basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

INFORMATION TECHNOLOGY P2

NOVEMBER 2016

MEMORANDUM

MARKS: 150

This memorandum consists of 17 pages.

SECTION A: SHORT QUESTIONS

QUESTION 1

1.1	1.1.1	B ✓	(1)
	1.1.2	B ✓	(1)
	1.1.3	D ✓	(1)
	1.1.4	A ✓	(1)
	1.1.5	C ✓	(1)
1.2	1.2.1	Data redundancy ✓	(1)
	1.2.2	Search Engine Optimisation/SEO ✓	(1)
	1.2.3	Patch/Hotfix✓	(1)
	1.2.4	Freeware ✓	(1)
	1.2.5	Hardware interrupt/IRQ ✓	(1)
	1.2.6	Extranet ✓	(1)
	1.2.7	Location-based computing/GPS/Geotagging ✓	(1)
	1.2.8	File Transfer Protocol/FTP/BitTorrent ✓	(1)
	1.2.9	CopyLeft/Creative commons ✓	(1)
	1.2.10	Distributed database ✓	(1)

TOTAL SECTION A: 15

SECTION B: SYSTEMS TECHNOLOGIES

QUESTION 2

2.1 *Any TWO*✓✓
- Check that all the important hardware is present and still working/performs the POST – Power On Self Test/Check CMOS settings
- Locates and loads the operating system/Boots up the computer
- Controls hardware at a low level
- Provides the user with a menu or set of options to configure the computer at the lowest level (2)

2.2 When a program is not being used and the RAM is full, the operating system will move the program from RAM into virtual memory. When you switch back to the program, the operating system quickly swops the program and its data back to RAM.

Concepts:
- Data that is not being processed ✓
- can be stored on the fast access area of the hard drive ✓ and
- transferred to RAM when required. ✓ (3)

2.3 2.3.1 Cache memory is high speed memory that is used to store recently/frequently/next used data and instructions for the CPU to reduce time wasted while waiting for data to come from the slower RAM (increase productivity).

Concepts:
- High speed memory/faster access ✓
- Data to be used next/frequently/recently ✓
- Increase productivity/don't have to wait for slower RAM ✓

Also accept:
Concept of caching/faster and slower medium (3)

2.3.2 Enables different threads/independent sections in a program to share the use of one CPU. The CPU swops from one thread to the other ensuring that less of the CPU's resources will be idle at any given time.
Concepts:
Many/multiple ✓ threads/sections ✓
OR
Hyper threading – Uses more than 1 pipeline/execution unit on one CPU chip so that it appears to the operating system as if there is more than one CPU. (2)

2.3.3 Graphics card has its own GPU/CPU which generates images that are displayed on the monitor, allowing the CPU to focus on carrying out the instructions of the program, thus making the computer operate faster.

Concepts:
- Own processing unit/graphics processing ✓
- CPU able to complete other tasks/released from processing images/helps the CPU ✓ (2)

2.4 *Any TWO problems* ✓✓ and *TWO solutions* ✓✓
- Not enough disk space – do disk cleanup/delete old files/replace/add external hard drive/move to backup device/compress files/archive files
- Disk becoming fragmented – defragment the disk
- Viruses, worms, spyware – run anti-virus/malware
- Too many tasks open at the same time/Insufficient RAM – close unnecessary programs/Add more RAM
- Cannot access all RAM - upgrade OS to 64-bit
- New software/updates released – upgrade CPU/SSD/RAM
- Old hardware – upgrade/replace hardware

NOTE:
If the problem is vague, try to link the problem with a solution. (4)

2.5 The device is automatically identified ✓ by the operating system and the required driver software is installed/configured ✓ from a library of available drivers.

Also accept:
The concept of searching for a driver (1 mark) (2)

2.6 2.6.1 More than one hard disk is required and a duplicate copy of the data is made.
OR
In the event that one disk fails, the copy of the data will be able to be restored.

Concepts:
- Using more than one disk ✓
- Duplicate copy of data on second disk ✓ (2)

2.6.2 *Any ONE* ✓✓
- Improved shock resistance
- Ensure the read/write heads move away from the platters when power goes off (2)

2.6.3 *Any TWO* ✓✓

- Direct link to files/Do not need Internet connection
- Many users on the network have access to the files
- Accessible from anywhere on the network
- Fixed cost/Once off cost
- Complete control/security over who has access to the storage device
- Physical ownership of hardware and data
- Good for long term, high capacity storage (2)

2.7 *Any ONE* ✓

- Can rent
- Cheaper to rent than to buy the software
- Always have access to latest version of software/automatically updated
- Have access to some cloud-based storage
- Accessible from different devices
- Does not necessarily use local storage space (1)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

3.1 3.1.1 *Any TWO* ✓✓
- Centralisation of data/Data store in one place/Everybody uses the same data
- Sharing of software
- Improved communication
- Entertainment/Play computer games
- Sharing of data/transferring data without needing a CD/flash disk
- Sharing Internet access

Do not accept: sharing of hardware (part of question) (2)

3.1.2 *Any TWO* ✓✓
A client-server network:
- More sophisticated security
- Better performance (faster)
- Large storage so other computers on the network do not need a large hard disk
- More suitable for a large number of/multiple computers/users
- Everybody uses the same data/ data always up to date/no need to transfer data
- Easier to manage/troubleshoot (2)

3.2 3.2.1 A set of rules for encoding and decoding data for transmission across the Internet or network
OR
Defines how communication takes place between different architectures and allows Internet communication

Concepts:
- Set of rules/way or how to communicate ✓
- Across networks/Internet ✓ (2)

3.2.2 Responsible for sending e-mail ✓ via the Internet (1)

3.3 3.3.1 *Any TWO* ✓✓
- Attenuation/signal gets weaker
- EMI
- Eavesdropping/listening in/hacking signal
- Crosstalk
- Cover relatively short distances/limited range
- Slower than fibre optic cable (2)

3.3.2(a) glass/glass fibre ✓
Also accept : light/laser (1)

3.3.2(b) *Any ONE* ✓
- Allow for high speed data transmission
- Able to transmit over long distances/No attenuation
- Safer option as it does not conduct electricity
- Immune to EMI
- No crosstalk
- No eavesdropping (1)

3.4 *Any TWO (Naming)* ✓✓ *(Prevention)* ✓✓
- Malware – install anti-malware/make sure anti-malware is updated regularly
- Hacking - password protect data/make files read only/set up honeypot/install firewall/use strong passwords/use encryption
- Packet sniffing concept/eavesdropping – secure cables
- Sabotaging file configuration on the storage device – make backups regularly
- Misuse of access/delete/modify files – strict access rights/change passwords regularly/set up security rights (4)

3.5 3.5.1 Any ONE ✓
- Wireless NIC/
- Wi-Fi card
- /Wi-Fi radio card/
- Wireless adaptor
- Wi-Fi adaptor
- Wi-Fi dongle (1)

3.5.2 *Any TWO* ✓✓
- Limited to short range
- Interference of signals by structures that are in the way
- Decreases the speed of connectivity when too many people are connected at the same time
- Unreliable connection
- Security can be compromised
- Require Wi-Fi compliant devices (2)

3.6 3.6.1 The functionality of many devices has been incorporated into one device.

Concepts:
- One device ✓
- Many functions ✓ (2)

3.6.2 *Any TWO* ✓✓
- Limited battery life
- Limited/poor Internet connection
- Size of device- small devices have less space for more powerful components and batteries
- Small screen/no keyboard/no mouse/limited input devices
- Impact on data limit
- Limited storage capacity
- Restricted functionality in apps and OS (2)

3.7 3.7.1 A public area where Internet access is available through a wireless Internet connection.

Concepts:
- Free/wireless/not password protected ✓
- Internet ✓ access (2)

3.7.2 *Any ONE* ✓
- Equitable use of the data
- To prevent misuse of the Wi-Fi network
  - Cost to the school
  - Making large uploads/downloads

Also accept:
- The number of users could slow down the connection (1)

TOTAL SECTION C: 25

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

4.1 *Any THREE* ✓✓✓
- Accurate
- Up to date/Current
- Valid
- Correct/verified
- Relevant
- Complete

Also accept: Correct format (3)

4.2 When an item of data changes in a table, ✓ the change is not applied to all the records related to this data item ✓ in other tables in the database.
OR
When updating a record in a database, related records in multiple tables in the database are not update/the update of these records is causing a problem/the update is incomplete. (2)

4.3 *Any ONE* ✓
- The user does not have direct access to the database/Access to the database is through custom written client software application/More secure
- Many users/computers can access the database
- Database is easily managed (1)

4.4 4.4.1 Managing/maintaining a database ✓
OR
Responsible for supervising of users of the database and optimal working of the database itself.

Note:
Accept: examples of specific tasks of maintaining:
backup/security/users rights/relationships/field types/add or delete fields or tables

Do not accept: Changes made to the data/content of the database (1)

4.4.2 *Any TWO* ✓✓
- Maintenance of the database structure/When changes have to be made to the underlying structure of the database (creating tables etc)
- Analysing and designing activities in terms of new developments (creates reports, queries, filters etc)
- Analysing the efficiency of the system (new software) (2)

4.5 Data warehousing/partitioning/normalisation ✓ (1)

4.6 4.6.1 The StandNo is the primary key ✓ in the tblStands table and is a unique value ✓. (2)

4.6.2(a) SELECT StandNo FROM tblStands
WHERE PlugPoint=True

✓ SELECT StandNo FROM tblStands
✓ WHERE PlugPoint
✓ True

Also accept: PlugPoint = 1 or PlugPoint = Yes (3)

4.6.2(b) UPDATE tblStands SET Assistants = Assistants + 1

✓ UPDATE tblStands
✓ SET Assistants
✓ Assistants + 1 (3)

4.6.2(c) DELETE from tblStands WHERE Standno = 'B02'

✓ DELETE from tblStands
✓ WHERE StandNo = 'B02' (2)

4.6.3

CompanyName	**NumStands**	**SumAssistants**
Funda	1	2
MoreDevices	3	3
NewWiz	2	1
BooksForAll	2	6

✓ 3 columns
✓ all 4 correct company names
✓ correct order of company names
✓ correct values for column NumStands
✓ correct values for column SumAssistants (5)

TOTAL SECTION D: 25

SECTION E: SOLUTION DEVELOPMENT

QUESTION 5

5.1 5.1.1(a) *Any TWO design requirements to improve navigation* ✓✓

- Information that is related should be grouped together e.g. personal information and exhibition stand information separately
- The natural reading order is top to bottom and left to right. The text boxes/buttons could therefore be underneath each other rather than scattered across the form/order.
- Submit button should be at the bottom right hand side of the form as all the information should be completed before it is submitted
- Missing labels
- Include a title

Accept any other sensible suggestion (2)

5.1.1(b) Any TWO ✓✓

- Checkboxes should be radio buttons to allow only one option
- The size of the tables field could be a combo box/list or a spin edit (Delphi) to ensure the entering of correct and valid values

Accept any other sensible suggestion (2)

5.1.2 ✓ Correct UML diagram structure (heading is optional)
✓ All the correct private fields with correct data types – Field names may differ from memo
✓ 1 public accessor method
Delphi accept: function StallCode/:string
Java accept : getStallCode
✓ 1 public mutator method (parameter is optional)
Delphi Accept: procedure PlugPoint
Java accept: setPlugPoint

objStand
-StallCode:string -ExhibitorName:string -PlugPoint:boolean -NumTables:integer -NumAssistants:integer
+getStallCode():string +setPlugPoint(pp:boolean)

(4)

5.2 5.2.1

```
randNum ← generate random number in the range 1 to 10 ✓
denominator ← randNum   } ✓
Answer ←0               }
Loop index from 1 to randNum ✓
    Fraction ←index / denominator ✓
    Decrease denominator ✓
    If index is an odd number          } ✓
        Answer ← Answer + Fraction     }
    Else
        Answer ← Answer - Fraction ✓
```

OR

```
randNum ← generate random number in the range 1 to 10 (1 mark)
denominator ← randNum   }  (1 mark)
Answer ←0               }
Sign ← 1
Loop index from 1 to randNum (1 mark)
    Fraction ←index / denominator * sign (1 mark)
    Decrease denominator (1 mark)
        Answer ← Answer + Fraction (1 mark)
        Sign ← sign * -1 (1 mark)
```

Concepts:
Generate random number (1 mark)
Initialise variable (1 mark)
Loop 1 to random (1 mark)
Calculate fraction (1 mark)
Decrease denominator (1 mark)
If odd then add (1 mark)
Else subtract (1 mark) (7)

5.2.2

A	**Is A >3?**	**B**	**Astring**	**Is B>A?**	**Display**	
1	No	1	"	No		✓
		2	*	Yes		
					*	✓
2	No	1	"	No		
		2	*	No		
		3	**	Yes		
					**	✓
3	No	1	"	No		
		2	*	No		
		3	**	No		
		4	***	Yes		
					***	✓
4	Yes					✓

(5)

TOTAL SECTION E: 20

SECTION F: INTEGRATED SCENARIO

QUESTION 6

6.1 6.1.1 Dynamic website – pages are generated 'on the go'. Different users may see different content even if they are visiting the same site.✓

Static website – Displays exactly the same information to all users as when the site was created.✓ (2)

6.1.2 RSS: A web feed that checks for updated content ✓ at a specific time and new content is automatically downloaded/notified/push ✓

Also accept: consolidated into one area/webpage (1 mark) (2)

6.1.3(a) Blog: *Any ONE applicable explanation* ✓✓

- The online diary/marketing - updated with news and events during the day to attract visitors to the exhibits
- Register as user - The names of different exhibitors can be displayed/recorded
- Display events/news - The latest/most recent information will always appear at the top of the list /in a chronological order so that readers will be able to see at a glance what new exhibits or exhibitors have been added

Accept any other correct example (2)

6.1.3(b)

- As traffic increases in response to the blog post the virtual server is supplied with resources ✓ (extra processors, bandwidth and memory)
- When traffic returns to normal, the extra resources are decreased ✓ (2)

6.2 6.2.1 Radio frequency/Radio frequency identification ✓ (1)

6.2.2 *Any ONE* ✓

- The reader can read tags that are moving past/ do not have stop and wait to be scanned
- Hidden tags can also be read
- Can read more than one tag at a time
- Tags can be read from a greater distance than barcodes
- Automated checking for tags, codes have to be scanned
- Better control/security with tags (1)

6.3 6.3.1(a) *Any TWO* ✓✓

- Some services are free with a relatively small amount of space.
- You are able to share your documents with others.
- When you share you may choose to allow the person to only view and comment/to edit the document.
- Collaboration on the same document at the same time.
- Files can be synced with your device.
- If device is stolen, you still have access to your data/backup copy available.
- Data is available anywhere.
- Save HDD space
- More storage is available as and when required (2)

6.3.1(b)

- Speed – quick/fast access/less waiting time/files uploaded and downloaded for quickly ✓
- Security –keep files private/safe/secure/protection from data theft ✓ (2)

6.3.2(a) Internet of Things:
Many devices are connected to the Internet ✓and can be controlled through the Internet/without human to device interaction/ communicate with each other✓. (2)

6.3.2(b) *Information overload: Any ONE*

- When searching for information on the Internet, there are many results making it difficult to get to exact information for the request
- It may be time consuming to work through all the search results to find exactly what one is looking for.
- The results need to be narrowed down and then verified which is time consuming

Concepts:

- Too much information✓
- Effect: makes decision making quite difficult/over stimulation/anxiety✓ (2)

6.3.3(a) Any ONE ✓

- A service which allows one to view video/movies on the Internet when you want to
- Video on demand
- Video streaming service (1)

6.3.3(b) *Any difference between* ✓✓

Streaming	**Download**
Real time	Wait for download to be complete
Do not have a copy on your computer	A copy is saved to your computer
Must stream each time in order to watch it	Can watch the saved copy many times over without downloading again
Higher data usage	Data usage once for download

(2)

6.3.4(a) HTML is required to format text files (content /source code of web pages) so that they display as meaningful, attractive and user-friendly web pages/ websites. ✓ (1)

6.3.4(b) JavaScript is interpreted by another program (normally a HTML program) at runtime. ✓ (1)

6.4 6.4.1 *Any ONE* ✓
Be able to:
- Detect objects in all directions
- Navigate
- Park the vehicle
- Start the vehicle

Accept: any other acceptable task (1)

6.4.2 *Any TWO* ✓ ✓
- Sensors
- Antennae
- Receivers/Microphone
- Video cameras
- Storage device
- Computing device
- Robotic device
- Biometric scanner

Accept: any other acceptable option (2)

6.4.3 *Any ONE* ✓
- Malfunctioning of the system
- Expensive system
- Liability issues
- Susceptible to hacking

Accept: any other valid reason (1)

6.5 6.5.1 *Any ONE ✓*

- Posting pictures without the person's permission
- Cyberbullying
- Software piracy
- Identity theft
- Illegal interception of messages - eavesdropping
- Facilitates organised drug trafficking, gambling, prostitution, weapon trade
- Distribution of pornography, racist propaganda
- Harassing or threatening communications like cyber-stalking
- Electronic money laundering and investment fraud
- Electronic vandalism, terrorism or extortion to disrupt networks or threaten to do so

Accept: Any other Internet related crime (1)

6.5.2 *Any ONE ✓(1 mark for impact) ✓ (1 mark for explanation/reason)*

- Loss of work time - while viruses and pop up messages are removed and software is reloaded
- Loss of business services - due to a DOS attack, hardware theft or disruption of a network
- Financial losses/victim will be left with bills, charges and a damaged credit record – phishing/hacking
- Loss of confidence and trust in the business – privacy/negative social media

Accept any other negative influence on the business (2)

6.5.3 Phishing websites lure e-mail recipients and Web users into believing that a spoofed website is genuine and when a user enters personal information it is captured and used for illegal purposes.

Concepts: Any TWO ✓✓

- Misleading that website is genuine
- Via e-mail
- Personal detail entered (2)

6.5.4 An audit trail records who made changes to the database, what changes were made and when the changes were made.
Concepts: Any TWO ✓✓

- Who
- What
- When (2)

6.5.5 A website is made unavailable ✓ by many computers requesting data from the site at the same time. ✓
OR
Servers become overloaded due to many requests. (2)

6.6 *Any TWO* ✓✓
- Recycle old computers
- Reuse parts/donate
- Switch off when not in use
- Refill ink cartridges
- Do not print unnecessarily/do not waste paper
- Get rid of e-waste in a responsible manner
- Use energy efficient designs/hardware (2)

6.7 6.7.1 A smart card has an electronic chip/processing features ✓ (1)

6.7.2 *Any ONE* ✓
- Makes it secure/less fraud
- Not easy to duplicate/copy
- Accuracy
- Saves time – don't have to type in details
- Convenient to carry around/smaller (1)

TOTAL SECTION E: 40
GRAND TOTAL: 150