



basic education

Department:
Basic Education
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* ✓✓ (2)
- 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
- 2.1.3 (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 (1)
- 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
- (b) *Any ONE* ✓ disadvantage of proprietary software (1)
- 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
- 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 ← 0 } ✓
value ← 5 } ✓

loop from 1 to 5 ✓

number ← digit at loop counter multiplied by value ✓

answer ← answer ✓ + number

value ← value – 1 ✓

controldigit ← answer modulus 5 ✓

ticket number ← 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 ← 0

Loop from 1 to 5 (index)

Answer ← Answer +(digit at index * (6-index))

Controldigit ← Answer mod 5

Ticket number ← 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