



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

INFORMATION TECHNOLOGY P2

FEBRUARY/MARCH 2013

MEMORANDUM

MARKS: 180

This memorandum consists of 17 pages.

SECTION A: MULTIPLE-CHOICE QUESTIONS**QUESTION 1**

1.1	A ✓	(1)
1.2	C ✓	(1)
1.3	C ✓	(1)
1.4	C ✓	(1)
1.5	B ✓	(1)
1.6	D ✓	(1)
1.7	B ✓	(1)
1.8	D ✓	(1)
1.9	C ✓	(1)
1.10	B ✓	(1)
TOTAL SECTION A:		10

SECTION B: HARDWARE AND SOFTWARE**QUESTION 2**

- | | | | |
|-----|-------|--|-----|
| 2.1 | 2.1.1 | Front Side Bus ✓ | (1) |
| | 2.1.2 | (a) Address bus✓, system bus✓, data bus✓ | (3) |
| | | (b) Quad pumping ✓ | (1) |
| 2.2 | 2.2.1 | Intel ✓ | (1) |
| | 2.2.2 | <p><i>The keyboard requires an IRQ because when a key is pressed, CPU processing needs to be interrupted to process the keystroke.✓</i></p> <p><i>Also accept any correct description that mentions that the CPU has to be interrupted.</i></p> | (1) |
| | 2.2.3 | <p><i>CMOS data:</i></p> <ul style="list-style-type: none"> • Data being read by the BIOS during power on test ✓ • Data set by the user e.g. the date and time, boot order, etc. ✓ | (2) |
| | 2.2.4 | <p><i>Accept any ONE item that connects to an IDE port✓</i></p> <ul style="list-style-type: none"> • Hard drive • Floppy drive • CD-ROM/DVD drive | (1) |
| | 2.2.5 | <p><i>Accept any TWO correct reasons for replacing PS/2 ✓✓</i></p> <ul style="list-style-type: none"> • PS/2 is old technology/is no longer viable to manufacture in the competitive market • USB has faster data transfer rates • USB allows different hardware devices (not only keyboard and mouse) to be connected to the same port using daisy chaining • PS/2 only allows PS/2 compatible keyboard and mouse to be connected | (2) |
| 2.3 | 2.3.1 | 4 ✓ | (1) |
| | 2.3.2 | <i>Multi-processing is when two or more processors ✓ can perform different tasks/threads at the same time✓</i> | (2) |
| | 2.3.3 | <p><i>Accept any ONE correct example explaining the use of threads ✓</i></p> <ul style="list-style-type: none"> • Auto save while working on the document • Spellchecking/grammar checking as you type out a document • Rendering of graphics screens while playing a computer game | (1) |

- 2.3.4 *Machine cycle*
- Fetch instruction ✓ from RAM to CPU
 - Decode the instruction ✓
 - Transfer the data ✓ from registers to CPU
 - Execute the instruction ✓
- (4)
- 2.3.5 (a) *Cache memory works by pre-fetching the instructions/data✓ most likely to be used next by the CPU✓ in order to assist the CPU from not reading the instructions/data from the slower RAM.*
- (2)
- (b) • Cache is very expensive✓
- Cache is located in the CPU and the space is restricted✓
- (2)
- 2.4 2.4.1 *Accept any TWO appropriate facts regarding memory management ✓✓*
- The operating system makes sure that every program gets the memory that it needs.
 - The operating system must ensure that two programs do not access the same piece of memory – prevents access violations in Windows OS.
 - The operating system ensures that no application gains direct access to RAM – gains access only through the memory management unit.
 - Manage the physical amount of RAM assigned to a program so its size may vary according to the programs needs.
 - No matter how much physical memory is available, all new operating systems make use of virtual memory.
- (2)
- 2.4.2 Virtual memory is an area reserved on the hard drive✓ that the OS uses as additional RAM ✓
- (2)
- 2.4.3 *Thrashing* is when the operating system spends more of its time swapping pages ✓ (parts of a swap file) between the RAM and virtual memory✓(paging) than executing application software.
- (2)
- 2.5 2.5.1 *Accept any ONE ✓*
- 3G/LTE
 - ADSL
 - WiMax
- (1)

2.5.2 *Accept any TWO advantages of the connection mentioned in Question 2.5.1 ✓✓*

3G/LTE	<ul style="list-style-type: none"> widely available in South African cities allows mobile devices an Internet connection fast data transfer rate only pay for data being downloaded/uploaded
ADSL	<ul style="list-style-type: none"> stable fast data transfer rate high bandwidth available/capped bandwidth simultaneous voice and data low latency
WiMax	<ul style="list-style-type: none"> fast data transfer rate is distinct from cellphone technology can provide broadband wireless access for up to 50 km for fixed stations and 15 km for mobile stations

(2)

2.6 2.6.1 *Accept any ONE correct way of solving no printer problem ✓*

- Drivers need to be installed
- Install the printer

(1)

2.6.2 (a) *Hot-swapping: Allows components to be replaced while the rest of the system continues to perform its tasks. ✓*

(1)

(b) No ✓

(1)

2.7 2.7.1 *Partitioning a disk - You can split a single physical hard drive into virtual/logical drives each with their own boot sector. ✓*

(1)

2.7.2 *Accept any TWO advantages for partitioning ✓✓*

- Can put different file systems onto one physical disk (example: FAT32 and NTFS) – one for each logical drive
- Can have two or more different operating systems installed on one physical drive (Linux and Windows) – different operating system for each logical drive
- Split the operating system files and the user data files onto the different logical drives.

(2)

2.8 2.8.1 A router manages the bandwidth because it is able to inspect the data packets as they arrive and determine the correct destination✓ of the data and forward it accordingly✓.

(2)

2.8.2 *Accept any TWO other capabilities of a router ✓✓*

- Connect different network types together
- Ensures the safe transfer of data between networks
- Mainly used to connect LAN's into a WAN/Used to connect networks to the Internet
- Routers can also be used for port-forwarding

(2)

- 2.9 2.9.1 *Accept any ONE correct explanation for "non-system disk" error message ✓*
- The user tries to boot from a DVD/CD/Flash/stiffy/hard drive that doesn't contain a bootable sector
 - The boot sector of the C drive is damaged
 - The default drive has not been configured as a boot disk
 - The hard drive with the boot sector is not present in the PC
- (1)
- 2.9.2 *Accept any ONE correct explanation for "safe mode" message ✓*
- The computer restarts after a power failure
 - The user pressed F8/Del repeatedly during the POST in order to select a different start up sequence
 - The user pressed the "reset" button repeatedly
- (1)
- 2.9.3 The BIOS executes a series of tests✓ to make sure that computer hardware is connected properly and operating correctly. ✓
- (2)
- TOTAL SECTION B: 47**

SECTION C: APPLICATIONS AND IMPLICATIONS**QUESTION 3: e-COMMUNICATION**

3.1 3.1.1 (a) The address will begin with HTTPS ✓

OR

The letter S is added to the HTTP section of the URL. (1)

- (b) *Accept any ONE correct explanation ✓*
- There are non-reputable vendors that can sell digital certificates.
 - A secure certificate only guarantees the website address and the name of the organization. It does not verify their ethics around their business practices.
 - Certificate has expired.
 - Another company/individual has taken over the domain. (1)

3.1.2 (a) Online trading through a digital means such as a website. ✓ (1)
Accept any similar alternative explanation

- (b) *Accept any ONE correct explanation ✓*
- It scrambles the information with a key so that it can only be unscrambled with the correct key.
 - Encryption prevents any plain text information from being sent over a network or Internet. (1)

3.1.3 (a) *Phishing* is an Internet scam whereby someone sends you an e-mail that attempts to trick you into believing they are a secure organisation such as your bank. ✓ When you access their own copy of the original website, your details are stolen so that your account can be accessed. ✓
Accept any alternative similar explanation (2)

(b) *Pharming* takes you to a fraudulent website that looks similar to that of the bank which requests your banking details✓ (1)

3.1.4 *Accept any TWO correct pieces of advice given to repond to a hoax ✓✓*

- Don't always believe the information received from unknown e-mail users.
- Delete the unsolicited e-mail immediately.
- The more desperate the plea that the message is not a hoax, the bigger the chances are that it is a hoax. Ignore and delete.
- If the information seems real – check the validity thereof against other sources from the Internet. (2)

3.2 *Accept any ONE valid reason for using a firewall ✓*

- Users from other branches might try to access the server at head office for some reason, e.g. gain access to personal data of other employees
- Firewall prevents unauthorised connections from outside the company, e.g. the opposition, to any ports of the network server.
- Communication from software on the server to any outside source is restricted/prevented.

(1)
[10]

QUESTION 4: SOCIAL AND ETHICAL ISSUES

- 4.1 4.1.1 SPAM is electronic junk mail✓ sent to someone without them requesting it (i.e. unsolicited).✓ (2)
- 4.1.2 *Accept any TWO ethical problems ✓✓*
- Violates the privacy of the clients
 - List can be sold by husband to third parties./Misuse of personal information
 - List can be used by husband to advertise business
 - The information belongs to the company and making a copy of it is theft. (2)
- 4.1.3 *Identity theft: When someone is taking on someone else's identity✓ and acting in that person's name. ✓* (2)
- 4.2 4.2.1 A travel blog is an electronic journal/diary✓ through which tourists can share knowledge and experiences about holiday destinations✓ (2)
- 4.2.2 *Accept any TWO ways of planning a holiday using ICT ✓✓*
- Using the Internet for booking of flights, transport, hotel, etc
 - Doing research on the destination
 - Easy to compare prices for different tour packages
- (or any explanation that correlates with this description)* (2)
- 4.3 4.3.1 *Accept any TWO **advantages** from the company's perspective ✓✓*
- If client is involved in an accident any notice about allergies is immediately available
 - If the client visits a malaria infected region, the immunisation records can be verified
 - If the client's prescription medication is finished – new medication can be dispensed from a local pharmacy because the prescription is available online
- Accept any similar valid explanations* (2)
- 4.3.2 *Accept any TWO **disadvantages** from the client's perspective ✓✓*
- The medical information of the client is confidential – any leak of the information can be seen as an invasion of privacy
 - The results of sensitive tests (e.g. HIV test) will be made available online – information not privileged for all to see.
 - The online prescriptions can be downloaded and edited by fraudsters and misused.
- Accept any similar valid explanations* (2)
- [14]**

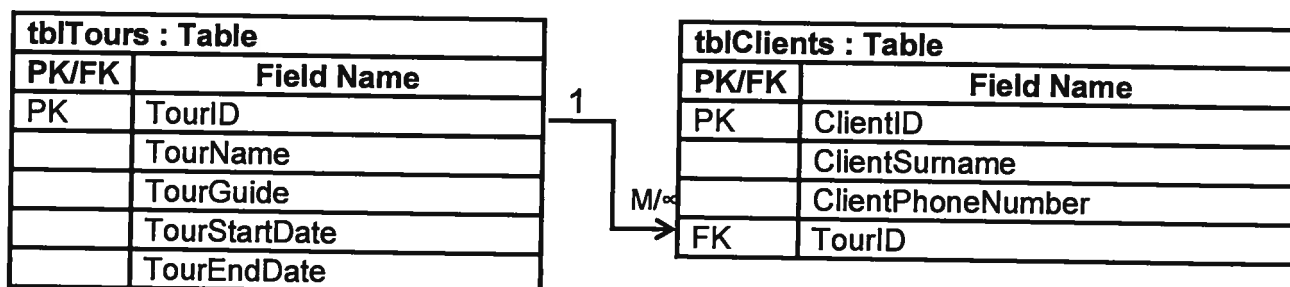
TOTAL SECTION C: 24

SECTION D: PROGRAMMING AND SOFTWARE DEVELOPMENT**QUESTION 5: ALGORITHMS AND PLANNING**

- 5.1 5.1.1 (a) A *primary key* is used to uniquely identify ✓ every record ✓ in a database table. (2)
- (b) TourID ✓ (1)
- 5.1.2 (a) The field size is limited to 50 characters. ✓ (1)
- (b) Accept any ONE valid comment on suitability of validation ✓
- A surname may be shorter than 10 characters; therefore the validation is not suitable.
 - It is not a good practice to validate text data such as surnames, names and addresses. (1)
- (c) Accept any ONE explanation ✓
- If Required = Yes:
- it indicates that the field must contain data
 - it is not allowed to be left empty / contain the NULL value (1)

5.1.3 Marked on Annexure A

A possible solution for 2NF (see criteria in (a) – (d)):



- (a) All the fields correct ✓✓✓✓
NOTE: Subtract 1 mark per error (4)
- (b) Indicate each primary key for each table:
- TourID in tblTours ✓
 - ClientID in tblClients ✓ (2)
- (c) Relationship
- Draw line between tables indicating relationship ✓
 - Indicate relationship as a one-to-many relationship ✓ (2)
- (d) Indicate foreign key (TourID) in tblClients ✓ (1)

- 5.1.4 *Any TWO correct facts about referential integrity ✓ ✓*
Referential integrity:
 - ensures that fields linked via a relationship can not be deleted or removed without destroying the relationship.
 - protects related data.
 - ensures that when inserting data no orphan data is created – where there is no such record in the "1" of the relationship.
(2)
- 5.2 5.2.1 *Algorithm: To define a step by step working solution to a particular problem usually written in pseudo-code. ✓* (1)
- 5.2.2 *Extreme data: e.g. 4560 ✓*
NOTE: The value must be FOUR characters and the year must be extreme! (1)
- 5.2.3 *Correct data: The correct year of birth of the client, e.g. 1980 ✓.*
Valid data: Any valid year value that falls within the range of 1900 to 2013. ✓ (2)
- 5.2.4 (a) *Accept any TWO correct logical errors ✓✓*
 - Check only if the current year is FOUR characters long.
 - The year entered is only checked against the current year
 - There is no valid interval for a valid range of birthdays, because someone born in 1645 won't be a current client.
(2)
- (b) *Accept any TWO correct explanations to correct EACH logical error of question 5.2.4 (a) ✓✓✓✓ (2 x 2 marks each)*
NOTE: No programming code is acceptable!
 - Add an ELSE statement to the first IF-statement for checking if the year is FOUR characters long
 - Change IF statement to test a valid range of year values that will be appropriate for current customers, e.g. dates ranging from 1900 – 2013
 - Change the second IF statement to: IF (year bigger than 1900) OR (year less than current year)
(4)
- 5.2.5 (a) *A syntax error occurs when the rules of the programming language are violated which prevents the program from running ✓ OR a syntax error occurs before the program executes.*
- Runtime error occurs when the program is running and there is a fault in the algorithm that only appears once the program is running. ✓* (2)

- (b) (i) *Accept any ONE practical example of a syntax error ✓*
- WHLE instead of WHILE (or any example of an incorrectly spelled key word)
 - Missing semicolon (;) or any other punctuation from statements where required. (1)
- (ii) *Accept any ONE correct example of a runtime error ✓*
- No file available/file not found/no access to file
 - Division by zero
 - Invalid input from user/file/any other source
 - Printer not available when a printing statement is executed (1)

- 5.3 *Accept any FOUR ways of improving GUI ✓✓✓✓*
- The buttons at the top should be in a logical order, e.g. New, Help and Exit
 - The heading label at bottom of form should be at the top
 - The caption of the "Accept data" Button should be more descriptive
 - Add a label to instruct the user to enter the details of a new client/All the textboxes have no labels to indicate their purpose
 - The text fields should be in sequence next to each other or below each other, first surname and then phone number.
 - The button should be below textboxes – to help in logical flow (4)
- 5.4 5.4.1 *The constructor is overloaded with three different versions. ✓*
Methods with the same name but different parameter options are called overloaded because the same method name can be called with different parameter options. ✓ (2)
- 5.4.2 (a) *Accessor methods are required because attributes are declared as private to protect them ✓ therefore a method is needed to return the data stored in the attribute. ✓* (2)
- (b) *Any ONE of ✓*
getFirstName()
getSurname() (1)
- 5.4.3 *Purpose of toString() → To output in a string format the attributes of the class in a meaningful way. ✓* (1)

- 5.5 5.5.1 *Accept any TWO valid reasons for using a WHILE loop with a flag ✓✓*
- A while loop will make use of its checking condition to stop the loop once the condition is true, i.e. the correct client is found.
 - The FOR-loop will check every client in the array even when the correct client is found – wasting valuable processing time.
 - The number of clients in the database is not constant and may change. (2)
- 5.5.2 (a) The flag needs to be:
- I – initialised before the loop starts ✓
 - T – tested in the loop condition/be part of the condition ✓
 - C – changed inside the loop using an IF statement ✓ (3)
- (b) *Accept any ONE correct example of an infinite WHILE loop ✓✓*
- The programmer could not set the flag variable correctly.
 - The client name could not be found (does not exist). (2)
- 5.5.3 Line 4:
If (Surname = ClientSurname) OR ✓
(First three letters of Surname = First three letters of ClientSurname) ✓ (2)

TOTAL SECTION D: 50

SECTION E: INTEGRATED SCENARIO**QUESTION 6**

- 6.1 6.1.1 *Accept any THREE advantages of a network ✓✓✓*
- Easier to share data and information – transfer rather than copy to flash/DVD
 - Cost effective to share hardware resources and software
 - Facilitating communication, e.g. e-mails, instant messaging, blogs, etc.
 - Easier to maintain – only have to repair one device/software application
- Also accept any other suitable advantage.*
- NOTE:** No marks for the same reason mentioned again with revised wording. (3)
- 6.1.2 (a) *Accept any TWO advantages of peer-to-peer network ✓✓*
- Does not need a server – cheaper
 - Does not need a server – easier to install
 - Computers can be used as standalone – more flexible
- Also accept any other sensible answer* (2)
- (b) *Accept any TWO advantages of server-based network ✓✓*
- Better security – securities easier to set
 - Larger number of computers can be connected – depends on number of employees
 - Clients don't need to be powerful but powerful server required – can be cheaper
 - Better performance – Powerful server enhances system
- Also accept any other sensible answer* (2)
- 6.1.3 (a) *Accept any TWO advantages of WLAN ✓✓*
- Mobility – can easily use mobile devices
 - Cost – use less cables
 - Planning – network doesn't need to be planned beforehand
 - Flexible – can move or add device, no extra cables
- (2)
- (b) *Accept any ONE disadvantage of WLAN ✓*
- Security is low
 - Range is limited
 - Data transfer rate is slow
 - Reliability is questionable
- (1)
- (c) *UTP cables are easier to install/don't need expertise to install✓*
- NOTE:** No mark for low cost (1)

- 6.2 6.2.1 *A thin client workstation* is a computer with no hard drive(s)/little or no storage facilities ✓ and is nearly always dependant on the server ✓ for storage and execution of applications. (2)
- 6.2.2 *Accept any TWO valid reasons* ✓✓
- No hard drive therefore no viruses or other malware can be saved on local hard drive
 - Better security facilities/settings available on the server to enforce on network hard drive
- (2)
- 6.3 6.3.1 *Web server:* Server permanently connected to the Internet ✓ hosting the company's websites ✓ (2)
- 6.3.2 *Proxy server:* Server that allows all other computers in the network ✓ to connect to the Internet ✓ (1)
- 6.3.3 *Accept any TWO advantages for using a proxy server* ✓✓
- Better control on websites visited
 - Better security, for example virus control
 - Easier to setup
 - Web caching of more websites visited by different users
- (2)
- 6.4 6.4.1 VoIP ✓ (1)
- 6.4.2 *Any of the following for one mark each:* ✓✓
- Headphone or speakers
 - Microphone
- OR**
- Any ONE of the following for two marks:*
- Skype phone
 - Headset
- (2)
- 6.5 6.5.1 *Hot spot:* Wireless Access Point ✓ that provides Internet connection for mobile devices ✓ (2)
- 6.5.2 *Accept any ONE device* ✓
- Laptop
 - Cellphone
 - Smart phone
 - PC with WiFi card
 - Or any other mobile device with WiFi ability
- (1)
- 6.5.3 WiFi ✓ (1)
- 6.6 6.6.1 WAN ✓ (1)

- 6.6.2 *Accept any TWO valid reasons why VPN is security risk ✓✓*
- Any employee can connect to company's server from anywhere an Internet connection is available.
 - Any person (doesn't have to be an employee) can try to access the server
 - Making use of telephone cables EMI and eavesdropping can become a problem. (2)
- 6.7 6.7.1 Web designer ✓ (1)
- 6.7.2 *Accept any TWO distinctive features of WAP website ✓✓*
- It must be developed to work in a smaller display area
 - Fewer keyboard functions
 - Touch screen optimised
 - Lower reliance on graphical output (2)
- 6.8 6.8.1 (a) *Accept any ONE disadvantage of printing (excluding cost) ✓*
- Smaller area to advertise
 - Not eco-friendly
 - Not always suitable for visually impaired people
- Also accept any correct alternative (1)*
- (b) *Accept any ONE disadvantage using DVD (excluding cost) ✓*
- Not everybody has DVD players
 - Overload of information
 - Cannot always look at info while visiting destination.
- Also accept any valid alternative (1)*
- 6.8.2 *Accept any ONE fact about each ✓✓*
- WIKI:** (source of information)
- Is a reference source (encyclopaedia) or article published on the Internet, usually written by a group of volunteers?
 - The main idea of a wiki is that any person can contribute to the content.
 - The final published articles on a wiki does not belong to anyone – they normally make it accessible in the public domain. (1)
- FORUM:** (More interactive – ask questions)
- Is an online place where people discuss issues or obtain online help
 - People ask a series of structured questions which is answered either by fellow subscribers to the forum or by the forum's expert
 - Specialised forums may need you to register before you are allowed to publish questions or answer other questions. (1)

- 6.9 *Accept any THREE ways of verifying the trustworthiness of data/information*
✓✓✓
- Check if data is authentic
 - Is the data from where it says it comes/Author?
 - Check data for validity/Is source valid?
 - Is data up-to-date?
 - Does the data correlate with other sources? (3)
- 6.10 6.10.1 **Data:**
Raw facts and numbers usually type into the database tables/excel spreadsheets.✓
- Example:*
The raw numbers of tourists arriving in the country
- Information:**
Results of queries/data filtered or sorted to answer questions.✓
- Example:*
A report on the number of tourists grouped per country of origin
- NOTE:**
Give ONE mark for a correct example of data/information (3)
- 6.10.2 Record-locking is required:
- if more than one employee works on the same record some of the changes done will be lost. ✓
 - because if the record is locked only one person is allowed to work on that specific record.✓ (2)
- 6.10.3 Both ✓
- A query is needed to extract all promoted employees.
A report is required to present the names in a presentable format to the board. ✓
Accept any correct alternative explanation (2)
- 6.10.4 *Any TWO duties of a database administrator* ✓✓
(excluding planning and creating database)
- Control access to the database – setting up user accounts/password
 - Creating backups of the database/get recovery procedure in place/do recovery of data
 - Create the queries required by the people using the database
 - Creates and maintains a data dictionary
 - Monitor performance of the database (2)
- TOTAL SECTION E: 49**
GRAND TOTAL: 180