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**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**INFORMATION TECHNOLOGY P2**

**NOVEMBER 2015**

**MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 18 pages.**

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

1.1	1.1.1	Utility software/Operating system ✓	
		NOTE: Do not accept system software	(1)
	1.1.2	Biometrics/Biometric input ✓	(1)
	1.1.3	Register/Cache memory ✓	(1)
	1.1.4	Drivers ✓	(1)
	1.1.5	Shareware/Demo/Trial ✓	(1)
	1.1.6	Virtualisation/Emulator/Dual Boot/Boot Camp ✓	(1)
	1.1.7	(Disk) fragmentation/Defragment ✓	(1)
	1.1.8	Lossy ✓ compression	(1)
	1.1.9	Plug-ins/Add-ons ✓	(1)
	1.1.10	Peer-to-peer network ✓	(1)
1.2	1.2.1	A ✓	(1)
	1.2.2	D ✓	(1)
	1.2.3	C ✓	(1)
	1.2.4	A ✓	(1)
	1.2.5	D ✓	(1)

**TOTAL SECTION A: 15****NOTE:**

- Do not accept answers that use general terms: cheaper, faster
- Do not accept rephrasing of the question
- Do not accept rephrasing/duplication of the answers in a list

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

- 2.1      2.1.1      Computer is made up of separate components. ✓ (1)
- 2.1.2      *Any TWO* ✓✓
- Easy to repair – replace only faulty components
  - Upgrade the computer by adding new parts/replace existing parts with more powerful components
  - Determine own system configuration by combining different components (2)
- 2.1.3 (a) *SATA connectors*  
To connect storage devices such as hard drives to the motherboard. ✓ (1)
- (b) *ZIF sockets*  
To house the CPU ✓ (1)
- 2.2      2.2.1 (a) *Any ONE* ✓ disadvantage of open source software
- No formal /dedicated support as compared to proprietary/Help manuals often not available/not useful
  - No one to hold responsible for shortcomings in the software
  - Various versions of the same software available/not standardised
- Also accept:
- High skill level may be required in some cases
  - Might contain bugs (1)
- (b) *Any ONE* ✓ disadvantage of proprietary software
- Proprietary software is owned by a company and you need to buy a licence to use it/Expensive
  - Cannot change source code to suit the specific needs of the company (1)
- 2.2.2      Programs and data that are not being used is moved to a reserved area ✓ on the hard disk ✓ which is being used as RAM.✓
- Concepts:
- Secondary storage
  - being used as RAM ( also accept memory)
  - Program not being used is moved to virtual memory/swapping process
- NOTE:  
Definition of virtual memory (2 marks) (3)

- 2.3      2.3.1      Computers that have limited resources, ✓ such as no HDD of their own/depends on a server for resources (1)
- 2.3.2      *Any TWO ✓✓*
- Cost effective/Cheaper hardware
  - Physically smaller dimensions/Space considerations
  - Consumes less power
  - Only need to install/update software on one computer (2)
- 2.4      2.4.1 (a)      Multiprocessing ✓ (1)
- (b)      The operating system divides the program into threads/processes which are independently processed on separate cores.
- Concepts:*
- Program is divided into threads/processes ✓
  - Multiple cores used to process independent/separate threads/processes✓
- NOTE:**
- If multithreading is given as the answer in (a):
- Program is divided into threads/processes
  - Threads are processed simultaneously
- If multitasking is given as the answer in (a):
- More than one program/task
  - Appears as if they are running simultaneously/CPU time is divided amongst tasks
- If any other valid processing technique is given as the answer in (a), follow up in (b) (2)
- 2.4.2      A flash memory/storage device that can be used in a variety of devices.
- Concepts:*
- Storage ✓ medium
  - Removable/specific device that it is used in ✓ (2)
- 2.4.3      *Any ONE ✓*
- Video output with sound
  - HDMI is best suited for the output of high-definition/resolution/quality video.
- NOTE:**
- Do not accept faster (1)

2.4.4 *Any TWO ✓✓*

- Wi-Fi has a longer range than Bluetooth
- Wi-Fi has a higher data transfer speed than Bluetooth
- Bluetooth is used to transfer data between devices
- Wi-Fi is used to connect to (larger) networks e.g. Internet

Also accept:

Bluetooth	Wi-Fi
Short range communication	Long range communication
Lower data transfer speed	Higher data transfer speed
	Allows devices to connect to a (larger) network/Internet
Transfers data between devices	
Can be used to connect devices (mouse and keyboard) to a computer	

(2)

- 2.5 The SSD will be faster at boot up time and conventional hard drive has a lot of space for data storage/SSD has smaller storage capacity

*Concepts:*

- SSD – faster access to software/boot up ✓
- HDD – (cheaper) to store large amounts of data/data that does not need fast access ✓

(2)

2.6 *Any ONE ✓*

- Printer out of paper
- Low on ink/toner
- Replace cartridge/drum
- Paper jam
- Online/ready to print
- Unsuccessful printing

**Do not accept:**

- Cable is not connected
- Cannot contact printer(offline)

(1)

**TOTAL SECTION B: 24**

**SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES****QUESTION 3**3.1 *Any TWO ✓✓*

- Security exposure
- Limited range
- Signal weakening due to structures e.g. walls
- Low bandwidth/slower when many users share limited access points

Also accept:

In general Wi-Fi is slower than cabled network

(2)

3.2 3.2.1 *Any TWO ✓✓*

- Signal can be transmitted over longer distance without regeneration
- Larger bandwidth/higher speed of data transfer
- Not susceptible to EMI

(2)

3.2.2 *Any ONE ✓*

- Electrical pulses
- Cables/copper/wires

(1)

3.3 3.3.1 *Any TWO ✓✓*

- Permanent connection/Stable connection/Always on/24-7
- Can phone and access the Internet at same time
- High bandwidth specifications are available
- Scalable solutions/packages
- Cost effective/affordable
- Higher download speed than upload speed

**NOTE:**

Do not accept Cheaper only

(2)

3.3.2 Router ✓

Also accept:

Router-modem

ADSL modem

Do NOT accept modem only

(1)

3.3.3 *Any TWO ✓✓*

- Internet connection may be down/both users must be connected to the Internet
- Both users need the same software
- Could be poor quality if connection is slow
- Cap could be used up quickly if using video/uses lots of data

(2)

3.4      3.4.1      Uniquely identifies/verifies ✓ the sender. (1)

3.4.2      *Any TWO ✓✓*

- Owner's name/details
- Owner's public key
- Name of issuer/ certifying authority/author
- Serial number of certificate
- Expiry date of public key
- Date of issue

**NOTE:**

Do not accept: IP address (2)

3.5      Accept any TWO ✓✓

- To supply the train tables/schedules
- Booking of tickets
- Checking availability of tickets
- Communication with personnel
- Organisation's resources made available
- Internet/Web-like environment
- Any other valid example

(2)

3.6      Log into the network over the Internet, from a remote location (home or while travelling) with the same privacy and security as a LAN.

*Concepts:*

- Use of existing Internet connections/accessible from a remote location ✓
- Security/Work is kept private ✓

(2)

3.7      3.7.1      BitTorrent is a Peer-to-peer protocol for the transfer and sharing of large files across a network/Internet.

*Concepts:*

- Content is accessed on multiple computers/peer-to-peer basis ✓
- transfer of files ✓

(2)

3.7.2      *Any TWO ✓✓*

- Often used to make pirated material available which is illegal
- Malware can be distributed
- IP address is accessible to anyone/access to other confidential information on computer
- Traffic congestion when seeding/sharing

(2)



- 3.8      3.8.1    All devices ('things') linked to the internet being able to independently communicate with one another.

**OR**

Data transfer can take place over the Internet without any human-to-human or human-to-computer interaction.

*Concepts:*

- Devices are connected to the Internet ✓
- Devices communicate independently ✓ of human interaction, with each other

(2)

- 3.8.2    Search results are personalised  
Providing content ✓ based on your profile/likes and dislikes ✓

Also accept for 1 mark each:

- Anticipates the needs of the user/automated searches/semantic
- Receive the right content at the right time from anywhere on any device
- Content is suggested for the user

(2)

**TOTAL SECTION C:      25**

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

4.1      4.1.1      Normalisation ✓ (1)

4.1.2 (a)   One to many ✓  
Also accept: Many to One (1)

(b)   Compound/Composite key ✓ (1)

4.1.3 (a)   **SELECT DName, DSurname, DContact FROM tblDrivers  
ORDER BY DSurname**

- ✓ SELECT DName, DSurname, DContact
- ✓ FROM tblDrivers
- ✓ ORDER BY DSurname

**NOTE:**

Accept ASC and DESC for sorting

Do not penalise spelling of field names, table names

Key words must be spelt correctly (3)

(b)   **SELECT RouteNumber FROM tblRoutes WHERE  
(ModeOfTransport="Taxi") and  
(DepartureTime="08h00")**

- ✓ SELECT RouteNumber FROM tblRoutes
- ✓ WHERE ModeOfTransport = "Taxi"
- ✓ and
- ✓ DepartureTime = "08h00"

**NOTE:**

Also accept: Like

Do not penalise for missing quotes/inverted commas (4)

(c)   **INSERT INTO tblDrivers  
(DriverID, DName, DSurname, DContact)  
VALUES ("S784", "Sanele", "Mahlangu", "0601610525")**

- ✓ INSERT INTO tblDrivers
- ✓ VALUES
- ✓ Values in correct order

**NOTE:**

- Do not penalise for missing quotes/inverted commas
- Fieldnames not required

(3)

4.1.4      **SELECT ModeOfTransport, COUNT(\*) AS [TOTAL]  
FROM tblRoutes GROUP BY ModeOfTransport**

- ✓ COUNT(\*) replaces SUM(\*)
- ✓ GROUP BY replaces ORDER BY

(\*) can be replaced by any field name (2)

4.2      Data is stored on a server which can be accessed through custom software by many users in different locations over a network.

*Concepts: Accept any TWO of the following: ✓✓*

- Central storage
- Accessible to many users
- Improve security
- Improve management of database

Also accept for 1 mark each:

- More compact
- Can handle large amounts of data
- Electronic capturing is more accurate
- Centralisation of data is possible
- Easier to process large amounts of data/queries

(2)

4.3      4.3.1      *Any ONE✓*

- UPS
- RAID
- Backup
- Physical security/locking up

(1)

4.3.2      • If an individual operation is not successful ✓  
• in a group of transactions ✓  
• then the DBMS will reverse all operations of the transaction (roll back).✓

OR

- If a group of transactions are processed
- and all transactions are successful
- then the DBMS will accept the operation.

(3)

4.4      Data mining ✓ (1)

**TOTAL SECTION D: 22**

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

- 5.1      5.1.1 (a) Public means the attribute/method/entity can be accessed from outside the class ✓  
Private means the attribute/method/entity can only be accessed from within the class/unit where the class is defined. ✓ (2)
- (b) Any ONE ✓  
• calculateAge()  
• toString() (1)
- (c) To return all the attributes of the class object in a single string  
Concepts:  
✓ attributes of class object  
✓ returning a string/to display/to print (2)
- 5.1.2 If a class does not contain a constructor a default constructor will be generated by the compiler which will be used to instantiate the object. ✓
- NOTE:**  
Class name in Java, create in Delphi (1)

**5.2** *Possible solution based on 5 digit number read in as a string:*

Read in 5 digit ticket number

answer  $\leftarrow$  0 } ✓  
value  $\leftarrow$  5 }

loop from 1 to 5 ✓

number  $\leftarrow$  digit at loop counter multiplied by value ✓

answer  $\leftarrow$  answer ✓ + number

value  $\leftarrow$  value – 1 ✓

controldigit  $\leftarrow$  answer modulus 5 ✓

ticket number  $\leftarrow$  5 digit number + controldigit ✓

Display ticket number

**NOTE:** *Accept the following for Java learners:*

loop from 0 to 4

*Alternative solution*

Read in 5 digit ticket number

Answer  $\leftarrow$  0

Loop from 1 to 5 (index)

Answer  $\leftarrow$  Answer +(digit at index \* (6-index))

Controldigit  $\leftarrow$  Answer mod 5

Ticket number  $\leftarrow$  5 digit number + Controldigit

**NOTE:**

Also accept 5 different variables used to extract the values and multiply

3 marks for correctly extracting the 5 digits into 5 variables

1 mark for multiplying with correct value

1 mark for adding up

Last 2 marks : same as previous solution

(7)

5.3

5.3.1

base	power	answer	Loop index	Display
5				
		5		
	3			
			1	
		25		
			2	
		125		
			3	
		625		
				625

Allocate 1 mark for each set of {}

If only the last line is displayed: 2 marks for

base	power	answer	Loop index	Display
5	3	625	3	625

(5)

5.3.2

*Any TWO ✓✓*

- Line 2 : answer ← 1
- Line 4 : loop index starts at 2
- Line 4 : loop index stops at power - 1

(2)

5.4

5.4.1

Unconditional loop ✓

The number of months is known/only 12 months ✓

(2)

5.4.2

*Any ONE ✓✓*

- The data types are different
- A 2-dimensional array can contain only 1 data type

(2)

**TOTAL SECTION E: 24**

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

- 6.1      6.1.1      *Any ONE ✓*
- The web page is customised according to the user preferences
  - Feedback can be given to management
  - Specific information can be obtained/supplied
- Also accept:
- suitable example tied to interactivity (1)
- 6.1.2      The URL will contain parameters after the name of the page ✓
- Also accept:  
The extension will probably not be .htm or .html  
The extension would be .php or .asp or .jsp or .ajax or .aspx or any other correct extension for a dynamic web page (1)
- 6.1.3 (a)      *Any TWO ✓✓*
- Log off your account/profile at the end of a session
  - Make sure URL/website is secure
  - Use a strong password
  - Do not give out unnecessary personal information/details
  - Make sure web site is valid – check security certificate
  - Shoulder surfing
- Also accept any GUI/web design concept that can improve security, e.g.
- Display password/sensitive information as an asterisk
  - Virtual keyboard
  - Using encryption (2)
- (b)      Compulsory/mandatory to enter data in this field ✓ (1)
- (c)      *Any TWO ✓✓*  
Use a:
- List box
  - Combo box/drop down list
  - Radio buttons
  - Coding to test/validate
  - Check box
- NOTE:**  
Do NOT accept:
- Clearly indicate the format in the label/message
  - Supplying a default value/hint (2)

(d) *Any TWO ✓✓*

The password should contain:

- uppercase and lowercase characters
- a combination of numeric and alphabetical characters
- special characters
- at least 8 or more characters
- no personal/predictable information
- no standard dictionary words
- no patterns/repetition

Do NOT accept:

Change password often

(2)

6.1.4 (a) *Any ONE ✓*

Combobox

- Only allows you to select one compliment/complaint at a time/may want to select more than one compliment/complaint.
- Complaint/compliment may not be in the existing list.

(1)

(b) Dynamic instantiation of components will ensure that only the components for that specific selection will be visible/available ✓

**OR**

Complaints list will appear only when complaints is selected and compliment list will appear only when complements is selected.

(1)

6.1.5 DDOS/DOS - Denial of service ✓

(1)

6.2 6.2.1 *Any TWO ✓✓*

- Many more mobile devices need Internet connection
- Users want to be connected all the time
- Devices have become smaller and more mobile
- Some people want to work while travelling/access to work data
- Social networking
- Attract more customers
- Improve the train service

Any other acceptable reason

(2)

6.2.2 *Any TWO ✓✓*

- Cellular/3G/4G/LTE, etc.
- WiMax (Do not accept Wi-Fi)
- Satellite

(2)



- 6.3      6.3.1      A place where Wi-Fi/wireless connection to the Internet is available.✓ (1)
- 6.3.2      Streaming:  
                  • Watching movies online/from web site ✓  
                  • as it is streamed/in real time ✓/do not need to download first/not saved locally (2)
- 6.3.3      *Any TWO ✓✓*  
                  • To have access from multiple devices  
                  • Accessible from point where there is an Internet connection  
                  • To be able to share files  
                  • To make a duplicate copy off-site/backup when device is lost  
                  • Less hardware requirements/does not use your own storage space (2)
- 6.3.4      *Cloud backup service: (Any ONE ✓)*  
                  • There is a proper backup schedule  
                  • Hard drive/specified files are backed up first  
                  • Duplicate copies of changed files are made  
                  • Files are encrypted/for your access only/private
- Cloud syncing services: ✓*  
                  • Software monitors the changes made to your files and mirrors the changes to the online storage/back to the device/all devices will have the same copy (2)
- 6.4      6.4.1 (a)      Additional information/data ✓ on data/video/file that is saved with the file/data on data (1)
- (b)      *Any TWO ✓✓*  
                  • Security reasons/tracking when stolen  
                  • Confirm that the drivers took a rest break  
                  • Confirm the route that was taken  
                  • Supply information on the present position of the bus (2)
- 6.4.2      *Any ONE ✓*  
                  • To keep up to date with changes to roads/road names etc.  
                  • To remove bugs of the software  
                  • To add new features to the software/improve capability (1)

6.4.3 *EULA: Any TWO ✓✓*

- Agree to the number of computers on which to install software
- Agree/not to the distribution of the software/copyright.
- Agree to renewal of licence
- Accept that the company will not be liable for defects in software
- Not to use software for illegal purposes
- Actions that can be taken for violation
- Not to unethically use the software
- Agree to allow the company to collect usage data

Do NOT accept:

Agree to terms and conditions

(2)

6.5 *Any TWO ✓✓*

- Switch off computers/monitors/printers/unplug chargers not in use
- Apply power saving mode/standby mode/apply balance between power and performance option/sleep/hibernate
- Adjust brightness of screens
- Use devices that are more energy efficient
- Use devices on low performance settings

(2)

## 6.6 MPEG-2/MPEG-4/.MP4/.avi/MKV ✓ or any other acceptable compression technique

(1)

## 6.7 6.7.1

- An electronic card/card with a chip ✓
- Performs processing functions/storage of data ✓

(2)

6.7.2 *Any ONE ✓*

- Using an app to scan a QR code/NFC
- Any appropriate example, e.g. Snap Scan/Zapper
- Internet banking/mobile banking/EFT

(1)

6.8 6.8.1 *Any TWO ✓✓*

- Software programming skills
- Graphic design skills
- Knowledge on HCI principles
- Creativity and imagination
- Knowledge on advances in technology

(2)

6.8.2 *Any TWO ✓✓*

- Page must automatically resize/provide for smaller screen
- Different format and page layout/readability
- Reduced size of image files/less data to download
- Exclude certain content/functionality/flash players
- Work cross platform

(2)

6.9 *Any ONE ✓*

- Make use of RSS feeds
- Suitable app
- Message alerts/SMS

(1)

**TOTAL SECTION E: 40**  
**GRAND TOTAL: 150**