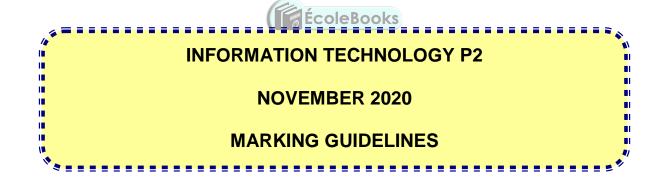basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**SENIOR CERTIFICATE/
NATIONAL SENIOR CERTIFICATE**

GRADE 12

INFORMATION TECHNOLOGY P2

NOVEMBER 2020

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 15 pages.

SECTION A: SHORT QUESTIONS

QUESTION 1

1.1   1.1.1   A ✓   (1)

        1.1.2   C ✓   (1)

        1.1.3   D ✓   (1)

        1.1.4   C ✓   (1)

        1.1.5   D ✓   (1)

1.2   1.2.1   E ✓   RAID   (1)

        1.2.2   R / C ✓   Alternate key/ Foreign key   (1)

        1.2.3   P ✓   Biometrics   (1)

        1.2.4   L ✓   SSL   (1)

        1.2.5   A ✓   Digital divide   (1)

        1.2.6   O ✓   Disk defragmentation   (1)

        1.2.7   Q ✓   Drivers   (1)

        1.2.8   M ✓   FTP   (1)

        1.2.9   J ✓   Rollback   (1)

        1.2.10   H ✓   Utility software   (1)

                                                            TOTAL SECTION A: 15

SECTION B: SYSTEM TECHNOLOGIES

QUESTION 2

2.1   2.1.1   Any ONE: ✓
- Faster data access speed/ reading speed
- Does not need to be defragmented
- Greater reliability due to the absence of moving parts
- Uses less power / more energy efficient
- Smaller in physical size   (1)

     2.1.2   Any ONE: ✓
More expensive when compared to hard drives
The inability to recover old data   (1)

2.2   2.2.1   RAM loses its contents when power is lost ✓/computer is switched off
Or any other correct explanation   (1)

     2.2.2   Any ONE: ✓

If the operating system/machine is 64-bit it can use more than 4 GB of RAM.

OR

If the operating system/machine is 32 bit, it would not be able to use more than 4 GB of RAM.   (1)

     2.2.3   (a)   Solid state drive ✓   (1)

           (b)   Any TWO: ✓✓
- Operating system and program performance / access time will be faster
- Bulk data can be stored on the cheaper hard disk drive, while programs that require high performance is stored on the more expensive SSD.
- Does not need to be defragmented
- Greater reliability due to the absence of moving parts
- Uses less power / more energy efficient   (2)

2.3   2.3.1   Any ONE:

Virtualisation/ Emulator/or examples of virtualisation software   (1)

     2.3.2   Any TWO of the following concepts: ✓✓

- New features
- Fixes to problems
- Updates
- Adding onto the existing operating system
- Provides updated security   (2)

2.4   2.4.1   A language that is easy for humans to write and understand/ language closely related to the language we use✓, because it relates to the English language.   (1)

     2.4.2   (a)   Difference: An interpreter translates line by line ✓

                         The compiler translates the whole program ✓   (2)

              (b)

Interpreter	Compiler
An interpreter displays error message(s) line by line	The compiler provides a list of error messages ✓
Does not provide an executionable file	Provides an executable file ✓

   (2)

              (c)   Delphi uses a compiler   (1)

     2.4.3   An API is an interface between the programming language✓ and operating system/ software/ services/ hardware ✓   (2)

2.5   2.5.1   DIMM slots ✓   (1)

     2.5.2   SATA connectors/ USB/ Firewire/ Thunderbolt ✓   (1)

     2.5.3   Any ONE: ✓

             PCI-Express slot   OR   PCI-e OR   AGP OR USB   (1)

2.6   The system clock generates pulses✓ that regulates the rate at which data is transferred between components. ✓

Concepts
Pulses are generated (1 mark)
The rate at which data is transferred (1 mark)   (2)

2.7   2.7.1   Machine cycle ✓   (1)

     2.7.2   Point-to-point connection ✓   (1)

TOTAL SECTION B: 25

SECTION C: COMMUNICATIONS AND NETWORK TECHNOLOGIES

QUESTION 3

3.1   3.1.1   (a)   Bandwidth is the total amount of data that can be sent and received/transferred in a network in a given period of time. ✓   (1)

                    (b)   Mega bits per second ✓   (1)

           3.1.2   Any TWO: ✓✓

                    Low/No signal degradation over a distance/ (Lower attenuation)
                    Mostly not affected by electro-magnetic interferences (EMI).
                    Immune to eavesdropping/more secure
                    Immune to crosstalk   (2)

           3.1.3   Any TWO: ✓✓
                                                                                         (2)
                    UTP is less prone to Interference
                    UTP is not as slow when shared between multiple users
                    UTP is not as influenced by objects like walls and trees
                    UTP has better security

                    Alternative:
                    Answers can be provided from the perspective of Wifi.

           3.1.4   A cable that connects different network segments or LANs together. ✓
                    OR
                    A backbone is part of a computer network that interconnects various pieces of a network providing a path of information exchange.   (1)

           3.1.5   Any ONE: ✓
                                                                                         (1)
                    A NIC facilitates/provides communication/connection between a computer and a network medium.
                    OR
                    Functions to encode and decode messages between computer and network

3.2   Any ONE: ✓

           The ability to choose what the user wants to watch
           A service which allows users to watch video content on demand (per request – users do not need to watch scheduled content) OR
           Any other suitable description.   (1)

3.3   3.3.1   Any ONE: ✓
                 • Decrease the likelihood of illicit/harmful downloads on the
                   network through BitTorrent clients.
                 • So that the network's bandwidth is not dominated by traffic
                   from BitTorrent downloads.   (1)

       3.3.2   No downloading of copyrighted material.✓   (1)

3.4   Blogs can be published by anyone. ✓
       Information is not verified. ✓   (2)

3.5   A static webpage displays the exact same information every time it is
       viewed✓ while the information displayed by a dynamic webpage may differ✓
       based on the user/ time/environment/ more interactive.   (2)

3.6   Any ONE: ✓
       • The document has not been changed.
       • The signature can verify the signer/sender of an electronic document.   (1)

3.7   3.7.1   Web browser ✓
                 Also accept a correct example such as Internet explorer/Mozilla
                 Firefox   (1)

       3.7.2   Any TWO: ✓✓
                 • Styles can be defined only once/in a single file that are
                   referenced and used by HTML files.
                 • If a change is made in the CSS file, all HTML files that
                   reference the styles defined in the CSS file will be updated.
                 • Styles are centralised and changes scale well without having to
                   change formatting/styling settings in multiple places across
                   HTML files.

                 Concepts:
                 Centralised design in a single file/only once
                 All web pages can access the design from the CSS files
                                                                                                 (2)

       3.7.3   Combines JavaScript with a browser command to allow the
                 browser to download data✓ without refreshing the entire
                 webpage.✓
                 OR
                 Allows parts of a webpage to be updated (1 mark) without updating
                 the entire webpage. (1 mark)   (2)

3.8　　　3.8.1　　A group of computers ✓ controlled by a hacker/computer criminal/ malicious software ✓and that work together to be used in an illegal manner　　(2)

　　　　　3.8.2　　Using a large number of computers✓ to overload servers/service with a large number of requests ✓ making it inaccessible. ✓　　(3)

　　　　　3.8.3　　It is the computer used/controlled by a computer criminal/ malware✓ in a DDoS attack or other criminal activity.　　(1)

3.9　　　3.9.1　　A type of malware that records keystrokes✓ and sends it off to a third party.　　(1)

　　　　　3.9.2　　Any TWO: ✓✓
- Installing/using anti-malware/ anti-virus software.
- Using a firewall.
- Keeping all your software up to date.
- Following a good password policy.
- Do not open unknown emails and attachments.
- Only use secure websites.
- Be updated with the new trends.
- Be guarded when sharing personal details.
- Do not install/add/open suspicious files.　　(2)

TOTAL SECTION C:　30

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

4.1　　4.1.1　　Data in field of primary key must be unique (no duplicates). ✓
　　　　　　　Cannot be null/empty. ✓　　(2)

　　　　4.1.2　　(a)　　ImporterID ✓ tblApplications/ tblImporters✓　　(2)

　　　　　　　　(b)　　One to Many ✓　　(1)

　　　　4.1.3　　Entity Relationship Diagram ✓

　　　　　　　　Also accept ER diagram / ERD/ Relationship diagram　　(1)

4.2　　Any ONE✓
　　　Boolean
　　　Yes/No
　　　True/False　　(1)

4.3　　The number of days it takes to process the request can be calculated/derived.✓　　(1)

4.4　　4.4.1　Any ONE: ✓

- A version of a piece of software that is made available for testing. Typically tested by a limited number of users.
- Version before its general release.
- A trial version of the software.　　　　　　　　　　　　　　　　　　(1)

　　　　4.4.2　Any ONE: ✓

- Validation rule/ Range check/ Format check
- Limit input with a component OR an example listbox/combobox　(1)

4.5　　4.5.1　TWO Marks:

　　　　　　　Test for correct range (0 or 1)

　　　　　　　OR

　　　　　　　ONE Mark each:
　　　　　　　Ensure/test for acceptable data
　　　　　　　Test for correct data type (Number)　　　　　　　　　　　　(2)

　　　　4.5.2　Data verification:
　　　　　　　Checking the correctness ✓ of data against the source/ human perspective.　　　　　　　　　　　　　　　　　　　　　　　　　(1)

4.6　　Any TWO: ✓✓

- Controlled access to building by means of NFC / RFID.
- Using biometric security to control access to a building.
- Placing servers/storage devices in lockable room / cabinet.
- Hiring security personnel to enforce access control to data.
- Using a cloud server/ off site server　　　　　　　　　　　　　　(2)

4.7   4.7.1   Data independence refers to the separation between software ✓that uses the database application and the actual data structure✓ managed by the DBMS server.   (2)

       4.7.2   Logical independence✓   (1)

       4.7.3   Any TWO✓✓
                • The user software/application cannot alter the structure or format of the data
                • Multiple applications can interface the same data because the physical structure is not a factor
                • DBMS software handles the actual data management.   (2)

                                                        TOTAL SECTION D: 20

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SECTION E: SOLUTION DEVELOPMENT

QUESTION 5

5.1　　5.1.1　A syntax error occurs when the rules of the programming language (or an example of a programming language error) are violated✓ OR an error that prevents the program from running.

A runtime error occurs when the program is executed/run and a problem is encountered (or an example of a runtime error). ✓　　　　　　(2)

　　　　5.1.2　Any TWO sensible guidelines: ✓✓
- Explain the error in understandable terms to the user.
- Provide an indication of whether the error is due to a problem with the software or hardware.
- Explain how to solve the problem.
- Give an indication whether it has been a program error or an error due to something that the user did.　　　　　　(2)

5.2　　The array list needs to be sorted ✓before binary search can be done.　　　　　　(1)

5.3　　5.3.1　Any ONE✓
- Variable S is not given an initial value (not initialised).
- Variable S needs to be initialised before the loop is executed.　　　　　　(1)

　　　　5.3.2　Any TWO✓✓
- Indentation to provide a readable structure
- Descriptive variable name to assist in understanding the purpose of the code
- Add a comment(s) to explain the purpose of the program
- Including blank lines between code segments　　　　　　(2)

5.4

Block Nr	f1	f2	i	i < 3?	fn	Output
1	2					
2		3				
3			1			
4				Yes ✓		
5					5 ✓	
6	3 ✓					
7		5 ✓				
8			2 ✓			
4				Yes ✓		
5					8 ✓	
6	5 ✓					
7		8 ✓				
8			3 ✓			
4				No ✓		
9						8 ✓

12/2
=(6)

5.5 Inc(i) ✓ OR Inc(i,1) (1)

5.6 5.6.1 + indicates public ✓members/methods/attributes
- indicates private ✓members/ methods/attributes
Also accept Public and Private if provided in that order without symbols. (2)

5.6.2 Any TWO: ✓✓
- setLocation()'s parameter doesn't specify a data type.
- getCapacity() method should return an integer data type.
- setEventDate()'s parameter should be a String data type OR fEventDate should be a Date data type.

Note:
Also accept the name of the incorrect method without an explanation. (2)

5.6.3 toString ✓ (1)

TOTAL SECTION E: **20**

SECTION F: INTEGRATED SCENARIO

QUESTION 6

6.1   6.1.1   Any TWO: ✓✓

Cache memory is physically closer to/on the CPU.
Cache memory stores frequently/recently/likely to be used instructions.
Type of memory used for cache memory is faster than RAM.
Do not accept only faster   (2)

       6.1.2   Any TWO: ✓✓

The CPU speed in GHz - higher speed improves performance
Number of cores - more for better performance
Number of threads - more for better performance   (2)

       6.1.3   (a)   Virtual memory ✓   (1)

                (b)   By swapping information not being used ✓between the hard disk space/virtual memory/additional memory and the RAM. ✓

Two of the following concepts:
- Content not being used,
- Moved from the RAM to storage
- Allocates a segment of hard drive as temporary RAM
- Saved until required again   (2)

6.2   Any TWO: ✓✓
- Not such a wide array of supported software applications available for Linux, (limited compatibility).
- Official support limited.
- No-one held accountable.
- Might include bugs in the source code.
- Many different versions exist, which might be confusing to users.   (2)

6.3   6.3.1   Any TWO: ✓✓
- Scalability
- Ubiquity, Can be accessed anywhere at any time
- Enables collaboration
- No need for maintenance and upgrades of hardware
- No need for software installation and upgrades
- Saves local resources/ storage space   (2)

       6.3.2   The distribution/sharing of resources of powerful computers between users ✓
The combining of resources of different computers to create a super powerful service ✓   (2)

6.4   6.4.1   Any TWO: ✓✓
- Can access e-mail from anywhere if you have Internet access.
- No additional costs for email facility.
- Using your web browser to access e-mail.
- Scalability
- Ubiquity, Can be accessed anywhere at any time
- Outsources maintenance and upgrades of hardware
- Outsources software installation and upgrades
- Saves local resources/ storage space   (2)

6.4.2   (a)   Any TWO: ✓✓

Browser tracks everything done by the user logged in.
Builds a detailed profile based on general interests and habits.
Filters results based on search history.

Accept any valid aspect that can be linked to the users profile.   (2)

(b)   The search engine uses situational data ✓ (e.g. location) to
make search results more relevant.   (1)

(c)   Any ONE: ✓

The search results will have less hits/more relevant.
More suppliers can be located.   (1)

6.4.3   Any TWO: ✓✓
- Mobile devices are more readily available.
- More streamlined interface.
- Able to easily receive notifications on user's device.
- Can use a mobile app on the go (anywhere).
- Ability to cache data locally on device so that data can be
  accessed offline.
- Less data usage.
- Don't have to memorise long URL's/App is dedicated to a
  specific website.   (2)

6.5   Any TWO: ✓✓
- The company runs a small business which does not require the complexity
  of a distributed database
- It is more expensive to set up/maintain a distributed database.
- A distributed database is more complex to set up/maintain.
- Synchronisation of data is more complex
- More complex security   (2)

6.6   6.6.1   Any TWO ✓✓
- To access files and documents on the business computer from
  anywhere /connect to your business
- with the same security as in the office/LAN
- with the same resources/ software as in the office   (2)

6.6.2   Any ONE: ✓
- Battery saver
- Power & sleep
- Mobile hotspot
- Airplane mode
- Location
- Bluetooth   (1)

6.6.3   Sharing a cellular internet connection ✓ to connect devices via Wi-Fi/Radio ✓   (2)

6.6.4   (a)   Multitasking: Operating System shares processing time✓ between multiple applications/ tasks/ programs✓   (2)

        (b)   Multiprocessing differs from multitasking in the following way:
More than one CPU core required, ✓
Different tasks or threads are processed simultaneously. ✓   (2)

6.6.5   Allows communication/sharing between electronic devices at a short distance from each other.✓
OR a correct and suitable description.   (1)

6.7   Any TWO: ✓✓
- Call quality is affected by Internet connection speed and traffic.
- To communicate over VoIP, all parties partaking in communication needs to use the same client software.
- To make video calls on the Internet can be expensive.
- Both parties need to have a high speed, stable internet connection.   (2)

6.8   Any TWO: ✓✓
- IoT can be used to monitor/ control temperatures remotely.
- IoT can be used to notify management of anomalies in fridge temperature.
- IoT can be used to keep a log of temperatures, showing the history of the temperature levels which can aid in decision-making.
- Any other acceptable answer.   (2)

6.9   6.9.1   Any ONE✓

        Radio/Radio waves
        Electromagnetism/Electromagnetic waves   (1)

        6.9.2   Any TWO✓✓
        - More than one tag can be read at a time
        - Tags can be hidden
        - Tags can be read even if they are moving at speed
        - Increased accuracy
        - Speed of capturing
        - Can be read over distances

        In terms of security related issues (scenario in question):

        RFID cannot be easily copied as in the case of barcodes.
        Any other security related examples.   (2)

                                                              TOTAL SECTION F: 40
                                                              GRAND TOTAL: 150