basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**SENIOR CERTIFICATE EXAMINATIONS/
NATIONAL SENIOR CERTIFICATE EXAMINATIONS**

INFORMATION TECHNOLOGY P2

2022

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 13 pages.

SECTION A: SHORT QUESTIONS

QUESTION 1

1.1	1.1.1	B - Bluetooth ✓	(1)
	1.1.2	D - cookie ✓	(1)
	1.1.3	A - Expert system ✓	(1)
	1.1.4	C - extremely high volumes of traffic that request data from the website. ✓	(1)
	1.1.5	D - `ytoje` ✓✓	(2)

1.2	1.2.1	K ✓	Cyberbullying	(1)
	1.2.2	F ✓	iOS	(1)
	1.2.3	E ✓	RSI	(1)
	1.2.4	A ✓	Algorithm	(1)
	1.2.5	H ✓	Spam	(1)
	1.2.6	D ✓	Hyperlink	(1)
	1.2.7	R ✓	Machine Cycle	(1)
	1.2.8	C ✓	Machine code	(1)
	1.2.9	L ✓	GIGO	(1)

TOTAL SECTION A: 15

SECTION B: SYSTEMS TECHNOLOGIES

QUESTION 2

2.1.1 a) DIMM slot ✓ (1)

b) *Any TWO functions of a motherboard:* ✓✓
- Houses components (also accept specific components)
- Connects components / communication
- Provides power/distributes power to components (2)

c) Increased use of virtual memory will result in data being accessed at a slower/lower rate ✓
Instructions and data are fetched at a slower rate from storage than from RAM ✓

OR

Decreased use of virtual memory/more instructions and data can be stored in RAM
Instructions and data are fetched faster from RAM than from storage (2)

2.1.2 A core is a single/separate processor on a CPU chip✓ (1)

2.1.3 *Any ONE type of storage device used to increase storage space:* ✓
- SD card / memory card (1)

2.1.4 *Why would device C would be the most suitable device to scan QR codes:*

Mobility/portability ✓
Access to camera/ front and rear facing camera/built in camera ✓ (2)

2.1.5 Central Processing Unit (CPU) ✓ (1)

2.1.6 *Any ONE motivation for having a dedicated graphics card:* ✓
- Needed for graphics intensive applications (Video editing / CAD)
- Improve overall performance
- Reduce the processing load on the CPU
- Crypto mining (1)

2.2.1 *Any ONE for what is modular design:* ✓
- Computer is built up from separate modules/ parts
- An indication that the computer consists of individual components (1)

2.2.2 *Any ONE reason for using modular design:* ✓
- Components can be combined according to your needs
- Easy to upgrade/replace
- Easy to repair (1)

2.3.1   *Any TWO properties of CPU cache memory:* ✓✓
- High speed memory/static memory
- Memory on the CPU
- Stores frequently used instructions/stores instructions likely to be used
  next   (2)

2.3.2   *Any TWO other types of caching that is used on a computer system:*

Web caching ✓
Disk caching ✓   (2)

2.4.1   A Trojan is malware disguised as useful software ✓
A user is tricked into installing ✓ the Trojan with the assumption that they are
installing useful/legitimate software

CONCEPTS:
- Malware disguised as useful/legitimate software
- Activated by action from the user (installing/downloading)   (2)

2.4.2   A firewall monitors/controls/filters traffic ✓ (incoming & outgoing) on a
network/internet and prevents unauthorised communication/access ✓   (2)

2.5   *Difference between software update and patch:*

An update fixes code/adds new features/enhances security to software ✓
A patch removes software bugs/replacing incorrect code/removes
vulnerabilities in code ✓   (2)

2.6   *Any TWO ways to free up storage space:* ✓✓
- Use a disk clean-up tool/example of disk clean-up
- Remove duplicate files
- Uninstall/remove unused software/applications
- Empty the recycle bin
- Compress data not frequently used
- Archive files/data
- Move data/files to cloud storage/external device   (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

3.1   3.1.1   *Any ONE type of cable used in wired LAN:* ✓
- UTP/Ethernet cable (CAT 5/6/7)
- Fibre   (1)

3.1.2   *Any ONE type of media used to transmit in WiMAX:* ✓
- Radio waves
- Electromagnetic waves   (1)

3.1.3   Wi-Fi ✓   (1)

3.2   3.2.1   VPN (Virtual Private Network) ✓   (1)

3.2.2(a)   *IP address:*
A unique address/code that identifies a device ✓ on a network.   (1)

3.2.2(b)   *Purpose of a DNS:*
To obtain the correct IP-address for a specific URL/linking URL's to IP-addresses ✓   (1)

3.2.3   The NIC encodes/decodes data ✓ that is transmitted across a network ✓

OR

Provides a network hardware port for the computer to allow for data transmission over a network   (2)

3.2.4   Intranet is a network similar to the Internet/browser based network ✓ of which the access is limited to a specific organisation ✓   (2)

3.3   3.3.1   *Any ONE characteristic of streaming:* ✓
- The immediate and real-time delivery of media content to a receiving device
- The file is not saved to the storage devices media, but only played on the device
- Live viewing/ Video on demand   (1)

3.3.2   *Any ONE way to prevent unauthorised viewing:* ✓
- Use on a closed channel/do not connect to a larger network
- Use a login/password to control access the content   (1)

3.4   3.4.1   You will find "HTTPS" in the URL ✓   (1)

      3.4.2 (a)   Changing the format of data ✓ using a mathematical formula/key to prevent unauthorised access✓

              OR

              Any TWO properties of encryption (SSL):
- The public key is used to encrypt the data.
- The data can only be decrypted using the specific private key.
- The private and public unique matching keys are provided by complex mathematical algorithms.
- The private key never travels on network and therefore cannot be intercepted.   (2)

      3.4.2 (b)   The CA verifies that the business or organisation is valid. ✓   (1)

3.5   *Difference between functions of a router and modem*:

A modem converts the format of a signal for a specific communication medium. ✓
A router determines the best/correct route ✓ for the transmission of a message/communication between two points on a network. ✓   (3)

3.6   3.6.1   Semantic Search ✓   (1)

      3.6.2   *Purpose of using SEO*:

              To ensure that a search engine ✓ will place the company's site higher up in the order of search results. ✓   (2)

3.7   3.7.1   FTP (File Transfer Protocol) ✓   (1)

      3.7.2   *Any ONE type of file sharing service*: ✓
- Cloud storage
- BitTorrent
- Git/Git hub

              Also accept examples of Cloud Storage like Google Drive, One Drive etc.   (1)

      3.7.3   *Any ONE benefit of using online file storage services*: ✓
- accessible from many devices/places
- collaboration/sharing
- Saving on local storage space
- Servers take responsibility for creating a backup of the files   (1)

TOTAL SECTION C: 25

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

4.1   It is the primary key. ✓   (1)

4.2   *Primary key*:
        Must be unique ✓
        Cannot be empty/have a null value/required field ✓   (2)

4.3   IDNumber ✓   (1)

4.4   *Suitable data type for the VehicleRegNumber and motivation*:
        Short Text (any text data type) ✓
        A vehicle registration number contains numbers and letters ✓   (2)

4.5   *Why should name and surname be split into two fields*:
        There is more than one piece of information in the field ✓
        OR
        Any indication that it might be necessary to separately work with the name
        and surname values   (1)

4.6   4.6.1   Data redundancy refers to the unnecessary repetition of data ✓   (1)

        4.6.2   Normalisation ✓   (1)

4.7   4.7.1   *Example of useful information extracted from the data*:

                Establishing the frequency of offences/most common offence/least
                common offence ✓

                *Accept any relevant or correct answer of information gained from
                the table*   (1)

        4.7.2   *How can step 3 & 4 in the data progression diagram be applied*:

                A logical solution ✓ linked to the information obtained ✓
                Example - Increase policing at stop signs

                Also accept other correct examples based on the information from
                QUESTION 4.7.1   (2)

        4.7.3   Fuzzy logic deals with reasoning that works with probabilities. ✓

                Drivers not stopping at stops are reckless drivers/there are many
                reckless drivers in the community ✓

                Also accept any other correct example   (2)

4.8   4.8.1   *SQL injection*:
                    A hacking technique where SQL statements are entered ✓ into data input fields ✓ instead of data.   (2)

        4.8.2   *Audit trail*:
                    A record or 'trail' that is made to keep track of who ✓ made changes to a database and when ✓ those changes were made.   (2)

4.9   4.9.1 (a)   Logical integrity ✓   (1)

        4.9.1 (b)   Physical integrity - ensuring that data is protected against damage from power surges, natural disasters, theft, etc. ✓   (1)

        4.9.2   *Any TWO ways to ensure the date is entered in the correct format*: ✓✓
- Provide a list/component to select from/date picker/calendar
- Specify format in input component/ghost text
- Format/Data type check/applying a validation rule
- Input mask   (2)

4.10   *How is transaction processing used to maintain data integrity*:
- In transaction processing, transactions that are dependent on one another to work are grouped together. ✓
- The transaction will only be completed if all the individual transactions are successful. ✓
- If any one of the parts/instructions are unsuccessful, everything will be rolled back. ✓   (3)

TOTAL SECTION D: 25

SECTION E: SOLUTION DEVELOPMENT

5.1   5.1.1 2 ✓   (1)

       5.1.2 0-9 ✓ A-F ✓   (2)

5.2   5.2.1 *Any ONE reason for using an array vs variable*: ✓
              • When working with a large number of values/variables
              • An array can store multiple values
              • A variable can store only one value   (1)

       5.2.2 *Any ONE reason why names and ages cannot be stored in array provided*: ✓
              • An array can only store values of one specific data type
              • Names and ages are represented by two different data types
              • The provided array can only store integer values   (1)

       5.2.3 Loop k index 10 ✓ down to 7 ✓   Loop k index 9 down to 6
                arrNum[k] ✓← arrNum[k-1] ✓   OR   arrNum[k+1] ← arrNum[k]
              arrNum[6] ← 92 ✓   arrNum[6] ← 92   (5)

5.3   5.3.1 (a)   FALSE ✓   (1)

              (b)   TRUE ✓   (1)

              (c)   FALSE ✓   (1)

       5.3.2 An accessor returns the value of an attribute ✓ of an object and a mutator
              changes the value of an attribute ✓ of an object.   (2)

5.4

Number	Factor	Loop	Number mod Loop = 0	Factor = 1	Output
4					
	0				
		2			
			True/Yes		
	1				
		3			
			False/No		
		4			
			True/Yes		
	2				
				False/No	
					4 is NOT a prime number
✓	✓	✓	✓	✓	✓

Notes:
• Values may be placed in the same line as long as progression of algorithm is clear.
• Mark with fault by penalising for the faulty value in that column only.   (5)

TOTAL SECTION E: 20

SECTION F: INTEGRATED SCENARIO

QUESTION 6

6.1   6.1.1   *Crowd funding*:
The practice of funding a project or venture by raising money from a large number of people ✓ who each contribute a small amount, typically via the internet/social networks.   (1)

         6.1.2   (a)   *Any TWO reasons of using technology to automate the assembly of new vehicles*: ✓✓
- Safer work environment
- Fewer people employed/cost saving
- Greater precision/consistency of repetitive tasks
- Greater efficiency
- Improved productivity

Also ACCEPT other valid answers.   (2)

                     (b)   *How could a learning algorithm be used to improve the manufacturing and sale of new vehicles*:

A learning algorithm observes the current processes/trends that are followed ✓, for example, colour preference of vehicles, also extras that are popular, creates a set of rules based on the observation ✓ and creates an optimal process that can be implemented. ✓

CONCEPTS:
- Studying/observing current processes/trends
- Creating a set of rules
- Creating an optimal process   (3)

6.2   6.2.1   Radio Frequency Identification ✓   (1)

         6.2.2   *Any TWO ways how passive tags work*: ✓✓
- Energy from reader's radio signal at tollgate powers the tag
- Tag sends a signal that the reader uses to identify the specific tag
- Amount is automatically deducted from tag holder's account   (2)

         6.2.3   (a)   GPS ✓   (1)

                     (b)   *Any ONE reason why active tags will be needed for satellite tracking*: ✓
- The signal needs to be transmitted over longer distances
- Stronger signal needed to communicate with satellite
- Signal needs to be transmitted continuously   (1)

6.3   6.3.1   *Uncapped*:
Unlimited amount of data that can be used in a month ✓
OR
No limit on amount of data used. (1)

        6.3.2   *Any ONE reason for installing fibre rather than mobile LTE*: ✓
- Fixed location internet has a lower cost per GB than mobile LTE
- Fibre might have faster connection speeds depending on the speed of the package
- Using a lot of data

                Also ACCEPT other valid answers. (1)

        6.3.3   Router/ONT ✓ (1)

        6.3.4   *Will the 70GB Night Surfer Data hold a benefit for the company*:
Yes, backup/update procedures can be done overnight ✓✓
OR any other applicable motivation

                OR

                No. Outside office hours
OR any other applicable motivation (2)

6.4   6.4.1   (a)   *Rootkit*:
Software designed to obtain administrator rights to a computer for unauthorised access. ✓ (1)

                (b)   *Any ONE risk to data due to rootkit*: ✓
- Opens the computer for hacking/illegally accessing data files
- Creating backdoors for other malware
- Used as a bot for launching attacks on other computers and networks.

                      Also ACCEPT other valid answers. (1)

        6.4.2   *Social engineering*:
An attempt to manipulate or con someone ✓ into installing malware or giving out sensitive personal information. ✓ (2)

        6.4.3   *Any ONE way that anti-virus software identifies malware*: ✓
- The anti-virus software scans the files to identify known threats using virus signatures/definitions
- Looks for pieces of code that is unique to specific viruses. (1)

6.5   6.5.1   *Any TWO ways that AI can be used when working with big data*: ✓✓
- Find possible connections among datasets
- Recognize knowledge using natural language processing
- Can be used to automate and accelerate data preparation tasks
- Can learn common human error patterns
- Detect and resolve potential flaws in information
- Can learn by watching how the user interacts with an analytics program
- Can identify data types
- It can alert users to anomalies or unexpected patterns in data
- Identify potential threats from system logs or social networking data

Also ACCEPT other valid answers.   (2)

6.5.2   With the duplication model, each separate site has a complete copy of the entire database stored. ✓
With the partitioning model, each site stores and manages only the part of the database it works with. ✓   (2)

6.5.3   (a)   *Purging*:
Deleting/removing records ✓ permanently from a database.   (1)

(b)   *Any ONE reason why records will need to be purged*: ✓
- To limit the size of the database file.
- Remove obsolete/redundant/outdated records
- Improve the performance of the database   (1)

6.6   6.6.1   Virtualisation is the use of software ✓ to create an entity that only exist for as long as the software is being run. ✓   (2)

6.6.2   *Any ONE benefit of virtualisation:* ✓
- Saving on hardware
- Can run software written for other platforms
- Convenience of not having to keep multiple devices   (1)

6.6.3   *Is it compulsory for the company to pay for the additional proprietary operating system*:

Yes, ✓ the user must pay for the operating system to avoid committing piracy ✓   (2)

6.6.4   *TWO ways in which virtualisation is applied to make scalability of services possible*:

Combining the resources of many machines into one powerful service ✓
Sharing the resources of one powerful machine between many users ✓   (2)

6.7.1   *Any ONE reason to frequently change a password:* ✓
- For security reasons
- Prevent access to your account due to password leaks

Also ACCEPT other valid reasons. (1)

6.7.2   *Any TWO reasons why mfundi is not a strong password:* ✓✓
- Password too short/must be more than 8 digits
- Only lowercase characters/must contain an uppercase and lowercase letter, number and special character
- Can easily be guessed/do not use personal information (2)

6.7.3   (a)   *How can Quantum computing can be used in the statistical process of preventing the spread of a virus*:

It is used to easily query, monitor, analyse and act on data ✓, regardless of the source. (1)

(b)   *Any TWO problems of cloud computing which are solved using Edge computing:* ✓✓
- Bypasses the latency caused by cloud computing.
- Acts as mini data centres which cloud computing lacks.
- Used to process time-sensitive data in remote locations with limited or no connectivity to a centralised location. (2)

TOTAL SECTION F: 40
GRAND TOTAL: 150