



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

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) <i>Any ONE accessor method for fNumMarathons, fRunnerNO, fQualify:</i> <ul style="list-style-type: none">• Function and function name ✓• Correct datatype ✓ <p><i>Examples:</i></p> <p>Function getNumMarathons (1): Integer (1) Function getRunnerNO (1): Integer (1) Function getQualify/isQualify(1) : Boolean(1)</p> <p>(b) setQualify ✓ To change/set the value of the attribute/class variable. ✓</p>	(2) (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