



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**INFORMATION TECHNOLOGY P2**

**MARKING GUIDELINES**

**NOVEMBER 2023**

**MARKS: 150**

**These marking guidelines consist of 17 pages.**

**SECTION A: SHORT QUESTIONS****QUESTION 1**

1.1	1.1.1	H ✓	Green computing	(1)
	1.1.2	I ✓	IoT	(1)
	1.1.3	J ✓	Volatile	(1)
	1.1.4	C ✓	Ergonomics	(1)
	1.1.5	D ✓	Wiki	(1)
	1.1.6	L ✓	Augmented reality	(1)
	1.1.7	P ✓	Query	(1)
	1.1.8	M ✓	jpeg	(1)
	1.1.9	G ✓	URL	(1)
	1.1.10	O ✓	BitTorrent	(1)
1.2	1.2.1	A ✓	Botnet	(1)
	1.2.2	D ✓	Cache	(1)
	1.2.3	C ✓	Open Source Software	(1)
	1.2.4	C ✓	Broadband	(1)
	1.2.5	C ✓	7	(1)
1.3	1.3.1	Plug-in / extension ✓		(1)
	1.3.2	Relational database ✓		(1)
	1.3.3	Ransomware ✓		(1)
	1.3.4	Copyright ✓		(1)
	1.3.5	Scalability ✓		(1)

**TOTAL SECTION A: 20**

**SECTION B: SYSTEMS TECHNOLOGIES****QUESTION 2**

- 2.1      2.1.1    *Any TWO characteristics of a motherboard: ✓✓*
- Type of ZIF socket
  - Type of DIMM slot
  - Number of DIMM/RAM slots
  - Number of PCI slots
  - Extra features: Wi-Fi/Bluetooth built-in
  - Number of SATA ports
  - Form Factor/physical size
  - On board features like NIC
- (2)
- 2.1.2    GPU ✓
- (1)
- 2.1.3    *Any TWO examples of flash storage: ✓✓*
- Flash drive
  - SSD/M.2
  - Memory cards
- (2)
- 2.2      2.2.1    It is a server that does not exist as a physical entity, but in software ✓  
running on an internet based server/service. ✓
- (2)
- 2.2.2    *Any TWO justifications of using cloud virtual servers: ✓✓*
- Accessibility/ubiquity – The server could be accessed at any location/any time using an internet connection
  - Scalability – The server specifications could be adapted to suit the changing needs of the university
  - The server does not use local resources
  - The service provider takes responsibility for maintenance and software upgrading
  - Outsourcing of skilled processes
- (2)
- 2.2.3    *Any TWO advantages for using SaaS: ✓✓*
- Don't need to install/update software on the computers.
  - No need for high-end computers as you only need to run the applications from the web browser.
  - SaaS company responsible for storing data and backups.
  - Work from multiple devices/locations.
  - Takes up less local resources.
- (2)

2.2.4 Using a site license means that use of the software is unlimited ✓  
when installed on any compatible devices belonging to the university.  
✓

OR

Allows an organisation to provide access to software to as many users as they want, (1) either by individual installations or providing network access/internet passwords. (1)

OR

It is cheaper to buy a site license (1) than individual single-user licenses for an institution. (1) (2)

2.3 2.3.1 A backup strategy is a plan that outlines the steps and procedures ✓  
necessary to create and maintain a set of backups, that contains a  
duplicate set of all the data from the university, ✓ that is tested and can  
be used to restore data and systems in a short timeframe in the case  
where data was lost/downtime. ✓

**Concepts:**

- A plan that outlines the steps and procedures to create and maintain set/s of backups
- That consists of having a separate/duplicate set of data
- That is tested to ensure restore is possible in short timeframe (3)

2.3.2 *Any TWO disadvantages of using cloud storage: ✓✓*

- Internet access required to access storage
- Bandwidth issues – You need a large amount of bandwidth to back up large chunks of data
- Full data recovery could take some time
- Data costs associated with storing data off-site
- Security of back-ups are managed by the company (2)

2.4 Power user ✓ (1)

2.5 2.5.1 *Any TWO properties associated with a computer worm: ✓✓*

- Creates back-doors for other threats to gain access to a computer system
- Uses weak areas in an application/operating system to spread
- Transfers over a network to other devices
- Emails itself to all the contacts in an email address book
- Uses a lot of system resources (slows down machine)
- Causes strain on network bandwidth (2)

2.5.2 Firewalls monitor and manage access to a network from other networks, ✓ while an anti-virus identifies and blocks/removes malware ✓ (2)

- 2.6 A SSD has no mechanical/moving parts ✓ defragmentation improves access speeds by rearranging data on the HDD to limit the movement of the parts (that slows down access) ✓ (2)

OR

A SSD uses electronic storage (1) where the groups/position of stored data don't influence access speed. (1)

**Concepts:**

SSD is electronic/has no moving parts

Data grouping/placement has no effect on accessing speed.

**TOTAL SECTION B: 25**

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

3.1 3.1.1 *Any ONE explanation of a network: ✓✓*

A network is a group of interconnected devices (1) that can communicate with each other and share resources.

OR

Devices connected with a medium (1) that makes communication possible (1).

**Concepts:**

- Multiple devices that are connected
- Communication is possible between the devices (2)

3.1.2 *Any TWO reasons why the school should invest in communication and network technologies: ✓✓*

- To increase the speed and reliability of data transfer between devices.
- To allow for better collaboration and communication between teachers, learners and staff. (2)

3.1.3 *Any TWO components of a LAN:  
2 x name of component ✓✓  
2 x motivation ✓✓*

- Network Interface Card (NIC) (1) - This is a hardware component that connects a device to the network. (1)
- Switch (1) - This is a networking device that connects multiple devices together in a local area network. (1)
- Router (1) - This is a device that connects multiple networks together and routes data between them. (1)
- Communication medium (1) – Wired or wireless connection medium used in a network. (1) (4)

3.1.4 (a) Any ONE problem disadvantage of layout described: ✓✓

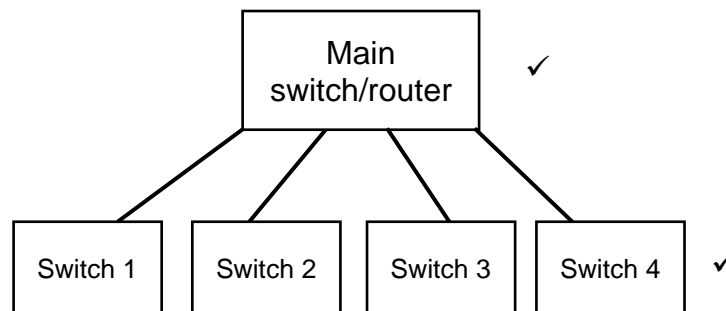
Multiple switches are connected in series (1) if any one of the switches fail, it can disrupt other parts of the network. (1)

OR

Single cable between network segments (1) can lead to congestion in the cables/loss of network management efficiency (1)

(2)

(b)



**Concepts:**

- Centralised switch (1)
- Secondary switches individually connected (1)

(2)

3.2 3.2.1 Any ONE wireless technology: ✓

- WiMax
- WiFi
- Satellite

(1)

3.2.2 The wireless capability of the school's network can be extended by using additional wireless access points, ✓ which can be placed strategically around the school to improve coverage and signal strength. ✓

(2)

3.2.3 Any ONE way the network could be extended to the hostel: ✓  
Motivation ✓

- Fiber back-bone – Data transfer is fast and secure over a distance.
- Repeater with a switch – Signal need to be strengthen to cover the distance.
- VPN – Use existing resources to securely connect to the school's network.
- Wireless access points (WiMax) – Data can be transferred over long distances when using WiMax technology.

(2)

- 3.3 3.3.1 (a) Voice over Internet Protocol ✓ (1)
- (b) *Any TWO of the following differences:* ✓✓
- No dedicated connection
  - Lower cost
  - Allows for video calls
  - Needs preinstalled software applications
  - Can make call to any computing device connected to the internet
  - Call cost not dependant on distances (2)
- 3.3.2 *Any TWO technical challenges to implement VoIP:*  
2 x name ✓✓  
2 x description ✓✓
- Stable internet connection (1) – VoIP requires a stable internet connection to ensure the call does not disconnect (1)
  - Sufficient bandwidth (1) – Low connection speed can influence the quality of the call (1)
  - VoIP-enabled devices (1) – must have correct software installed (1)
  - Software (1) – Both parties using VOIP must have the same software (1)
  - Data cost (1) – High data cost when making video calls (1) (4)
- 3.4 An intranet is an organisation's private network and is an Internet-like environment consisting of web pages. ✓ Course notes, schedules, news, announcements etc. could be posted to the intranet so that people logging on to the network could gain access to these documents/information ✓ (2)
- 3.5 3.5.1 *Any TWO reasons why a RDC be used:* ✓✓
- Software is easily configured on host and target computer compared to setting up a VPN
  - Allows users same control on the remote device as if sitting in front of the device
  - Changes are made to files directly on the remote computer
  - Software is included in your operating system (2)



3.5.2 *Any ONE advantage: ✓*

- Provides access to viewing from any location / at any time
- Low maintenance cost
- Convenient/saves time

*Any ONE disadvantage: ✓*

- Prone to hacking
- Setup cost is expensive

(2)

**TOTAL SECTION C: 30**

**SECTION D: DATA AND INFORMATION MANAGEMENT**

**QUESTION 4**

4.1 4.1.1 A primary key is a field in a table that uniquely identifies each record in that table. ✓ (1)

4.1.2 Cannot have a null value ✓ (1)

4.1.3 (a) Any ONE design error: ✓✓

Data is duplicated in the Teacher field. (1) If the teacher is replaced the data needs to be corrected everywhere (1)

OR

Table is not normalised (1) the table contains redundant data/Teacher field is linked to register class/Teacher field is dependent on another field that is not part of primary key (1) (2)

(b) Create a separate table ✓ and move the RegisterClass and Teacher fields to that table. ✓ Use the RegisterClass field as the foreign key in the tblLearners table ✓ and the primary key in the new table. ✓

**tblLearners**

ID (PK)
FirstName
Surname
Age
Gender
RegisterClass (FK)

**tblRegisterClass – new table**

RegisterClass (PK)
Teacher

(4)

4.2 The process of validation is ensuring that data is entered ✓ is acceptable (correct format/data type/range/presence/check digit) ✓

Verification is the only way of ensuring the correctness of data, ✓ by checking it against source of data/provided data. ✓ (4)

4.3 4.3.1 SQL/Structured query language code. ✓ (1)

4.3.2 A business with many branches and a lot of personnel would use a server-based DBMS. ✓

A server-based database will allow many users to use the database at once ✓, from many different locations. ✓

**Concepts:**

- Many users
- Simultaneous use of database
- Access from different locations (3)

- 4.4 4.4.1 The creation of an audit trail enhances data security in the school database by allowing administrators to track changes made to the database ✓, and identify who made the changes and when they were made ✓. (2)
- 4.4.2 *Any ONE different method ✓ with explanation enhancing the security of the school database: ✓*
- Access controls: Setting permissions and access levels for users, administrators can ensure that only authorized personnel can access, modify, and delete data.
  - Encryption: By encrypting sensitive data such as learner records, the school can prevent unauthorized access to this information.
  - Regular backups: Regular backups are essential for protecting data from loss due to hardware failure, data corruption, or other disasters.
  - Firewall: Using a firewall to monitor all incoming and outgoing transmissions/traffic and block unwanted communication/requests. (2)

**TOTAL SECTION D: 20**

**SECTION E: SOLUTION DEVELOPMENT****QUESTION 5**

5.1 5.1.1 (a) *Any ONE indicating initialising:* ✓  
 • Line 1  
 • Line 4 (1)

(b) *Any ONE indicating looping:* ✓  
 • Line 2  
 • Line 5 (1)

5.1.2 15 ✓ (1)

5.1.3 \*\*\*\*\* ✓  
 Only one line ✓ (2)

5.1.4 iCol := 1; ✓  
 while iCol <= 5 ✓  
 begin  
 inc(iCol); ✓  
 sLine := sLine + '\*';  
 inc(iCounter);  
 end;

OR

iCol := 0; (1)  
 repeat  
 inc(iCol); (1)  
 sLine := sLine + '\*';  
 inc(iCounter);

until iCol = 5 (1)

Concepts:

- Initialise counter (1)
- Conditional loop with correct condition (1)
- Increment column position (1) (3)

5.2

name	counter	Is counter <= 5?	Is arrNames [counter] = name?	Display
Lebo				
	0			
		True		
	1			
			False	
		True		
	2			
			False	
		True		
	3			
			True	
				Found
	✓	✓	✓	✓

**Concepts:**

- Correct **counter** column (1)
- Correct **Is counter < 5** column (1)
- Correct **Is arrNames [counter] = name** column (1)
- Correct **Display** - Found (1)

(4)

5.3

Input sWord (Given)

Loop ✓ K from length of sWord downto 1 ✓  
 sOutput ← sOutput ✓ + sWord[K] ✓

OR

Input sWord (Given)

Loop (1) K from 1 to length of sWord (1)  
 sOutput ← sWord[K] (1) + sOutput (1)

**Concepts:**

- Loop (1) for length (1)
- Concatenate string (1)
- Position according to loop (1)

(4)

5.4

TStudentCard	
- fStudentNumber : String	
- fName : String	
- fSurname : String	
- fStudyYear : integer	
+ <<constructor>> Create (sStudentNumber, sName, sSurname : String; iStudyYear : integer)	
+ setStudyYear (iStudyYear : integer)	

**Concepts:**

- Indicate private attributes ✓
- Indicate public methods ✓
- All private attributes declared correctly ✓
- Constructor method declared correctly ✓  
with correct parameters ✓
- Mutator method declared correctly ✓

(6)

**TOTAL SECTION E: 22**

**SECTION F: INTEGRATED SCENARIO****QUESTION 6**

- 6.1 6.1.1 A QR code is a way of representing text as an image ✓ that can be captured using a digital camera. ✓ (2)
- 6.1.2 *Any ONE way information is automatically entered: ✓*
- Autocomplete done by the browser
  - A cookie from previous visits to site
  - Device/App feature from registered/stored information (1)
- 6.2 6.2.1 (a) Multiprocessing is the simultaneous execution of multiple tasks or processes ✓ by a computer's OS utilising more than one processor or processing core. ✓ (2)
- (b) The process of ensuring that each process gets enough CPU time ✓ and access to memory, storage and other hardware to be able to work without interference by other processes. ✓
- Concepts:**
- Processing time
  - Memory allocation (2)
- 6.2.2 When a website is visited for the first time, the browser downloads all the necessary content from the server to cache. ✓
- When the user visits the website again, the browser loads the content from cache. ✓ (2)
- 6.2.3 *Any FOUR of the following critique on streaming: ✓✓✓✓*
- Requires high bandwidth internet connection for streaming
  - Downloading can be done on lower bandwidth connections
  - Wastage of data due to repeated downloading when streaming
  - Downloading provides a copy that can be viewed at any time
- ALSO ACCEPT other relevant and correct answers. (4)
- 6.3 6.3.1 *Any TWO features of a Web 1.0 website: ✓✓*
- Static pages that do not change frequently
  - Simple design with limited graphics and multimedia content
  - User is a content consumer and not a content creator
  - Hyperlinks to other webpages for further information
  - Basic HTML and CSS code used for webpage creation
  - No interactive or collaborative features, such as user comments or social media integration (2)

6.3.2 *Any TWO reasons why websites have evolved from Web 1.0 to Web 2.0: ✓✓*

- Users had the opportunity to contribute content
- User prefer to interact with content on webpages rather than just consuming static content
- Technology has evolved to allow social networking via webpages
- Higher bandwidth
- Internet availability

(2)

6.4 6.4.1 *Any TWO of the following: ✓✓*

- Because of the different formats used to enter the same information/data not standardized.
- It will be difficult to group/compare/analyse/sort records with different formats.
- Difficult to extract core information that can lead to errors

**Concepts:**

- Different formats can lead to (1)
- Incorrect capturing of data

OR

Difficulty in extracting/interpreting the data (1)

(2)

6.4.2 *Any TWO of the following: ✓✓*

- Selection components
  - List box
  - Combo box
  - Radio group
  - Spin edit
- Providing examples of required format
- Input mask

(2)

6.4.3 (a) Information ✓

(1)

(b) Knowledge ✓

(1)



- 6.5 6.5.1 *Any ONE* suitable option for using a distributed database: ✓
- More stable (reduces redundancy)
  - Increased performance levels/less traffic on network/less traffic on server/less data transfer
  - Can accommodate many users
- (1)
- 6.5.2 The information is scrambled using a mathematical formula. ✓
- The information can only be deciphered back into a readable format using a key or password. ✓
- (2)
- 6.5.3 Partitioning ✓ each server only stores the part of the data it works with ✓  
OR  
Duplication (1) every server holds all the data (1)
- (2)
- 6.6 6.6.1 *Any TWO examples of valid digital technologies:* ✓✓
- Email
  - Social media
  - Blogs
  - Online newspapers
  - Instant messaging
- (2)
- 6.6.2 *Any ONE example of a policy document:* ✓
- Acceptable Usage Policy (AUP)
  - Privacy Policy
  - POPIA
- (1)
- 6.7 *Any TWO potential risks of using ChatGPT:* ✓✓
- People rely on the information generated without any fact-checking.
  - Copyright issues/Plagiarism
  - Over reliance on the technology.
  - Replacing human skills/removing motivation to learn skills.
  - Limited accountability.
- (2)

**TOTAL SECTION F: 33**  
**GRAND TOTAL: 150**