



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

INFORMATION TECHNOLOGY P2

NOVEMBER 2022

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 14 pages.

SECTION A: SHORT QUESTIONS

QUESTION 1

- | | | | |
|-----|--------|-------------------------------|-----|
| 1.1 | 1.1.1 | C ✓ | (1) |
| | 1.1.2 | B ✓ | (1) |
| | 1.1.3 | C ✓ | (1) |
| | 1.1.4 | A ✓ | (1) |
| | 1.1.5 | C/D ✓ | (1) |
| 1.2 | 1.2.1 | H ✓ (Transaction) | (1) |
| | 1.2.2 | K ✓ (Array) | (1) |
| | 1.2.3 | J ✓ (Backdoor) | (1) |
| | 1.2.4 | I/R ✓ (JavaScript/Python) | (1) |
| | 1.2.5 | A ✓ (Copyright) | (1) |
| | 1.2.6 | O ✓ (Synchronising) | (1) |
| | 1.2.7 | E ✓ (Driver) | (1) |
| | 1.2.8 | B ✓ (User Rights) | (1) |
| | 1.2.9 | D ✓ (Artificial Intelligence) | (1) |
| | 1.2.10 | C ✓ (Scalability) | (1) |

TOTAL SECTION A: 15

SECTION B: SYSTEM TECHNOLOGIES**QUESTION 2**

- 2.1 2.1.1 (a) DIMM ✓-slots (1)
- (b) Bytes / MB / GB ✓ (1)
- 2.1.2 *Any TWO GPU hardware specifications: ✓✓*
- Speed/number of cores/type of processor
 - Speed/size/type of RAM
 - Slot type of the GPU (2)
- 2.1.3 (a) ZIF ✓-socket (1)
- (b) *Reasons for point-to-point connection:*
- CPU need to transfer large amounts of data/higher workload to and from RAM ✓
 - Point-to-point connection is dedicated ✓ for single component OR bus is shared amongst many components (2)
- 2.2 2.2.1 Software that manages/controls ✓ all the activities of a computer system. (1)
- 2.2.2 *Any TWO functions of an operating system: ✓✓*
- Provides a user interface
 - Manages processes and tasks
 - Manages memory
 - Manages input and output/peripherals/hardware and software
 - Manages storage
 - Manages security (2)
- 2.3 2.3.1 Virtual memory ✓ (1)
- 2.3.2 *How virtual memory works:*
When more applications are opened the system runs out of available RAM. ✓
Processes not actively being used are moved to virtual memory (special storage) ✓ to open up space in RAM for other applications. (2)
- 2.4 2.4.1 A software bug is an error ✓ in software. (1)
- 2.4.2 *Any ONE example of how the software bug could be revealed: ✓*
- Incorrect/inaccurate calculated values
 - System crash/run-time error
 - System malfunction (1)

- 2.5 *Any ONE way to prevent unauthorised access to software: ✓*
- Use passwords/access control
 - Install anti-malware/anti-spyware
 - Setup a Firewall
 - Physically restricting access (locking up, etc.) (1)
- 2.6 2.6.1 *Any TWO limitations related to mobile devices compared to PC: ✓✓*
- Small Screen
 - Small keyboard
 - Limited processing power
 - Limited storage
 - Limited mobile OS
 - Mobile devices are not expandable/upgradeable (2)
- 2.6.2 Convergence ✓ (1)
- 2.7 2.7.1 They both convert programs into machine code. ✓ (1)
- 2.7.2 *Any TWO reasons why a compiler would be a better choice than an interpreter: ✓✓*
- A compiler compiles the whole program at once, whilst the interpreter does it one line at a time.
 - A compiler provides a list of errors whilst the interpreter stops at the first error.
 - A compiled program does not need the compiler to execute, whilst the interpreter is needed to run (creates an executable file). (2)
- 2.8 2.8.1 *Any ONE reason to clean up/arrange items on a desktop computer: ✓*
- Easy to locate programs
 - Better organisation
 - Avoid clutter
 - Increase storage space/remove unnecessary files (1)
- 2.8.2 For the operating system to select the correct application ✓ to open the file with. ✓
- Also accept:
For the operating system to identify the type of file (1)
to be able to view the file. (1) (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

- 3.1 3.1.1 (a) UTP/Ethernet cables ✓
Also accept: Fibre (1)
- (b) *Any ONE:* ✓
• Radio waves
• Wi-Fi
• Microwaves (1)
- 3.1.2 *Any TWO advantages of installing a wireless network:* ✓✓
• Mobility
• No cables used
• Cost saving
• Easy to setup/connect (2)
- 3.1.3 *Any ONE function when no internet access on a network:* ✓
• Transfer files/Communication between computers
• Sharing of files/applications/software resources
• Share hardware/mention a specific hardware device (1)
- 3.2 3.2.1 *Any TWO reasons why peer-to-peer is less suitable:* ✓✓
• Less secure in terms of managing access to resources
• Difficult to manage a large number of computers
• Does not provide centralised storage/services
• More prone to spread of malware (2)
- 3.2.2 BitTorrent ✓ (1)
- 3.2.3 *Any ONE role of server:* ✓
• A server provides resources (software, storage, etc.)
• Serves as a log-on controller
• Manages security settings on network (1)
- 3.2.4 When a switch fails, all the computers connected to the switch will not be able to access the network ✓ (single point of failure). (1)
- 3.3 3.3.1 (a) HTTP is the protocol that defines how web pages, and their content are transferred across the Web. ✓ (1)
- (b) HTTPS provides for secure/encrypted transfer of web content. ✓ (1)

- 3.3.2 *Encoding of data:*
To change the format of data ✓ for transmission over different mediums. ✓ (2)
- 3.4 3.4.1 A website is a collection of related webpages. ✓ (1)
- 3.4.2 (a) To ensure high ranking in search results/increase the amount of traffic on a website ✓ by changing the design of webpages. (1)
- (b) Adding specific keywords/phrases ✓ that relates to the way in which search engines does content search. (1)
- 3.5 CSS separates the formatting of the HTML and gathers all of it in one place, in a .css file. ✓ When you want to make a change in the formatting of your website, you only change the CSS file and all the web pages get updated. ✓
- Concepts:
- Formatting is placed in a single .css file/style sheet
 - Formatting is applied to all web page (2)
- 3.6 3.6.1 *Any TWO Hotspot risks:* ✓✓
- Network might not be secured/encrypted
 - Exposure to hacking
 - Possible risk of malware spread
 - Shoulder surfing
 - Signal/hotspot spoofing (2)
- 3.6.2 A VPN creates an encrypted connection ✓ to a private network over a public network/Internet ✓ to gain access with the same security as a direct local connection. ✓
- Concepts:
- Communication is encrypted
 - Connecting to a private network over a public network/internet
 - Same security as a local connection/secure connection (3)
- 3.7 3.7.1 The company will have information on the website that stays the same over time/no need to be regularly updated. ✓ (1)
- 3.7.2 *Any TWO advantages for the users of dynamic web pages:* ✓✓
- They can receive relevant/customised versions of webpages
 - Webpage will allow interaction with users
 - Content is more likely to be up to date
 - Users can now also be contributors of content (2)

- 3.7.3 (a) A set of data that describes and gives additional information on other data. ✓ (1)
- (b) A search will take place using the metadata of the relevant content on the internet and will relate it to the user's contextual information ✓ to present a search result uniquely suited to the user. ✓

Concepts:

- The metadata is matched to users' search request/query
- Providing the user with tailored/suitable results (2)

TOTAL SECTION C: 30

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SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

- 4.1 4.1.1 *Any ONE example of invisible data captured: ✓*
- Purchasing habits/preferences
 - Shopping hour preferences
 - Gender/family composition
 - Whether the person has pets
- OR any other valid example (1)
- 4.1.2 *Any ONE reason why a company wants to capture invisible data: ✓*
- To predict/plan other products to stock
 - Anticipate the needs of the clients
 - Target marketing
- OR any other valid example (1)
- 4.1.3 *Any TWO mechanisms of invisible data capturing: ✓✓*
- Forms - completing forms
 - E-toll - passing through E-toll gates
 - Cell phone logging
 - Online activities – Web searches, online purchases, etc.
 - GPS navigation - Using Google Maps, etc.
 - Security camera footage – Biometrics, etc.
 - Background voice capturing by devices
 - Access control system – Entering a premises/site
 - Smart devices/IoT
 - RFID
- (2)
- 4.2 4.2.1 *Any TWO ways of ensuring the validity of captured data: ✓✓*
- Format check
 - Data type check
 - Range check
 - Presence check
 - Check digit
 - Uniqueness check
- (2)

- 4.2.2 A unique value, a primary key, will be allocated to each customer. ✓
OR
Any correct example of a unique field related to the customer. (1)
- 4.3 4.3.1 (a) Data redundancy ✓ (1)
(b) An update anomaly occurs when a record cannot be changed at a single entry ✓ but has to be changed at multiple entries. ✓ (2)
- 4.3.2 (a) One-to-One ✓ (1)
(b) One-to-Many ✓ (1)
- 4.4 4.4.1 Composite/Compound ✓ (1)
- 4.4.2 CollectionNumber ✓ OR any other suitable new field
Also accept: Autonumber field (1)
- 4.4.3 Short Text ✓ (1)
- 4.4.4 The data contained in the field of a foreign key must already exist as an entry in the table where the field is the primary key. ✓
OR
No record in the secondary/many table may refer/link to a record in the primary/one table that does not exist. (1)
- 4.4.5 (a) True ✓ (1)
(b) False ✓ (1)
(c) False ✓ (1)
(d) False ✓ (1)

TOTAL SECTION D: 20

SECTION D: SOLUTION DEVELOPMENT**QUESTION 5**

- 5.1 5.1.1 Any ONE reason for the use of modular programming: ✓
- Avoids repetition of code
 - Methods can be called and used easily in more than one class
 - Enhances readability
 - Easier to debug
 - Collaboration between programmers
- (1)
- 5.1.2 Any ONE difference between a procedure and a function: ✓
- Procedure does not necessarily return a value, whilst a function must return a value.
 - A function has a data type associated with the function name, that acts as a variable for the return value, whilst a procedure does not have that.
 - A procedure is an independent call, whilst a function must form part of another statement.
- (1)
- 5.2. 5.2.1 Valid ✓ (1)
- 5.2.2 Valid ✓ (1)
- 5.3 5.3.1 Defensive programming uses code to avoid/handle errors ✓ that will prevent the normal execution of a program. ✓ (2)
- 5.3.2 (a) Any ONE possible reason for an overflow error: ✓
- When a value to be stored in a variable is outside the range of the data type/ or is too large
 - Endless loop
- (1)
- (b) Any ONE of the following to prevent a runtime error: ✓
- Data validation
 - Exception handling techniques
 - Any example of defensive programming e.g. testing for division by zero
- (1)
- 5.4 5.4.1 Instantiate/Create/Initialise an object ✓ (1)
- 5.4.2 getCompanyName ✓ (1)
- 5.4.3 (a) CompanyNum ✓ (1)
- (b) The company number uniquely identifies the company ✓ and should not be changed. (1)

ALSO ACCEPT - CompanyName in (a) with correct motivation in (b)

- 5.4.4 (a) Some of the attributes are declared public/attributes should be private. ✓

OR

Indicating specific examples (+ ContactNumber
+ NumberOfEmployees)

(1)

- (b) Declaring an attribute public it is directly accessible from outside the class ✓ which could have unintended/unforeseen effects. ✓

(2)

- 5.5 5.5.1 Number of repetitions are not known in advance. ✓

(1)

- 5.5.2 `iNumber := RandomRange(1,11) ✓;`
`While (iNumber = 5) ✓ OR (iNumber = 8) ✓ do`
`iNumber := RandomRange(1,11) ✓;`

(4)

TOTAL SECTION D: 20

SECTION F: INTEGRATED SCENARIO**QUESTION 6**

- 6.1 6.1.1 Electronic waste refers to electronic devices or items related to electronics that are obsolete/no longer needed. ✓ (1)
- 6.1.2 Contains toxic/harmful materials ✓ (1)
- 6.1.3 *Any TWO ways to reduce electronic waste:* ✓✓ (2)
- Keep old devices/replace only if necessary
 - Extend the life of your electronics. Buy a case, keep your device clean, and avoid overcharging the battery.
 - Donate/sell used electronics
 - Recycle electronics and batteries
 - Refill toner cartridges
- 6.1.4 The drive must be formatted/cleared/factory reset (or any way to permanently destroy access to data) ✓ so any personal information cannot be accessed/retrieved by others. (1)
- 6.2.1 (a) With POP your emails are downloaded to your device ✓ and deleted from the server (unless you change the default settings). (2)
- With IMAP, emails 'reside' on the server ✓, and you can easily read and interact with emails from multiple devices. (2)
- (b) *Any ONE negative effect of spam:* ✓ (1)
- Spam clogs the Internet/generates unnecessary traffic (impacts speed)
 - It impacts employee productivity/employees must sift through 'junk mail' to find what they really want
 - Spam could contain malware that infects devices
- (c) *Any TWO possible ways how to identify fake news:* ✓✓ (2)
- Consider the source of the news
 - Check the references of the author
 - Apply common sense (recognise unrealistic news)
- Cross-referencing the content with:
- Reputable news sites
 - The citations and references given
 - Fact-checking websites
 - Experts in the field

- 6.2.2 (a) The file should be uploaded to cloud storage/service ✓ and shared.
OR
Any valid example of cloud storage/service that allows this e.g. Google drive, OneDrive, WeTransfer, TeamViewer, etc. / FTP (1)
- (b) *Any ONE risk of sending the attachment via cloud:* ✓
 - Limited storage available on free versions of services
 - The service might not have good security practices
 - The service might not have good backup policies
 - The service might 'oversell' their services
(1)
- (c) An online storage location for the sharing / downloading / streaming of files. ✓ (1)
- (d) The cloud/files can be accessed from anywhere and at any time. ✓ (1)
- 6.3 6.3.1 (a) It is software that appears to be useful/innocent, that is then installed ✓ and then allows an attacker to remotely control the infected computer. (1)
- (b) *Any TWO ways in which a computer could be infected with Trojan malware:* ✓✓
 - Open an infected attachment in email
 - Download/installing a Trojan file
 - Download/installing a Trojan file from a malicious site
 - Reacting on spoofed chat messages
 - Opening/Installing a Trojan file from an infected removable storage device
(2)
- 6.3.2 *Any TWO reasons why websites are often hacked:* ✓✓
 - Steal users' personal information (email addresses, passwords, credit card information) for identity theft
 - Deface the website or place political messages on the website
 - Reroute traffic from the website to a phishing website
(2)
- 6.4 6.4.1 A distributed database is where a database is spread/stored ✓ across servers in separate locations. ✓ (2)
- 6.4.2 Duplication is when every separate site has a copy of the entire/complete database. ✓
- Partitioning is when each site manages/stores only its own data that it works with. ✓ (2)

- 6.4.3 When data is duplicated, each site works with its own copy of the data and data sets will start to differ over time. ✓
Synchronisation will ensure that changes are replicated ✓ over all data sets to prevent problems. (2)
- 6.5 6.5.1 Decision Support System / DSS ✓ (1)
- 6.5.2 Human expertise is coded into software ✓ to create a rule-based system that can make decisions based on the input obtained ✓ from a system such as mentioned in Question 6.5.1. (2)
- 6.6 6.6.1 Software that is available with access to the source code, ✓ which can be modified and adapted by a user. (1)
- 6.6.2 *Any ONE type of file that the disk clean-up program will remove:* ✓
 - Temporary/redundant files
 - Cached webpages
(1)
- 6.6.3 (a) The gap between those who have access to computers and the internet, and those who do not. ✓ (1)
- (b) *Any TWO factors that contribute to the digital divide:* ✓✓
 - Lack of financial resources to acquire technology
 - Difference in educational levels
 - The age gaps
 - Disabilities
 - Lack of supporting infrastructure
 - Fear of ICT
(2)
- 6.7 6.7.1 RPA - Used for repetitive, rule-based processes using robotics. ✓
Hyper-automation – AI decides on the best strategy ✓ for tasks. (2)
- 6.7.2 *Any TWO concepts to be covered in discussion:* ✓✓
 - Robots can replace workers
 - Robots can improve worker productivity
 - Robots can do task that requires strength and good health
 - Robots can take over dangerous tasks
(2)
- 6.8 6.8.1 Virtual reality replaces reality ✓ with software.
Augmented reality enhances reality ✓ by adding onto the real-world experience using software.
Also accept examples of each. (2)
- 6.8.2 Mixed reality super-imposes computer-generated objects that users can interact with. ✓ (1)
- TOTAL SECTION F: 40**
GRAND TOTAL: 150