



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

INFORMATION TECHNOLOGY P2

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MEMORANDUM

MARKS: 180

This memorandum consists of 18 pages.

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

- 1.1 B ✓ (freeware) or A (shareware) (1)
- 1.2 A ✓ (bandwidth) (1)
- 1.3 C ✓ (podcast) (1)
- 1.4 B ✓ (signature) OR C (certificate) (1)
- 1.5 B ✓ (Linux) (1)
- 1.6 C ✓ (spooling) OR B (buffering) (1)
- 1.7 D ✓ (Compiler) (1)
- 1.8 C ✓ (Price of a book) (1)
- 1.9 B ✓ (abc.wav) (1)
- 1.10 C ✓ (CMOS) (1)

TOTAL SECTION A: 10

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

- 2.1 2.1.1 The management of the data transfer ✓ between all the components of the motherboard ✓ is regulated by the chipset.
Accept: 1 mark – to indicate communication or control, speed of data
1 mark - to indicate the components (2)
- 2.1.2 A = south bridge ✓
B = north bridge ✓ (2)
- 2.1.3 (a) Bus is a set of wires used to transfer the data/instructions ✓ between two components on the motherboard. ✓
1 mark – the medium
1 mark – the components (2)
- (b) D ✓ (1)
- (c) (Any TWO busses – (name ✓ and description ✓)(2x2))
 - **Address bus** → transfers the address of the data/instruction from the CPU to the RAM/one-way communication between CPU and RAM
 - **Control bus** → transfers a control signal (read/write) to the memory/one-way communication between CPU and RAM
 - **Data bus** → transfers data in a two-way communication between the RAM and CPU**Accept: USB, FSB, PCI, PCI Express, internal bus, BSB**
(2 marks for the busses and 2 marks for the explanation) (4)
- 2.1.4 (Any THREE advantages ✓✓✓)
 - USB can be used to connect different devices e.g. flash drives, external hard drives.
 - USB is hot-pluggable / placed externally
 - Plug-and-play applies to USB.
 - USB supplies a small amount of electric power to the connected devices.
 - USB can make use of daisy chaining connected devices.
 - USB provides faster data transfer rates / high speed transfer.
 - A popular device, most used device**DO NOT Accept: No drivers required.** (3)

- 2.1.5 (a) The ALU (arithmetic logic unit) is responsible for the processing of logic equations and whole number (integer) calculations. ✓
NB: Any 1 fact
Logical Arithmetical operations
Numerical calculations (1)
- (b) YES ✓ (any correct reason ✓)
 - The size of the register dictates the largest number (2^{32} vs. 2^{64}) the CPU can store correctly.
 - The size of the register also dictates the maximum size of RAM the CPU can work with.
 - Can store more data
 - Increases the efficiency/performance**NOTE:** If answered NO – no marks ($0/2$)
DO NOT Accept: Increases processor speed (2)
- 2.1.6 The CPU will run at a faster speed than it is designed for. ✓
Accept: faster (1)
- 2.1.7 NO ✓ (any correct reason ✓)
 - Newer CPU's might not fit on this motherboard because of different pin configurations, number of cores, etc.
 - If you are going to replace the CPU, it will have to be with the same type otherwise you would need to buy a new motherboard.
 - Make sure the current heat sink and CPU fan fit on the new CPU otherwise they will need to be changed as well.
Accept: Yes, with a correct motivation (2)
- 2.1.8 (a) An instruction set is the basic set of instructions that the CPU recognises and executes. ✓
Accept: The computer instead of CPU
Do not accept: A basic set of instructions (1)
- (b) (Any valid example of extended instruction set ✓)
 - MMX
 - SSE
Accept: CISC, 3D-Now (1)

- 2.1.9 (Any TWO valid ways to prevent CPU overheating ✓✓)
- Use a heat sink on the CPU's / thermal paste
 - Add additional fans to the computer box.
 - Improve circulation by using a bigger box.
 - Water cooling / nitrogen cooling / Circulation of liquid
 - Soft Cooling, using software to cool the system (2)
- 2.2 2.2.1 (a) 'Data about data' – metadata refers to additional or extended data on a file structure ✓ **OR** The design and specification of data structures. (1)
- (b) (Any ONE example ✓)
Fat32,Filename, extension, file attributes, create time / date, last accessed, last modified, size
- Accept: Track number/Genre/Camera model/Date picture was taken/Database design. (1)
- 2.2.2 (a) (Any TWO advantages of NTFS ✓✓)
- Support additional security and management properties
 - Allows the network administrator to set permissions on the files, e.g. who is allowed to read/write/modify the file
 - Adds more file attributes to the file
 - Provide better security for system files
 - NTFS has no restriction on the number of files
 - NTFS has no restriction on the size of a file (whereas FAT32 can only handle files up to 2 GB) (2)
- (b) • Size on disc (112 kB) → The cluster size used✓ by the file system is fixed (cluster consists of set number of sectors).
• File size (110 kB) → The file didn't use up the whole cluster when it was saved ✓ – therefore it is smaller than the disc size.
• Accept: Slack
• Any reasonable answer (2)
- (c) (Any TWO ways to prevent file modification✓✓)
- Change the *Read only* attribute to true.
 - Remove the *full control* file permission on the file.
 - Remove the *modify* file permission on the file.
 - Change the file permission to *deny full control/modify*.
Accept: Encryption / Passwords (2)

- 2.2.3 (a) Partition – to split one hard drive into two or more logical drives each with their own boot up sector. ✓
Accept: Creating virtual drives
Split 1 drive into 2 or more drives (1)
- (b) (Any TWO advantages of partition ✓✓)
 - Allows the installation of two different operating systems on one physical hard drive
 - Allows user to split data and operating system files on the two logical hard drives / Easier backups created
 - Allows the user to have two different file systems (FAT32 and NTFS) on the two logical drives
Accept: Improves security / protection / prevention of virus spreading
Formatting can take place on only one hard drive (2)
- (c) The file system is placed on the disk. ✓✓
The file system is used by the operating system as an index to keep track of what is saved and where it has been saved on the hard disk.
(OR any similar explanation) (2)
- 2.2.4 (a) RAID is a way to spread data over many discs to make data recovery easier. ✓
Accept: many hard drives are seen as a single drive
RAID – Redundant Array of Independent/ Inexpensive Disks. (1)
- (b) RAID Level 5 →
 - Data is broken into/split into blocks and distributed between disks ✓
 - The RAID controller generates and stores a 'parity' block which is distributed across the disks. / Parity bit is stored ✓**OR**
Only one mark for: Striping with parity. (2)
- 2.3 2.3.1 Topology is the physical arrangement of the computers/devices in the network ✓
Accept: Layout (1)
- 2.3.2 Bus ✓ (1)
- 2.3.3 (a) (Any ONE ✓)
 - UTP
 - Fibre optic (1)

- (b) **UTP** (Any ONE disadvantage ✓)
- Susceptible to EMR or eavesdropping / Crosstalk
 - Signal strength can decrease rapidly with cable length
 - Accept: Limited bandwidth/slower than fibre optic

OR

Fibre optic (Any ONE disadvantage)

- High cost to install
- Difficult to install – needs network technician (1)

- (c) (Any ONE **ADVANTAGE** of star topology ✓)
- Easy to add new computers
 - Easy to troubleshoot network
 - Accept: Computers are still operational if 1 workstation malfunctions.
Faster than a bus topology.
Improves security.

(Any ONE **DISADVANTAGE** of star topology ✓)

- If the central hub/switch fails the entire network is down.
- A lot of cabling is required to set up the network. (2)

- 2.3.4 (Any THREE functions – network administrator ✓✓✓)
- Creates user accounts
 - Deletes user accounts
 - Maintenance of user accounts
 - Set up security
 - Maintain data integrity
 - Install/Uninstall programs
 - Making of backups/Implementing a backup policy
 - Development of network
 - Network documentation
 - Accept: Any reasonable explanation (3)

- 2.3.5 (a) Thin-client computer network is a network where application software, data and processing occurs on the server rather than on the client PC. ✓
- Accept: The client/computer is dependent on the server. (1)

- (b) (Any TWO disadvantages of a thin-client computer network ✓✓)
- A powerful server needs to be bought.
 - Use of multimedia is restricted.
 - Less flexible on certain operating systems – the programs need computers with their own resources to execute and will not run on thin clients.
 - Accept: The computers cannot run as standalone computers
 - Accept: Slower than fat clients
 - Accept: Clients can only use software from the server. (2)
- 2.4 2.4.1 System software ✓ (1)
- 2.4.2 (a) Multithreading → When a program is broken up into different threads✓, which run independently✓, seemingly at the same time.
Accept: Example only – 1 mark (2)
- (b) (Any valid reason) ✓
- The bus size of the computer (32-bit) and the bus size the OS (64-bit) is capable of addressing is different.
 - The 64-bit OS will not function.
- Accept: Problem obtaining 64 bit drivers / software
Accept: any valid explanation (1)
- 2.4.3 (Any TWO disadvantages of open-source software in a school network✓✓)
- Risk of no support / Nobody is responsible if something goes wrong
 - Higher skills required to use some of the software
 - Different versions of the same software are available on the Internet
 - Source code of software is available – the learners may obtain access to sensitive information/data in a school network
 - Security
 - Reliability
 - Does not support all software
 - Compatibility problems (2)

TOTAL SECTION B: 58

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

- 3.1 3.1.1 An ADSL line is a **permanent digital connection** ✓ that is a single line that is split using multiplexing so that **both voice and data** ✓ can be used on **the same line.** ✓
Accept: (Any 3 of the following)
High Speed Connection
Digital connection
Full time/permanent connection
Allows simultaneous voice/data
Fixed monthly rate (3)
- 3.1.2 (a) (Yes/No → mark allocated for valid explanation ✓)

NO → You need a 3G card for your laptop/PC or any 3G capable electronic device e.g. cellphone/PDA.
OR
YES → A modem is required to connect to the Internet – the cellphone/3G card acts as the modem. (1)
- (b) Cellphone technology ✓ / Mobile technology (1)
Accept: Radio waves, wireless
Do not accept: Wifi, WiMax, HSDPA, GPRS
- 3.1.3 (Any ONE ✓)
 - Your Internet connection is slower than normal
 - You may notice indicator lights on your wireless router flashing rapidly while you are not connected to your wireless network.
 - There is a facility to monitor the computers currently connected to your wireless network – you will notice a computer that does not belong to you but is connected to the network.
Accept: The CAP gets used up too quickly, excessive data used. (1)
- 3.2 Netiquette → Rules describing acceptable behaviour when sending e-mails or any form of electronic communication ✓
(Any acceptable example ✓)
 - You should not advertise products using e-mail.
 - Do not send lengthy e-mails.
 - Do not attach very large documents to your e-mail.
 - Avoid spelling errors.
 - Do not take part in flame war.
 - Do not forward spam or hoaxes
 - Do not use only capital letters, etc.
 - Do not accept: general comments, must be linked to electronic communication. (2)

- 3.3 3.3.1 SSL provides encryption of all data ✓ that passes between a client and an Internet server. Once the client has a digital certificate ✓, the Web browser communicates securely with the client.
Accept: Use of private key / public key
Encryption (2)
- 3.3.2 (Any ONE ✓)
SSL is:
 - More processor intensive
 - Bandwidth intensive
Accept: Cost implications
Not always required (1)
- [11]**

QUESTION 4: SOCIAL AND ETHICAL ISSUES

- 4.1 YES/NO ✓ and any valid reason ✓
- Yes → Any acceptable motivation such as the company pays for the e-mail service and has the right to monitor the use of the e-mail service.
- No → Intercepting the e-mails violates the privacy of the employee.
- (OR any other acceptable answer) (2)
- 4.2 4.2.1 (Any TWO ✓✓)
 - Vision can be affected – computer-vision syndrome – tired, blurry, burning, itchy eyes
 - Computer-related repetitive strain injury (RSI)
 - Carpal-tunnel syndrome – inflammation of the nerves that connect the forearm to the palm or the wrist
Accept: Anti-social
Overweight and unfit
Back/joint related problems (2)
- 4.2.2 Ergonomics – the science of incorporating comfort, efficiency and safety into the design ✓ in relation to the human body ✓
Accept: User friendly devices – 1 mark (2)

- 4.3 (Any TWO valid suggestions on e-waste ✓✓)
 • Recycle old computers.
 • Put legislation in place that enforces a more aggressive approach towards e-waste.
 • Force computer companies to be responsible for collecting and recycling their products. (2)
 Accept: Extending the use/re – use of computers
 Accept: Temporary storage for later disposal
- 4.4 You are deceiving the public. ✓ (1)
[9]
- TOTAL SECTION C: 20**

SECTION D: PROGRAMMING AND SOFTWARE DEVELOPMENT

QUESTION 5: ALGORITHMS AND PLANNING

- 5.1 5.1.1 C ✓
 5.1.2 E ✓
 5.1.3 B ✓
 5.1.4 A ✓
 5.1.5 D ✓ (5)
- 5.2 5.2.1 Modular programming – Dividing a program ✓ into separate subprograms ✓ called methods, procedures or functions. (2)
- 5.2.2 (Any THREE advantages of modular programming ✓✓✓)
 • Easier to debug/maintain.
 • Modules/functions/procedures can be used repeatedly.
 • Modules/functions/procedures can be used in other classes/forms.
 • No repeating/duplication of code segments – make use of functions/procedures.
 Accept: A team of people can work on a module (3)
- 5.2.3 Yes ✓, it is a segment of code or a module. ✓ The code segment can be used / called repeatedly ✓ (3)
 Also Accept: A constructor is a special method because it can create an instance of a class; it can receive parameters

- 5.2.4 A private method can be accessed only in the class/unit in which it is declared ✓ whereas a public method can be accessed in other classes/units as well. ✓ (2)
- 5.2.5 An accessor method is used to return the value of a field/data ✓ and a mutator method is used to change the value of a field/data. ✓
Accept: State, content instead of values.
Accessor have a return value and mutators are generally void methods (2)
- 5.3 5.3.1 Syntax ✓, Logical ✓ and Runtime ✓
Also accept: 1 example of each type of error (3)
- 5.3.2 Exception handling is a programming construct or computer hardware mechanism designed to handle the occurrence of special conditions or problems that change the normal flow of program execution ✓ in order to prevent the program from crashing. ✓
OR
Exception handling is used when abnormal or uncommon errors need to be caught and dealt with to prevent the program from crashing as a result of the error.
Accept: Contains/prevents/catches expected errors

(OR any other correct explanation)
Do not accept: A description of validation (2)
- 5.3.3 (Any TWO reasons for validation ✓✓)
 - To ensure the capturing of valid/accurate data
 - To prevent the program from crashing
 - To prevent errors made by the users
 - To ensure a correct output
 - To ensure a correct format/range
Do not accept: Examples (2)
- 5.3.4 Extreme ✓, erroneous ✓ data/abnormal data/missing data
Accept: An appropriate example to explain each type of error (2)
- 5.3.5 (Any TWO ✓✓)
 - Indentation
 - Commenting code
 - Modular programming
Accept: Use appropriate, good variable names
Avoid the use of global variables
The use of a debugger
The use of appropriate white spaces / blank lines (2)

- 5.4 5.4.1 One-to-many relationship✓ (1)
- 5.4.2 StallCategory✓ (1)
- 5.4.3 (a) The StallCategory must match one of the categories in tblCategories. ✓✓ (2)
Accept: There is no field called Books in tblCategories
Defies referential integrity
Add a Book category in tblCategories
- (b) (Any TWO ✓✓)
Use a
- Combo box / Drop down list
 - Validation rule
 - Lookup wizard
- Accept: Use of radio buttons (2)
- (c) Referential Integrity✓ (1)
- 5.4.4 TRUE (**OR** True) ✓✓ (2)
- 5.4.5 (Any ONE advantage – using a database vs a text file ✓)
 - Can perform queries on data
 - Reports and input forms can be created in database
 - Easier to validate the format and the range of data
 Accept: The use of separate tables.
 More organised and easier to read.
 Allows features like relationships, queries, reports, forms (1)
- 5.5 5.5.1 A step-by-step approach to solving a problem.✓ (1)
Accept: A solution/way/plan to solve a problem
- 5.5.2 The algorithm must be able to be interpreted and understood by programmers using any programming language.✓✓ (2)
Accept: It is a plan and not the actual solution.
- 5.5.3 (a) OR✓ Accept || (1)
- (b) AND✓ Accept && (1)
- (c) >=✓ (1)
Accept ≥
- 5.5.4 (a) The number of people participating in the rating is unknown. ✓ (1)
Accept: Any reasonable statement that implies an unknown number of times.

- (b) (Any ONE of the following reasons ✓✓)
- The value of the ticket number is not being changed inside the loop.
 - The ticket number remains the same throughout the algorithm, resulting in Step 4 always being true. (2)
- (c) (i) Input ticket number ✓
- (ii) (Any ONE of the following places ✓)
- Between Line 10 and Line 11 (inside the while-loop) (2)

TOTAL SECTION D: 49

SECTION E: INTEGRATED SCENARIO**QUESTION 6**

- 6.1 6.1.1 (a) Any e-mail software ✓
e.g. MS Outlook, GMail, yahoo, Outlook Express, Internet Explorer
Accept: open-source e-mail clients (1)
- (b) (Any TWO valid differences ✓✓)
 - A tweet is restricted to 140 characters whereas the size of an e-mail message is not restricted.
 - A tweet is public by default whereas an e-mail is sent to a specific user.
 - A tweet must be shorter
 - A tweet cannot have an attachment
 - A tweet identifies users to follow
 - A email is a more formal form of communicating (2)
- 6.1.2 (Any THREE properties of a smart phone ✓✓✓)
 - Allows you to display maps
 - Listen to music – portable media player
 - Receives and sends e-mail
 - Share photos and videos – built-in camera
 - Provides PDA capabilities such as running applications
 - GPS capabilities
 - Touch Screen
 - Has a more powerful/advanced operating system than a normal phone
 - Has more memory
 - Allows for Internet access
 - Instant messaging (3)
- 6.1.3 (a) Social networking refers to virtual communities that communicate over the Internet. ✓✓
Tool, application or website where relationships or connectedness is explicitly defined.
Also Accept: People and friends instead of a virtual community
Any indication of social communication (2)
- (b) (Any TWO valid negative impacts ✓✓)
 - Learners don't learn social skills
 - No interpersonal relationships
 - Internet bullying
 - Identity theft
 - Distribution of pornography
Accept: School work is neglected
Antisocial (2)

(c) Communication protocol is a set of rules controlling the communication ✓ between two or more devices using a communication medium. ✓ (2)

(d) VoIP ✓ (1)

6.2 6.2.1 (Any THREE valid advantages for education sector ✓✓✓)

- Not restricted to a classroom situation – making long-distance video conferencing possible
- Access to research material is easier
- Can easily communicate with other 'experts' in the same field of study
- Examinations can be conducted in various centres across the world at the same time, e.g. Microsoft certifications (3)

6.2.2 (Any THREE valid careers in networking ✓✓✓)

- Network administrators
- Network technician
- Website designers
- Webmasters
- Database administrators
- Graphical designers
- Hackers
- Security specialists, etc (3)

6.2.3. All candidates will be awarded 8 marks for this question.

6.2.3 (a) Cyber terrorist

- Someone who uses the Internet/network to destroy or damage computers for political / religious reasons. ✓
- The extensive damage might destroy a nation's air-traffic control system, electricity-generating companies or a telecommunications infrastructure. ✓ (2)

(b) Cyber extortionist

- Someone who uses e-mail as a vehicle for extortion. ✓
- These perpetrators send a company a threatening e-mail message indicating they will expose confidential information, exploit a security flaw, or launch an attack that will compromise the company's network if they are not paid a sum of money. ✓ (2)

(c) Script kiddie

- Has the same intent as a cracker but does not have the technical skills and knowledge. ✓
- Script kiddies are often teenagers who use prewritten hacking and cracking programs to break into computers. ✓ (2)

- (d) Wardriver
- Intrusion technique in which an individual attempts to detect wireless networks via their mobile devices while driving a vehicle through areas they suspect have a wireless network. ✓
 - The damage caused to other people range from using Internet data cap; having access to confidential material, etc. ✓
- (2)

- 6.2.4 (a) (Any TWO from the list provided ✓✓)
(Unauthorised access to confidential information)
- Biometrics
 - User names and passwords
 - Encryption
- (2)

- (b) All candidates to be awarded 2 marks for this question.

- (Any TWO from the list provided ✓✓)
(Back doors)
- Backup ✓
 - Audit trail ✓
 - Authentication
- (2)

- 6.2.5 A honeypot is a vulnerable computer that is set up to entice an intruder to break into it. ✓✓

NOTE: Any of the following for only ONE mark:

- Honeypots are used by companies so they can analyse an attack.
- These computers, which appear real to the intruder, actually are separated safely from the company's network.

Accept: A trap set up to allow users unauthorised access. (2)

- 6.3 6.3.1 (Any TWO valid sectors ✓✓)
- Moviemakers
 - Musicians
 - Publishers
- Accept: Entertainment / software / books (2)

- 6.3.2 (Any TWO ways to identify real DVD ✓✓)
- The IFPI SID code – it stands for International Federation of the Phonographic Industry Source Identity Code
 - The copyright information with the copyright symbol ©
 - The studio's symbol which tells you who made or released the original movie/music
 - The zone indicator identifying where the DVD is meant to be sold, e.g. South Africa is zone 2
 - The hologram insignia
- Accept: Purchase from a legitimate retailer
Label must be genuine
There is a clear colour deviation on the back of the disk
The image quality of copies is inferior (2)
- 6.3.3 (a) Bootlegging is the process of illegally recording a live event / broadcast and then selling this recording without obtaining the copyright holder's permission. ✓ (1)
- Accept: Examples
- (b) (Any valid example ✓)
- Filming a movie while it is being shown in a cinema
 - Video-taping a live concert that you attend and then selling the video (1)
- 6.4 6.4.1 (Any TWO valid ways to trust a web page ✓✓)
- Check the author of web page
 - Check who the publisher of the information is
 - Check the reliability of the information (2)
- 6.4.2 (Any TWO ways to verify information on web page ✓✓)
- Check if the data/date is current
 - Is there any cross references?
 - Is there more than one web page with the same type of information provided?
 - Accept all answers from 6.4.1 (2)
- TOTAL SECTION E: 43**
GRAND TOTAL: 180

NB: Do not mark the following: 6.2.3 and 6.2.4(b)