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Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

INFORMATION TECHNOLOGY P2

NOVEMBER 2021

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	B✓		(1)
	1.1.4	C✓		(1)
	1.1.5	B✓		(1)
1.2	1.2.1	F✓	Check digit	(1)
	1.2.2	I✓	BitTorrent	(1)
	1.2.3	G✓	Virtual memory	(1)
	1.2.4	J✓	String-grid	(1)
	1.2.5	M✓	Run time error	(1)
	1.2.6	N✓	RFID	(1)
	1.2.7	P✓	Record locking	(1)
	1.2.8	A✓	Social engineering	(1)
	1.2.9	B✓	CMOS	(1)
	1.2.10	D✓	Information overload	(1)

TOTAL SECTION A: 15

SECTION B: SYSTEMS TECHNOLOGIES**QUESTION 2**

- 2.1 2.1.1 The source code of the software is available / accessible ✓ to view and is editable.✓
Two marks for editable (implies accessible)
One mark accessible / view / available (2)
- 2.1.2 *Any ONE (Free operating system): ✓*
 - Linux
 - Red hat
 - Ubuntu
 - Chrome OS
(1)
- 2.1.3 *Any TWO (Disadvantages of FOSS): ✓✓*
 - Lack of formal support
 - No one to hold accountable for errors
 - Possible bugs/Unstable versions / malware
 - Different versions
 - Not regularly updated
(2)
- 2.2 2.2.1 Defragmentation rearranges files ✓ that are fragmented / scattered ✓ on the HDD disc (2)
- 2.2.2 Solid State Drive ✓ (1)
- 2.2.3 *Any TWO (Why is SSD faster than HDD?): ✓✓*
 - A SSD is electronic
 - No moving / mechanical parts
 - No increase latency due to read write heads having to find the correct sectors/tracks
(2)
- 2.3 2.3.1 *Any ONE (Virtualisation): ✓*
 - Virtualisation refers to creating an entity (referred to as a virtual machine) that only exists in software.
 - It is a machine that runs on the host machine and running a different operating system as a guest operating system using the hardware of the host.
(1)

2.3.2 (a) *Any TWO (Benefits of SaaS): ✓✓*

- Minimal setup required / not necessary to install the software on your machine / (minimal effort involved)
- Use less space/resources on your machine
- Pay license fee instead of buying the software/minimal initial cost (saving cost)
- Software is updated automatically on the cloud computers
- New features are regularly added
- Ubiquity – use it on any device at any time / can be used from any computer with an Internet connection
- Easy to collaborate or share information with other users
- Scalability – E.g. payment per month can vary, etc. (2)

(b) You pay a subscription fee ✓ and gain access software / use of the service ✓ (2)

2.4 2.4.1 A full backup is made initially ✓ and on set intervals all the changes that have been made to the data gets backed up. ✓ (2)

2.4.2 Prevents unauthorised access ✓
OR an acceptable explanation (1)

2.5 2.5.1 *Any ONE (Device used for a power outage)✓*

- Uninterrupted Power Supply (UPS) / power bank
- Inverter with battery/generator / solar power
- Use a mobile device (laptop / tablet) / device with built-in battery (1)

2.5.2 *Any ONE (Connect device to laptop): ✓*

- WiFi/ connect wirelessly/Bluetooth
- LAN / network cable / wired connection

Also accept HDMI / examples of cables (1)

2.6 2.6.1 SOHO ✓ (1)

2.6.2 Concepts:

- Suitable example from using a wordprocessor
- More than one process running at the same time

Example:

The word processor will be able to type, spell check, auto save, etc. ✓ at the same time. ✓ (2)

2.6.3

- More RAM can store more applications / data ✓
- Faster access from RAM ✓

OR

- Leads to less use of virtual memory
- RAM is faster than virtual memory (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES**QUESTION 3**

- 3.1 3.1.1 *Any TWO (Computer network): ✓✓*
 Concepts:
 - Multiple devices
 - Connected with communication medium
 - Ability to communicate / transfer / share software, hardware, data and information.

A collection of computers or other computing devices connected via some sort of communication medium to allow users to share software, hardware, data and information. (2)

3.1.2 WAN / Internet ✓
Also accept: GAN (1)

3.1.3 *Any TWO (Disadvantages of network): ✓✓*
 - Administrator required/ high expertise
 - Sophisticated security required
 - Malware can spread
 - Cost implications

Also accept:
 - Device /server /network malfunction can disrupt the network
 - Loss of data due to device / server / network crashing (2)

3.2 3.2.1 The layout / arrangement of devices ✓ in a network. (1)

3.2.2 Star topology requires each of the nodes/devices to be connected ✓ to a central hub/switch ✓ (independently / individually / its own cable) (2)

3.3 3.3.1 *Any TWO (Benefits of VOIP): ✓✓*
 - Lower call cost
 - Software is generally free
 - Allows video conferencing / calls
 - Allows you to display / transfer documents, images, and videos all while simultaneously engaging in a conversation (2)

3.3.2 *Any ONE (Requirement of using VOIP): ✓*
 - Internet connection
 - Same software installed on both devices
 - Purchase credits to make phone call to certain numbers
 - Have speakers, webcam, and mic / headset (1)

3.4

3.4.1

- (a) A browser simply displays web pages. ✓

Also accept

- Used to view web pages
- Web browser is used to run the search engine (1)

- (b) You need a search engine to search for content ✓

Also accept

- With a search engine you do not need to know the URLs
- A web browser can only view pages, not search (1)

3.4.2

- (a) A cookie is a small text file ✓ used to store the preferences/settings of a website visited. ✓ (2)

- (b) When visiting the same website again, it 'remembers' your profile and applies your preferences automatically. ✓

Any answer that implies using user preferences being stored and used (1)

3.4.3

Click farms are companies that pay workers / bots / botnets to repeatedly click on website elements / generate 'likes' ✓ to artificially 'increase' / 'boost' the status of a product or web page. ✓

Concepts:

- Clicks being generated
- Artificially create a status/likes/popularity for a web page (2)

3.5

3.5.1

Any ONE (Range) ✓

- Range refers to the measurement of how far data or a signal can be transmitted and received,
- Distance that can be covered

Any ONE (Bandwidth) ✓

- Bandwidth refers to how much data you can send through the network per time unit
- Speed of connection (2)

3.5.2 Shaping occurs when an online activity gets prioritised over other activities ✓ when the network / Internet is busy ✓ – only certain online activities are restricted during peak times.

Throttling reduces bandwidth ✓ to all activities when network is strained or once you have exceeded your monthly limit.

Concepts:

- Both happens when there is congestion / high traffic / excessive data usage
- Shaping – Limit bandwidth to specific prioritised activities
- Throttling – Limit bandwidth on all activities

(3)

3.6 3.6.1 A digital certificate is used to verify the validity/authenticity of a person or organisation. ✓ (1)

3.6.2 *Any ONE (Secure connection):* ✓

- There will be an 's' in the URL of the website e.g., <https://www.Google.co.za>
- There will be a lock symbol in the address bar

(1)

3.7 3.7.1 *Any ONE (Computer worm):* ✓

- A type of malware that exploits weaknesses in an application or operating system / network in order to spread
- Spreads copies or replicates itself / without interaction
- Spreads itself over a network

(1)

3.7.2 *Any ONE (Activity indicating a computer worm):* ✓

- Hard drive space decreases even though no extra files have been loaded on the HDD
- Performance of the computer decreases
- Files are missing but not deleted by the user / new files on HDD that were not added by the user
- Anti-virus software detects a worm and requests a user response to delete the file
- Emails sent out from computers without the user's knowledge

(1)

3.7.3 A firewall is a network security device/software that monitors incoming and outgoing network traffic ✓ and decides whether to allow or block specific traffic ✓ based on a defined set of security rules

Concepts:

- Monitoring of traffic
- Blocking of unwanted traffic

(2)

3.7.4 A white hat / ethical hacker / security analyst ✓

Also accept:

Penetration tester / PEN tester

(1)

TOTAL SECTION C: 30

SECTION D: DATA AND INFORMATION MANAGEMENT**QUESTION 4**

4.1 4.1.1 A database containing multiple tables linked together in a relationship. ✓

Also accept:

- A database containing tables that are linked with primary and foreign keys.

(1)

4.1.2 Any **ONE** (*Anomaly*) ✓ with explanation: ✓

- Insertion anomaly: The database has been created in such a way that the required data cannot be added unless another piece of unavailable/unrelated data is also added.
- Deletion anomaly: The legitimate deletion of a record of data can cause the deletion of some required data.
- Update / Modification anomaly: Incorrect data may have to be changed, which could involve many records having to be changed, leading to the possibility of some changes being made incorrectly.

(2)

4.2 Any **THREE** fields with correct data type ✓✓✓

- ReleaseDate: Date/Time / TDate
- Price: Currency / Real / Double
- eMagazine: Boolean / Yes No
- NumPrinted: Number / Integer / ShortInt / LongInt

(3)

4.3



Concepts:

- Correct entities / table names included and displayed on diagram ✓
- Correct relationship type indicated (One-to-Many) ✓
Any acceptable notation indicating the correct relationship
- Correct / acceptable action verb describing the relationship ✓

(3)

4.4 4.4.1 Any **TWO** (*Aspects of data integrity*): ✓✓

- Completeness of data
- Accuracy / Correctness / Reliability of data
- Consistency of data
- Validity

(2)

4.4.2 Any **ONE** (*Way to ensure data integrity*): ✓

- ensuring referential integrity
- including validation in your database design
- verify that all the data is correct

(1)

4.5 *Any TWO (Uses of DBMS): ✓✓*

- Improves the organisational structure / storage of data
- Reduces redundancy
- Improves data transfer
- Enhances data security
- Improved data integration
- Minimises data inconsistency
- Faster data access
- Better decision making
- Increased end-user productivity
- Many operations like insertion, deletion or creation of file or data are easy to implement
- Prevent anomalies though a correct structure

Accept any other applicable and correct answer (2)

4.6 *Any ONE (Way to minimise user input): ✓*

- Default values
- GUI-controls / components / examples of components
- Importing data from other systems / automated input
- Barcode scanner / reader
- RFID

(1)

4.7 *Any TWO (Benefits of a server based DB instead of a desktop DB): ✓✓*

- Ideal to accommodate large numbers of users
- to work simultaneously on the database
- from many different locations

(2)

4.8 Data warehousing will decrease the size ✓ of a database and increase the speed. ✓

OR

Increasing the size of the data warehouse decreases the speed of the data warehouse

(2)

4.9 *Any ONE (Role of a human in data mining): ✓*

- Selecting and preparing data sets
- Developing data mining software and algorithms
- Interpreting / verifying results delivered by the data mining software

(1)

TOTAL SECTION D: 20

SECTION E: SOLUTION DEVELOPMENT

- 5.1 5.1.1 True ✓ (1)
- 5.1.2 False ✓ (1)
- 5.1.3 False ✓ (1)
- 5.2 5.2.1 6 ✓
 6 ✓
- Also accept:*
 Any description that indicates both values to be 6 (2)
- 5.2.2 Input A
 Input B
- Temp ← A ✓
 A ← B
 B ← Temp ✓
- All three statements above in the correct order* ✓
- Display A
 Display B
- Accept any variable used as a temporary holder (3)
- 5.3 5.3.1 *Any ONE (Syntax error that will be displayed):* ✓
- A string value is assigned to an integer type variable
 • Add the StrToInt function
 • Type cast from a String to an integer (1)
- 5.3.2 `if iFirst > iSecond ✓`
 `then sMeal:= 'chicken' ✓`
 `Else if iThird < iFirst ✓`
 `then sMeal:= 'fish' ✓`
 `Else sMeal:= 'burgers' ✓`
- Concepts:
- If and condition
 • Assign correct value to sMeal
 • Else if and condition
 • Assign correct value to sMeal
 • Else assign correct value to sMeal / initialise sMeal at the start (5)
- 5.3.3 B ✓✓
- If a list of options are :
- Only mark the first answer (2 marks)
 • Subtract 1 mark for every incorrect answer added (2)

5.4

5.4.1 Any TWO (*Reasons why UML diagrams are important*): ✓✓

- Specifies the structure or behaviour of an object /
Helps to visualise an object
- Provides a template as a guide to constructing an object
- Breaks down a complex object into simple parts
- To list attributes / data types
- To indicate accessibility of attributes / methods
- UML is generic, it can be interpreted by any programmer (2)

5.4.2 Returns the current value of an attribute ✓ of an object (1)

5.4.3 setNumCopies() ✓ (1)

TOTAL SECTION E: 20

SECTION F: INTEGRATED SCENARIO**QUESTION 6**6.1 6.1.1 *Any ONE (Example of a local / server side scripting language): ✓*

- PHP
- JavaScript
- ASP.NET
- Node.js
- Ruby
- Perl
- Python
- Lua
- HTML 5

(1)

6.1.2 It allows web developers to design the layout and appearance of web pages once ✓ and then automatically updates the design changes done on other web pages ✓

Concepts:

- Design the layout and appearance once
- Automatically updates / implements on all web pages

(2)

6.1.3 SQL is used to interact with the database, ✓ and make the website more interactive. ✓

Concepts:

- Interaction with the database/ store and retrieve / extract data
- Makes the website more interactive

(2)

6.1.4 (a) Location based ✓ computing

(1)

(b) GPS ✓

(1)

6.2 6.2.1 *Any TWO (Components on the motherboard that can be upgraded): ✓✓*

- RAM
- CPU
- Graphics card / GPU
- I/O cards

Also accept

- HDD/SSD

(2)

6.2.2 *Any TWO (Benefits of desktop computers over laptops): ✓✓*

- Larger screens
- Supports modular design / custom design
- Easily expandable / upgradeable
- Easier to repair
- Affordability / lower cost

(2)

6.2.3 *Any ONE (Way to improve the speed of computers without adding hardware) ✓*

- Disable specific features
- Run system clean-up
- Clock manipulation
- Removing malware
- Updating of software
- Closing some applications

Also accept examples that apply to the above

(1)

6.2.4 *Any TWO (Ways to dispose computers in an eco-friendly way) ✓✓*

- Recycle the material
- Dispose at an approved e - waste site
- Reuse components
- Donating computers
- Sell working parts of computers / computers

(2)

6.3 6.3.1 Process whereby certain routine office processes are carried out without human intervention✓ / process done by a computer / machine

(1)

6.3.2 *Any TWO (Advantages of office automation): ✓✓*

- Saves time/ complete repetitive tasks faster
- More accurate
- Manages digital processes effectively
- Decrease the workload of workers

(2)

6.4 6.4.1 *Any ONE (Employees connect to company's network): ✓*

- Hotspot / Access Point / Wi-Fi modem
- Naming a specific device / setting that can be used to connect to Wi-Fi
- Network Interface Card (NIC) on the users device

(1)

6.4.2 (a) *Any ONE (Problem with attenuation): ✓*

- Attenuation causes loss of signal strength in networking
- Limits the distance that signals can be transmitted

(1)

(b) Fibre optic cable✓

(1)

6.4.3 Any TWO (WiMax more suitable than Wi-Fi): ✓✓

- Wider range
- More secure
- Faster speed / higher bandwidth

(2)

6.5 6.5.1 Posting of short ✓ text / pictures / audios / videos ✓

(2)

6.5.2 Any TWO (Negative impact of excessive use of social media): ✓✓

- Anxiety
- Depression
- Addiction
- Overweight / obesity
- Eye strain
- Wrist aches / Carpal Tunnel Syndrome (CTS)
- Back aches
- Repetitive Strain Injury (RSI)

Also accept:

Any appropriate / relevant health issue

(2)

6.6 6.6.1 Internet of Things✓

(1)

6.6.2 Any TWO (Ways): ✓✓

- Wi-Fi / Wirelessly
- Bluetooth
- Cellular
- Satellite
- Physical Connection / Wired
- Sensors

(2)

6.7 6.7.1 The processing power of many computers are combined to work together ✓ to solve a single problem.✓

(2)

6.7.2 Any ONE (Example of distributed computing): ✓

- Counting the number of stars in the galaxies
- Finding a solution/cure for the Ebola virus
- Finding a solution/cure for certain strains of childhood cancer
- Finding new prime numbers
- Categorising galaxies
- Searching for alien life
- Fight AIDS
- Weather modelling
- Genetic research

Also accept any other applicable example

(1)

- 6.8 A growing list of records / entries / transactions ✓ that are linked using cryptography / difficult or impossible to altered/changed/ incorruptible ✓

Concepts:

- A list of records / entries / open ledger / transactions ✓ that are linked
- Difficult or impossible to change / incorruptible (2)

- 6.9 More than one level / factor / technique of authentication ✓
An explanation / example to justify the above ✓

Also accept for two marks

Naming TWO different techniques of security checks with appropriate examples

Examples of security techniques can include the following:

A password / OTP / SMS / Email / Biometrics / QR code (2)

- 6.10 *ANY ONE (Why does electronic media use DRM): ✓*

- Encryption / technique to control access to the content / protection of rights.
- Encryption / technique to prevent unlawful copying / piracy. (1)

- 6.11 6.11.1 *Any TWO (Tasks performed with Read permissions): ✓✓*

- List
- Read / access / open files
- Copy / download files
- Save As
- Execute (2)

- 6.11.2 Administrator ✓

Concept:

Any person in charge of the files in the folder (1)

TOTAL SECTION F: 40
GRAND TOTAL: 150