encrypted and decrypted using SSL:

- The public key is used to encrypt data. ✓
- Private and public key linked using algorithms / processes / cryptography. ✓
- The encrypted data can be sent to the recipient ✓ over the internet.
- The private key is used to decrypt the data. ✓

(4)

6.2 6.2.1 Explain how an RFID tag can be used to determine the time it took the athlete to complete the marathon:

RFID tags are used to record the start and finish times of each athlete. ✓ The system captures the tag's unique identifier ✓, allowing for precise time calculations.

Concepts:

- Unique identification of athletes / tag attached to an athlete
- Scanning/recording/capturing
- start and finish times

(2)

6.2.2 Briefly discuss how athletes can benefit from using RFID technology:

Any TWO: ✓✓

- RFID technology provides accurate and automated timekeeping, eliminating the need for manual recording
- RFID ensures precise and reliable timing data, which is crucial for assessing performance and rankings
- Immediate results are available
- Speeds up entry times and by reducing time in queues
- Captured data can be posted online in real time allowing spectators / fans / family to follow the athletes progress from home

(2)

6.3 6.3.1



(a) Discuss how GPS technology works:

GPS technology uses signals from satellites ✓ to determine the device's location ✓, enabling accurate tracking and mapping. (2)

(b) Any TWO ethical issues related to wearing a device with GPS technology: ✓✓

- Invasion of privacy
 - Data security
 - Misuse of location information
- (2)

6.3.2 Bluetooth ✓ (1)

6.3.3 Sensor/s ✓ (1)

6.3.4 Describe how the power of distributed computing can supplement the processing power of the wearable devices: ✓

Provides a link between the device and external servers / systems ✓
Supports devices by collecting data / AI capability ✓
Allows access to real time information ✓
Shared battery life ✓ (4)

6.4 6.4.1 Any TWO advantages of a wiki site: ✓✓

- Collaborative editing and information sharing/uploading
 - Real-time contribution and editing by multiple users
 - Harnessing collective knowledge and expertise
 - Creation of comprehensive and up-to-date information repositories
 - Valuable for collaborative projects, research, and knowledge sharing
 - Cost effective – affordable/free for teams working together
 - Wiki's track the changes made holding contributors responsible/reliable
- (2)

6.4.2 Any TWO explanations how content providers can improve the quality of contributions: ✓✓

- Encourage source/author verification
 - Determine the currency/date of the information
 - Implement moderation/validation/non bias
 - Foster a culture of responsibility
 - Provide educational resources on critical evaluation
- (2)

6.5 Explain the term *information overload* and motivate why it could pose a challenge to some individuals. Give a well-explained example as part of your answer:

Explain (1)

- Information overload refers to the overwhelming abundance of information ✓

Motivate why it could pose a challenge (2)

- All the information makes it challenging for individuals to process and absorb ✓, leading to difficulty in decision-making and information management. ✓

Well-explained example (1) ✓

- If you are researching the topic of your IT PAT, there are many resources available, and you need to decide which of these sources are valid. (1)
- Easily distracted due to availability of excessive information (1)

Accept any other relevant and correct example.

(4)

6.6 6.6.1 Explain the term *spoofing*:

An email/website/source that appears to be from a legitimate organisation but is only a replica created ✓ with the intent to collect personal information. ✓

(2)

6.6.2 Why do criminals prefer the ransom amount to be paid in *cryptocurrency*?

Cannot be traced / anonymity. ✓

(1)

6.7 Any TWO possible disadvantages of enabling automatic updates for software applications on a device: ✓✓

- An unexpected increase in internet/data usage
- Slows down/interrupts the device while updating
- An unwanted restart of the device at an inconvenient time
- Does not support rollback features
- Install update/s that is not wanted/requested
- Lose data that was not backed up
- Potential compatibility issues

(2)

TOTAL SECTION F: 33
GRAND TOTAL: 150