



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

INFORMATION TECHNOLOGY P2

2023

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 14 pages.

SECTION A: SHORT QUESTIONS**QUESTION 1**

- | | | | |
|-----|--------|-----------------------|-----|
| 1.1 | 1.1.1 | E✓ Metadata | (1) |
| | 1.1.2 | K✓ Record | (1) |
| | 1.1.3 | H✓ Mbps | (1) |
| | 1.1.4 | N✓ Exception handling | (1) |
| | 1.1.5 | A✓ WWW | (1) |
| | 1.1.6 | O✓ Spam | (1) |
| | 1.1.7 | F✓ Plug-in | (1) |
| | 1.1.8 | Q✓ Parameter | (1) |
| | 1.1.9 | C✓ mp3 | (1) |
| | 1.1.10 | L✓ Semantic search | (1) |
| 1.2 | 1.2.1 | C✓ VPN | (1) |
| | 1.2.2 | C✓ Botnets | (1) |
| | 1.2.3 | D✓ Data mining | (1) |
| | 1.2.4 | B ✓✓ Answer: 4 | (2) |

TOTAL SECTION A: 15

SECTION B: SYSTEMS TECHNOLOGIES**QUESTION 2**

- 2.1 2.1.1 Performs calculations and other instructions ✓ (1)
- 2.1.2 (a) A *processor* that has more than one processing unit/core ✓ on a single processor chip ✓ (2)
- 2.1.2 (b) Any ONE processing technique: ✓
 - Multi-processing
 - Multi-threading
(1)
- 2.1.2 (c) Multiple tasks or threads are processed at the same time ✓, by the different processing units/cores which shortens the processing time of tasks/improves the speed at which tasks are completed/done. ✓ (2)
- 2.1.3 Graphics processor has its own resources/processor/RAM which handles the processing of graphical images/rendering ✓, thus lessening the load on the CPU ✓ (2)
- 2.2 2.2.1 Diagonally from one corner to the opposite ✓ (1)
- 2.2.2 HDMI ✓ – It allows for faster transfer of data/ also carries sound ✓ (2)
- 2.3 Any TWO: ✓✓
 - High access speeds
 - No noise
 - Very low heat dissipation
 - Non moving parts – more robust
 - Low power use
(2)
- 2.4 Wi-Fi has a higher bandwidth than Bluetooth ✓ and the range that a Wi-Fi signal can travel is further than a Bluetooth signal ✓ (2)
- 2.5 2.5.1 An operating system is system software ✓ which controls all the activities that take place in a computer ✓ (2)
- 2.5.3 Any THREE motivations/reason why a specific model: ✓✓✓
- Open-source**
- Source code is available for further development
 - Can be customised with necessary skills
 - Often available for free
- Proprietary**
- Formal support
 - Creators accept greater responsibility for the product
 - Fewer versions/more standardised
- (3)

- 2.6 2.6.1 Software is not bought, but rented ✓ (1)
- 2.6.2 Any TWO of the following merits in SaaS: ✓✓
- Easier to roll out updates and fixes
 - Better control over piracy
 - More constant income stream
 - Can provide mobile and Web access. (2)
- 2.7 The antivirus needs to scan each file for viruses ✓ before it is executed, adding more tasks that continuously run in background ✓. (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES**QUESTION 3**

- 3.1 3.1.1 (a) Any ONE: ✓
• Connects the devices
• Regenerates signals
• Directs the traffic between devices in the network (1)
- 3.1.1 (b) Sends and receives radio signals ✓ and allows devices to connect to a network wirelessly ✓ (2)
- 3.1.1 (c) Makes communication between networks possible by directing data to its correct destination ✓ (1)
- 3.1.1 (d) Provides resources to clients in a network ✓ (1)
- 3.1.2 Any TWO: ✓✓
• Installing and updating anti-virus
• Keeping all your software up to date
• Being aware of current trends in computer crime
• Following a good password policy
• Encryption (2)
- 3.1.3 Any TWO: ✓✓
• Amount of users connected to AP
• Electromagnetic interference
• Distance from the access point (2)
- 3.1.4
• Files are broken up into smaller parts ✓
• Parts are downloaded from different servers ✓
• Parts are recombined to form files ✓ (3)
- 3.1.5 (a) Switch ✓ (1)
- 3.1.5 (b) If the switch malfunctions, the entire network will not function. ✓ (1)
- 3.2 3.2.1 File syncing ensures that all your devices contains the latest copy of your files ✓ while a backup is an additional copy of your files to be used in case damage or loss. ✓ (2)
- 3.2.2 Any TWO: ✓✓
• You need internet access
• Cost for additional space on cloud storage

Also accept other suitable examples. (2)
- 3.2.3 Higher bandwidth ✓ and does not degrade over long distances ✓ (2)

- 3.3 3.3.1 Locally ✓ (1)
- 3.3.2 Any ONE: ✓
- Preferences of the website
 - Unique ID for the user
 - The name of the website (1)
- 3.3.3 Any TWO motivations for the use of apps: ✓✓
- Transfers less data, leading to faster speeds
 - Gives the user a more user-friendly control
 - Gives the user more control on what they can do
 - Allows the user to receive automatic notifications when content on the webpage is updated.
 - Easy access
 - Personalised
 - More mobile (2)
- 3.4 3.4.1 (a) People that group together online ✓ based on common interests and/or beliefs. (1)
- (b) Any ONE of the following Web 2.0 developments:
- Dynamic webpages were developed
 - Users became contributors of content (1)
- 3.4.2 (a) Multiple devices are connected to the internet. ✓ These devices can independently communicate with each other ✓ and make 'intelligent'/ rule-based logic decisions based on the input received. (2)
- 3.4.2 (b) Any suitable example ✓✓
- Example 1:**
The alarm clock and the kettle are both connected to an app over the internet. When the alarm goes off, the kettle is switched on.
- Example 2:**
The app that manages the swimming pool is connected to a sensor in the pool as well as to other devices such as the pool pump. The sensor communicates the need for chemicals. The app then switches on the pump.
- Concepts:**
More than one device connected
Communication between the devices (2)

TOTAL SECTION C: [30]

SECTION D: DATA AND INFORMATION MANAGEMENT**QUESTION 4**

- 4.1 4.1.1 An ERD provides a visual representation of how the data/tables are linked ✓ in a relational database ✓ (2)
- 4.1.2 (a) Entity ✓
(b) One/Mandatory ✓
(c) Relationship ✓
(d) Many/Mandatory ✓ (4)
- 4.1.3 Cannot be null ✓ /empty/needs to contain a value (1)
- 4.1.4 (a) Any TWO ✓✓
 - The number of songs can be calculated
 - The content will need to be updated as songs are added or removed from the table
 - There should be no repeating fieldsAlso accept any other valid explanations (2)
- 4.1.4 (b) Any ONE ✓
 - Easy to filter information
 - Perform queries
 - Easier to maintain the database (1)
- 4.2 4.2.1 (a) The mark must be an integer ✓ (1)
- 4.2.1 (b) The range of marks is 0 to 150 ✓ (1)
- 4.2.1 (c) Each learner must have a unique ID ✓ (1)

- 4.3 **Physical independence:**
A change in the physical level usually does not need change at the application program level.✓
OR
The application does not need different code to take the location where the database is stored/ on which media the database is stored into account
- Logical independence:**
You need to make changes in the application program if fields are added or deleted from the database.✓
OR
When you change the design of a table/field in an existing database, the application will remain unaffected. (2)
- 4.4 4.4.1 To ensure that changes made are reflected on all related records/tables✓ (1)
- 4.4.2 Rollback ✓ (1)
- 4.4.3 Record locking ✓ (1)
- 4.4.4 Many people work at the agency (1) and it will be difficult to establish who made which changes without an audit trail (1)
OR
The playlists contain copyright material of which the rights need to be protected (1), thus access and changes to this need to be monitored (1)
- Any other valid example that includes the following **TWO concepts**:
- A motivation for tracking access/changes.
 - Indicating that an audit trail tracks who accessed/made changes and when they were made. (2)

TOTAL SECTION D: 20

SECTION E: SOLUTION DEVELOPMENT**QUESTION 5**

- 5.1 5.1.1 Any ONE ✓
- Improves validation
 - Easier to choose than to type
 - Eliminates the risk of incorrect information being entered (1)
- 5.1.2 The text file allows for permanent storage of information (1)
- 5.1.3 Any ONE ✓
- Linked to a prewritten event
 - Has an icon that graphically indicates the purpose of the button (1)
- 5.2 5.2.1 Line 9 ✓ The square root of the dice value must be assigned to a real variable ✓ (2)
- 5.2.2 Line 13 ✓ The formula should be `iSquare := Power(iDice,2)` ✓ (2)
- 5.2.3 Line 15 ✓ Division by zero is undefined ✓ (2)
- 5.3 5.3.1 Correct ✓ (1)
- 5.3.2 Incorrect ✓ (1)
- 5.4 5.4.1 Private access ✓ (1)
- 5.4.2 A method such as the `toString()` method is made public to provide access to the method by methods of other classes from outside object class. (2)

5.5

Text	Count	Index	Text [Index] = one of Y&\$6@?	Index <= Length?	Count >=3 AND Length>=8?	Display
Y&\$6@	0	1	False			
		2		True		
			True			
	1	3		True		
			True			
	2	4		True		
			False			
		5		True		
			True			
	3	6		False		
					False	INVALID
	✓	✓	✓	✓	✓	✓

(6)

TOTAL SECTION E: 20

SECTION F: INTEGRATED SCENARIO**QUESTION 6**

6.1 6.1.1 Video on demand (VOD) is a service used for delivering video content directly to individual customers ✓ for steaming/downloading using an internet connection. ✓ (2)

- 6.1.2 Any TWO aspects that will be addressed by an EULA: ✓✓
- Copyright provisions
 - Set the conditions of your license agreement with a user
 - Explain what users are and aren't allowed to do with the software
 - Stipulate the conditions under which user's access might be limited or terminated

Also accept other valid answers. (2)

6.1.3 Geo-blocking works by establishing the user's Internet Protocol (IP) address. ✓ The IP address is used to determine geographical location of the user ✓ and then block content based on the location.

Concepts:

- Track user's IP address
 - IP address is used to establish geographical location of user for blocking
- (2)

6.2 Any TWO ergonomic guidelines to avoid potential health problems: ✓✓

- Sit up straight with your back perpendicular to the ground.
- Your forearms should be at the same height as your mouse and keyboard.
- Your feet should be placed firmly on the ground.
- The back of your chair, height of your chair and height of the armrests of the chair should be adjusted to support your body in this position.
- Your monitor should be positioned at eye level and roughly 50 cm away from you.
- Your monitor should be tilted to reduce glare.
- You should take regular breaks while using the computer.

Also accept other valid answers. (2)

- 6.3 6.3.1 Any TWO motivations for streaming ✓✓
- Users want to start watching content immediately
 - Copies of material will fill up user's storage
 - Material are mostly copy right protected
- (2)
- 6.3.2 (a) Lossy compression ✓ (1)
- (b) Inconsequential data is lost ✓ and video content does not work with numbers and values where accuracy is essential. ✓ (2)
- 6.4 6.4.1 Any ONE way in which secure connections can be checked ✓
- Lock symbol
 - URL starts with https
 - Checking digital certificate
- (1)
- 6.4.2 (a) Sensitive/private information is communicated over the internet during online payments, ✓ encryption will ensure that unlawful access is not obtained to this information on a public network like the Internet. ✓
- Concepts:**
- Private information is send over public network/internet
 - Access to this information are prevented by encryption
- (2)
- (b) • Public key is obtained over the network from secure site ✓
- Session key / data is encrypted using the public key ✓ and sent to secure site.
 - Data is decrypted with the matching private key ✓ retained at secure site.
- (3)
- 6.4.3 Any ONE example ✓ and explanation ✓ of cyber attempts to obtain banking details of users
- Phishing - try to obtain sensitive information by sending emails to users that look like official emails.
 - Spoofing – changing electronic communication's information to make it seem as if it originated from a legitimate source
 - Pharming - create an official-looking website that requests sensitive information.
 - Hacking – breaking through security of networks to gain illegal access to personal information
- (2)

- 6.5 6.5.1 (a) The ability to adapt the size/scale of the service to the changing requirements ✓ (1)
- (b) TWO ways to use virtualisation:
Combining the resources of many computers into one powerful service ✓
Sharing the resources of one powerful machine between many users ✓ (2)
- 6.5.2 (a) Any ONE example ✓ and motivation ✓ of a distributed model
- Duplication – all servers will have to be able to handle any user because users can log on from anywhere
 - Partitioning – users will be mostly distributed in certain geographical areas based on the countries where they reside.
- NOTE:** The motivation must fit with the concept of duplication having all the data, while partitioning only stores data needed by the specific server. (2)
- (b) Regular synchronization of databases ✓ (1)
- OR suitable description of synchronization (1)
- 6.6 6.6.1 Artificial intelligence is computer software ✓ that simulates human behaviour ✓ and decision making (2)
- 6.6.2 Any ONE advantage of using chatbot: ✓
- Facilitate seamless live communication
 - Make customer service available 24/7
 - Save time and money
 - Reduce people-to-people interactions with customers
 - Eliminate tedious time-consuming tasks
 - Get constant improvement over time with machine learning (1)
- 6.6.3 Any TWO motivations for using a real person: ✓✓
- Can handle a wider variety of questions/answers
 - Provides employment to people
 - Unwillingness of people to use service because they know it is a machine / negative perceptions of AI (2)

6.7 6.7.1 TWO steps of data analytics with examples:

Analysing data ✓ *to make informed decisions* - for example identify which age groups makes more use of VOD services and what their preferences are. Informed decisions can be made based on the information for example to provide more of the preferred VOD services to the specific age groups ✓

Modelling ✓ – use software to visualise the data for example in the form of graphs. In this example the popularity of VOD services can be shown in terms of time of day/night being watched/categories of VOD services in terms of age groups, etc. ✓

OR other examples related to the scenario. (4)

6.7.2 Any TWO challenges with big data: ✓✓

- Extreme processing power needed to process very large amounts of data
- Large amount of storage required for large amounts of data
- Algorithms must be able to process variety of data
- Mechanisms to collect / capture data from variety of sources

OR any other applicable challenge (2)

6.7.3 Any TWO negative impacts on users to provide content to the user which specifically matches their viewing history: ✓✓

- User's field of interest is artificially limited
- Negative or incorrect perceptions might be continuously re-affirmed
- Process can be used to manipulate user for other intentions

OR any other suitable example of negative impact (2)

TOTAL SECTION F: 40
GRAND TOTAL: 150