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) (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