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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

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

**INFORMATION TECHNOLOGY P2**

**2021**

**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 13 pages.**

**SECTION A: SHORT QUESTIONS****QUESTION 1**

1.1	1.1.1	G✓	(1)
	1.1.2	I✓	(1)
	1.1.3	A✓	(1)
	1.1.4	N✓	(1)
	1.1.5	E✓	(1)
	1.1.6	L✓	(1)
	1.1.7	H✓	(1)
	1.1.8	K✓	(1)
	1.1.9	J✓	(1)
	1.1.10	C✓	(1)
1.2	1.2.1	SSD – solid state drive	(1)
	1.2.2	Driver	(1)
	1.2.3	Software as a service (Saas)	(1)
	1.2.4	Convergence	(1)
	1.2.5	Cookie	(1)

**TOTAL SECTION A: 15**

**SECTION B: SYSTEMS TECHNOLOGIES****QUESTION 2**

- 2.1 Point to point connections between components (not devices) are not shared/ are dedicated ✓  
providing high data transfer speeds ✓ (2)
- 2.2 2.2.1 Quad-core ✓ (1)
- 2.2.2 A task is separated into different threads ✓ that can be processed simultaneously ✓ spread/executed on/by different cores. (2)
- 2.2.3 Any TWO of: ✓✓
- Stores data and instructions that may be needed next / recently used / pre-fetched
  - It is high speed memory / closer to (on) the CPU
  - Faster access than fetching from RAM
  - Prevent slower process from slowing down systems (2)
- 2.3 A bus ✓ (1)
- 2.4 Discuss TWO characteristic of RAM (2 x ✓✓) of the following:
- RAM has no moving parts and it is completely electronic (Solid State Memory) - Electronic
  - RAM is faster than any mechanical hardware (hard/optical drive) - Fast
  - RAM loses its contents if the power supply is interrupted - Volatile
  - RAM is more expensive per GB than storage - Comparatively expensive
  - It stores data and instructions currently being executed.
- NOTE: Only one mark if the characteristic is mentioned with no discussion (4)
- 2.5 By using one computer ✓ developers can test their software on different operating systems / platforms. ✓ (2)
- 2.6 2.6.1 Firmware is used to control the basic operation of a device. ✓ (1)
- 2.6.2 On a ROM ✓ chip (1)
- 2.7 The CMOS is the type of memory that stores the BIOS settings that can be changed, ✓ while the BIOS contains the essential start-up instructions / does the POST on a computer. ✓ (2)

2.8 *THREE concepts: ✓✓✓*

- Make sure that you have a good backup policy and know how to restore your data / save all your important files in the cloud / syncing of files across devices.
- Make sure you have records of all your licence keys and serial numbers.
- Keep the software installation files/CD/DVD/flash disk in a place where you can easily find and access them.

Concepts:

- Data backup
- Keeping licence keys/ serial numbers
- Keep installation files/CDs/DVD/flash disk

2.9      2.9.1      8 bits ✓ (1)

2.9.2 *Any TWO of ✓✓*

- Ease of access/speed
- This enables the user to better search for a file using words or phrases that might appear inside the document.
- The operating system has an index that does not only include file names, but also include words and parts of text inside the file.

(2)

2.9.3 *Any ONE of ✓*

- To remove temp files downloaded from the Internet
- To remove deleted files and folders by emptying the recycle bin
- To remove temp files created by operating system
- To remove components of operating system that are not used
- To remove installed programs that you no longer/seldom uses
- To free up/open up additional space on the HDD
- To improve the access speed of the device

(1)

**TOTAL SECTION B:      25**

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

- 3.1      3.1.1    Ethernet ✓ (1)
- 3.1.2    Any TWO of ✓✓
- New devices can easily be added/removed/set up on the network.
  - Easy to troubleshoot/maintain
  - If any connected device breaks, the rest of the network is not affected.
  - Network traffic can be managed more effectively (2)
- 3.1.3    A switch connects many computers ✓ on the same network and has the ability to direct network traffic to the correct port / lessens network traffic. ✓ (2)
- 3.2      3.2.1    The person/point from which a downloaded file is being shared ✓ (1)
- 3.2.2    Internet: Any ONE ✓
- The Internet shares information accessible to everybody.
  - Internet - much larger network than an Intranet / unlimited resources
- Intranet: Any ONE ✓
- An Intranet shares information / is accessible privately/ limited group.
  - Intranet – small network with limited resources (2)
- 3.3      3.3.1    VPN ✓ (any explanation implying VPN) (1)
- 3.3.2    It is a loophole that is programmed into software ✓ that is used to bypass the security ✓ controls in the network/computer/program. (2)
- 3.3.3    All changes/updates of the files will automatically be copied to ✓ all the devices linked to online storage/folders. ✓ (2)
- 3.4      3.4.1    Customised: A search in which the results are customised by search engines (like Google) to match one's profile of interests and activities. ✓
- Context aware: A search in which additional information (e.g. one's present physical location) is used as criteria to make search results more relevant. ✓ (2)

- 3.4.2 Advertisers pay for sponsored links to appear ✓ even when not relevant to the search. ✓  
OR  
The user often sees sponsored links first on the results page and these links do not always take you to a relevant information/website. (2)
- 3.5 3.5.1 Any TWO of ✓✓  
Javascript, Pearl, Ruby, ASP.net, Python, PHP, HTML-5 (not without 5) (2)
- 3.5.2 Retrieves information from a database on the web server using the profile of the user ✓ for whom the web page is dynamically created on the server before downloaded to your browser. ✓
- Concepts:
- Personal information obtained from a database on the webserver
  - Web page is created on the server before downloaded. (2)
- 3.6 DSS analyses the information gathered and presents it in a summarised or graphical format suitable for making informed decisions.
- Any TWO of the following concepts: ✓✓
- Analyse information
  - Presents information in a summarised or graphical format suitable
  - Assists in informed decision making/decision support system (2)
- 3.7 The quality of information - can be questionable as anybody can create/edit the information. ✓  
OR  
The bias of editors - any editor can select/edit the information to promote his/her point of view. (1)

**TOTAL SECTION C: 24**

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

- 4.1      4.1.1      To uniquely identify a record in a table. ✓ (1)
- 4.1.2      There can be more than one store in the mall that opened on the same day. ✓ (1)
- 4.1.3      StoreID/StoreNumber. ✓ (1)
- 4.2      4.2.1      **Normalisation** is the process of efficiently designing a database ensuring data integrity✓ and eliminating data redundancy.✓  
OR  
Designing a database to prevent anomalies and data redundancy. (2)
- 4.2.2      NumYearsOpened can be calculated✓using the DateOpened field.✓ (2)
- 4.3      Any TWO of ✓✓
- Test for the format of the date e.g.
    - format must be yyyy/mm/dd.
  - Test if the date is in the correct range e.g.
    - the date the shop opened was after the date that the mall opened
    - check that the date is not in the future.
  - Presence check – a date was entered or selected.
- NOTE: In each case accept an explanation or a suitable example. (2)
- 4.4      4.4.1      Any ONE of: ✓  
Has  
Employs  
Also accept any other sensible action verb that describes the relationship. (1)
- 4.4.2      B      One to many ✓ (1)
- 4.5      4.5.1      False✓ (1)
- 4.5.2      True ✓ (1)
- 4.5.3      True ✓ (1)
- 4.5.4      True ✓ (1)
- 4.5.5      True ✓ (1)

## 4.6 Any TWO of ✓✓

- To make the data more suitable for data mining.
- Data need to be compressed to limit size.
- Data need to be standardised to the same format as the data in the data warehouse. (2)

## 4.7 Any ONE of ✓

- To access the history of the record.
- To reinstate the record / provide for recovery if records are deleted accidentally.
- For auditing purposes. (1)

## 4.8 Any TWO of ✓✓

- Slows down the network traffic because of the large volume of data being communicated/overloading.
- High data charges (cost).
- The risk of the whole business shutting down when the central database is down. (2)

## 4.9 Any TWO ✓✓

- Validate data fields.
- Provide only certain options for example using a component where input can only be selected.
- Limit size of fields to be entered.
- Use parameterised queries. (2)

## 4.10.1 Online data collection is where data is processed immediately✓/in real time after it has been captured or collected. ✓

OR

Data is captured/recorded and saved directly/immediately onto a system (2)

## 4.10.2 Any ONE example ✓ with the benefit/use of data ✓

Possible answers:

- The specific purchases are recorded – business establishes buying patterns of clients.
- The bank that clients use is recorded – business can use it as bargaining tool with bank.
- The time of day that purchase is made – can plan for rush hours.

Also accept other valid answers. (2)

**TOTAL SECTION D: 27**

**SECTION E: SOLUTION DEVELOPMENT****QUESTION 5**

- 5.1 5.1.1 Any ONE of ✓  
 • Flowchart  
 • IPO  
 • Pseudo code (1)
- 5.1.2 Any ONE of ✓  
 • A programmer of any programming language must be able to understand / code the algorithm  
 • Anyone must be able to interpret the algorithm.  
 • It is just a planned solution, not a program. (1)
- 5.2 5.2.1 Any ONE of ✓  
 • Indent the code  
 • Better line spacing/open lines  
 • Add comments to code (1)
- 5.2.2 (a) Logical error ✓ (1)
- (b) Concepts:  
 Scope:  
 • iSum is a local variable in each of the subprograms / not global ✓  
 Life time:  
 • iSum is again declared 'empty' in each displayAnswer procedure call ✓ (2)
- 5.3 5.3.1 Any ONE of ✓  
`iRandom := random(31) + 10;`  
`iRandom := randomrange(10, 41);` (1)
- 5.3.2 (a) (iii) `if (iRandom MOD 2 <> 0) then` ✓ (1)
- (b) (ii) 8 ✓ (1)
- (c) (iii) Repeat  
 ...  
 Until `iCountOdd = 15;` ✓ (1)

- 5.4 5.4.1 Integer✓ (1)
- 5.4.2 Real/ Double ✓ // the compiler will reject integer because of the sqrt (1)
- 5.5 5.5.1 Accessor method returns the current value of an attribute of an object✓  
Mutator method returns no value but changes the current value of an attribute of an object.✓ (2)
- 5.5.2 (a) Any ONE of: ✓  
  - Accessibility
  - Private and public declaration
(1)
- (b) Any ONE of: ✓  
  - To control access from other units/programs
  - Unintentional changes prevented
  - Direct access and change prevented.
(1)
- 5.5.3 setContactNumber ✓ (1)
- 5.6
- ```

sLine ← iTerm1 + ' ' + iTerm2 ✓
loop ✓ I from 1 to iNumTerms - 2 ✓
  start loop
    iTerm3 ← iTerm1 + iTerm2 ✓
    sLine ← sLine + iTerm3 + ' ' ✓
    iTerm1 ← iTerm2✓
    iTerm2 ← iTerm3 ✓
  end loop
Display sLine ✓

```
- (8)

**TOTAL SECTION E: 25**

**SECTION F: INTEGRATED SCENARIO****QUESTION 6**

- 6.1      6.1.1    Micro waves / Radio waves ✓ (1)
- 6.1.2    *Any TWO of ✓✓*
- To increase the range/ mall can cover a large area
  - There may be a lot of traffic with many users on a single access point / less sharing of available bandwidth / will provide higher access speed
  - Signal interference by structures like walls (2)
- 6.2      6.2.1    Mobile device ✓  
OR accept a suitable example such as Smart phone/tablet/smart watch (1)
- 6.2.2    The trend that mobile devices increasingly use apps ✓ to access web-sites directly rather than via a browser.✓  
OR  
The web is the backend and the app is the front end. (2)
- 6.2.3    *Any ONE for two marks✓✓*  
Designing your program to ensure the continuing function of a piece of software under unforeseen circumstances.  
OR  
When a programmer anticipates problems and writes code to deal with them. (2)
- 6.2.4    *Any TWO of ✓✓*
- Check data for consistency and integrity
  - Use try/catch
  - Range checking
  - Format checking
  - Using pre-defined lists / combo box
  - Check if items are selected or input entered from components (2)

- 6.3      6.3.1    HTTPS / SSL ✓ (1)
- 6.3.2    • Public key sent to the person/computer wishing to communicate, sent over the network ✓  
 • Public key used to ENCRYPT data/session key that is sent back to institution ✓ (bank),  
 • Private key that matches the public key which never moves over network) is used to DECRYPT the data/session key ✓
- Concepts: Marks allocated towards the following:
- Encryption using public key  
 Decryption using private key  
 Public key is sent / private key retained by user (3)
- 6.4      6.4.1    Computer-processing where the physical location of people and objects are determined ✓ and used during processing. ✓ (2)
- 6.4.2    *Any ONE of* ✓  
 • Specific advertisements / notifications when someone walks pass a shop.  
 • Request to rate a shop as soon as you visit the shop.
- Any other acceptable answer. (1)
- 6.5      6.5.1    A white hat hacker does not cause damage ✓ they just prove skills/ test security/not committing a crime  
 A black hat hacker hacks to cause damage ✓ or steal data or commit a crime. (2)
- 6.5.2    The servers become overloaded, unresponsive, and effectively unavailable for everyone. ✓ (1)
- 6.5.3    *Any TWO of* ✓✓  
 • Loss of revenue due to cost for security  
 • Downtime  
 • Damage of reputations / losing customers  
 • Loss of data  
 • Theft of money via web (2)
- 6.6      A fixed physical address that has a reception desk and meeting room ✓ which is used as a shared space by people who otherwise work from a mobile office. ✓ (2)

- 6.7      6.7.1    Telecommuting ✓ (1)
- 6.7.2    List the device ✓ (example filtered microphone / ear phones)  
Motivation ✓ (example to block out background - sound / block out other conversations) (2)
- 6.7.3    Any ONE of ✓  
  - Skype
  - Teams
  - FaceTime
  - Jitsi
  - Zoom
  - WhatsApp calls
Any other correct video conferencing platform (1)
- 6.7.4    Any ONE of ✓  
  - Google Drive
  - One Drive/Share point
  - Dropbox
Any other correct online storage space (1)
- 6.8      6.8.1    While Virtual Reality immerses you into a virtual world and blocks out the real world ✓ / Computer based,  
Augmented Reality refers to overlaying computer-generated images on top of real-time images ✓ / Combines real world images with computer generated images. (2)
- 6.8.2    Any ONE of ✓  
  - The app can have an assistant advertising some products
  - The app can give you 3D views of some of the items in the shops
Good explanation showing knowledge about using AR (1)
- 6.8.3    Any TWO of ✓✓  
  - Camera
  - Gyroscope / movement sensor
  - Accelerometers
  - GPS
  - Light sensor
(2)

**TOTAL SECTION F: 34**  
**GRAND TOTAL: 150**