



# basic education

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

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**INFORMATION TECHNOLOGY P2**

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**MARKING GUIDELINES**

**MARKS: 150**

**These marking guidelines consist of 13 pages.**

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

|     |       |                                   |     |
|-----|-------|-----------------------------------|-----|
| 1.1 | 1.1.1 | D ✓                               | (1) |
|     | 1.1.2 | B ✓                               | (1) |
|     | 1.1.3 | D ✓                               | (1) |
|     | 1.1.4 | A ✓                               | (2) |
|     | 1.1.5 | B ✓                               | (2) |
| 1.2 | 1.2.1 | CMOS ✓                            | (1) |
|     | 1.2.2 | Biometrics/Fingerprint-scanning ✓ | (1) |
|     | 1.2.3 | Digital signature ✓               | (1) |
|     | 1.2.4 | Utility software ✓                | (1) |
|     | 1.2.5 | Constructor ✓                     | (1) |
|     | 1.2.6 | Normalisation ✓                   | (1) |
|     | 1.2.7 | Trace table ✓                     | (1) |
|     | 1.2.8 | Lossy compression ✓               | (1) |

**TOTAL SECTION A: 15**

**SECTION B: SYSTEM TECHNOLOGIES****QUESTION 2**

- 2.1      *Any TWO ✓✓*
- Touch screens make selecting options quick and easy
  - Portable/small in size – could walk around to the tables and take orders/easy to fit into hand
  - Can link to system using Wi-Fi
- (2)
- 2.2      2.2.1      *Any TWO ✓✓*
- CPU
  - Hard drive
  - Memory/RAM
- (2)
- 2.2.2      *Any TWO ✓✓*
- Deletes the temporary internet files
  - Empties the recycle bin
  - Deletes any other temporary files
  - Deletes downloaded files
  - Debug dump files
  - Delete setup log files
  - Delete system error memory dump files
- (2)
- 2.3      2.3.1      *Any TWO ✓✓*
- Cache faster than RAM
  - Cache smaller capacity than RAM
  - Cache stores recently used instructions while RAM stores the whole program
  - Cache found on CPU and RAM on motherboard
- (2)
- 2.3.2      Software ✓ that converts the basic instructions of the operating system to messages that can be interpreted by the hardware component. ✓  
**OR**  
Software that allows the OS to communicate with and control the hardware
- (2)
- 2.3.3      To prevent illegal copies of software from being used ✓
- (1)

- 2.3.4 (a) *Any ONE advantage of installing updates: ✓*
- Always have latest functions/features
  - Bugs and problems are resolved
  - Security loopholes are fixed
- (1)
- 2.3.4 (b) *Any ONE disadvantage of installing updates automatically: ✓*
- Unexpected/unplanned use of data
  - A hastily released update may cause more problems than it fixes.
  - Slows system down (due to background processes)
  - Unwanted restart
- (1)
- 2.3.5 (a) When RAM fills up/is full ✓ (1)
- 2.3.5 (b)
- Uses dedicated area on HDD ✓
  - Moves unused data to HDD where it will easily be accessible again ✓
- (2)
- 2.4 2.4.1 *Any ONE: ✓*
- Physical damage
  - Power surge
- Also accept examples of physical damage such as dropping a PC can cause a hard drive head crash while transporting/Spilling water on motherboard or HDD with PC case open
- (1)
- 2.4.2 UPS ✓ (1)
- 2.4.3 *Backup:*  
A duplicate copy of a file ✓ is created for use when the original copy is damaged or lost ✓  
*Archiving:*  
Less frequently used files can be compressed and stored where they can be retrieved ✓ when necessary (3)
- 2.4.4 Monitors communication with computer/system and the internet/other networks ✓ and blocks unauthorised communication by software/malware ✓ (2)

**TOTAL SECTION B: 23**

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

3.1 Any TWO advantages ✓✓

- Fast and efficient communication
- Centralisation of data/data always up to date
- Transfer of files between devices
- Leisure/LAN computing games/Watching movies
- Increased control and security

(2)

3.2 3.2.1 An NIC is used to encode or 'convert' the data so that the data can be transmitted over a specific medium and it decodes the data that is received.

**Concepts:**

Decode/Encode✓

Making communication between devices possible over a network ✓

(2)

3.2.2 Radio waves ✓

(1)

3.3 3.3.1 Fibre Optic cables ✓

(1)

3.3.2 Any TWO ✓✓

- Provide sufficient/multiple access points
- Interference by structures should be limited by strategically placing access points/line of sight
- Use a repeater to increase signal strength
- Limit the noise by making use of different frequencies

(2)

3.3.3 Any TWO: ✓✓

- Provides higher bandwidth
- Better security
- Greater range

(2)

3.4 3.4.1 The Semantic Web refers to a web where the content has been optimised for computers and devices to be able to navigate and filter it intelligently✓ without human intervention or involvement✓.

(2)

3.4.2 To supply additional data on which specific searches are done. ✓

Accept any explanation that metadata is used to improve results on specific searches.

(1)

- 3.5 3.5.1 POP3 ✓ (1)
- 3.5.2 Notification – user is notified by a sound or message that a new e-mail has arrived ✓  
Push Technology – The user is notified and the e-mail is automatically downloaded to the device ✓ (2)
- 3.5.3 File sharing allows large files to be uploaded to online storage ✓ and a link can be inserted in the e-mail ✓/the online storage is shared with the receiver.
- Concepts:
- File stored/uploaded to cloud storage
  - Link provided/storage shared (2)
- 3.5.4 (a) Phishing is a technique to obtain sensitive/personal information from a user ✓ by using an e-mail/electronic communication that appears to be from a legitimate institution ✓ in order to trick the user into providing information. (2)
- 3.5.4 (b) Any ONE example: ✓
- Request to confirm bank details
  - Request to provide pin number for bank cards
  - Request to confirm user name and provide password (1)
- TOTAL SECTION C: 21**

**SECTION D: DATA AND INFORMATION MANAGEMENT**

**QUESTION 4**

4.1 Any ONE ✓

- When a transaction takes place, the database is updated to increase or reduce the stock items/items available/Relevant data obtained at POS is stored for the restaurant
  - Customers details are updated as they pay for meals
  - Accounting information is updated as customers pay
  - Obtain item information and prices from the database
- (1)

4.2 4.2.1(a) Any ONE ✓

- String
  - Text
- (1)

4.2.1(b) Any ONE ✓

- Boolean
  - YesNo
- (1)

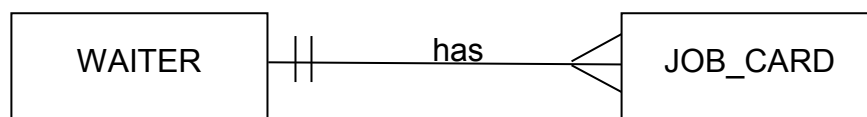
4.2.2 The waiter's initial and surname are captured in one field/Initials captured as the first section of the initial and surname field. ✓ (1)

4.2.3

|    | Field Name        |   |
|----|-------------------|---|
| PK | JobCardNr         | ✓ |
|    | NormalHoursWorked |   |
|    | WeekStartDate     | ✓ |
|    | HoursOvertime     | ✓ |
| FK | WaiterID          | ✓ |

- ✓ FK correctly identified
  - ✓ TotalHours is NOT included
- (6)

4.2.4 One Waiter has many Job cards



- Mark allocation
- ✓ One to many diagram
  - ✓ Word that describes the relationship between tables: has/uses/creates
  - ✓ Placing entities in correct order
- (3)

- 4.3      4.3.1      *Any ONE* ✓
- Power failure
  - Natural disasters
  - Mechanical failure of hardware
  - Theft of devices
  - Human error
- (1)
- 4.3.2      *Any TWO:* ✓✓
- Data validation/validation rules
  - Each record has a unique primary key
  - Normalisation rules applied
  - Ensuring referential integrity/Foreign key must refer to an existing record in the other table
  - Verification of data
- (2)
- 4.4      *Any THREE:* ✓✓✓
- Design the database
  - Security of the database
  - Backup and restoration plans and policies
  - Monitoring the performance of the database.
- (3)
- 4.5      *Server DBMS:*  
Managing simultaneous multiple connections to the database to execute the transactions/It will allow a large number of users to connect simultaneously to a database
- Concepts:
- Multiple connections/users✓
  - Simultaneous access✓
- (2)
- 4.6      4.6.1      *Any ONE:* ✓
- Data is transmitted across networks
  - Multiple servers are used/Many systems are used
  - Create security exposure on multiple fronts
- (1)
- 4.6.2      *Any ONE:* ✓
- Faster performance /less congestion
  - Less downtime
  - If connection is interrupted, database is not damaged/ corrupted
- (1)
- 4.6.3      *Partitioning:*  
Each site manages its own part of the database ✓ and uploads data to a central database in a scheduled batch process. ✓
- (2)

**TOTAL SECTION D:      25**



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

- 5.1 5.1.1 *Any TWO guidelines: ✓✓*
- Commenting of code
  - Descriptive variable names
  - Modularity
  - Indentation
- (2)
- 5.1.2 An algorithm is a solution to a problem ✓ which contains a set of steps ✓
- (2)
- 5.1.3 Debugging is the process of finding ✓ and resolving ✓ defects or problems within the program that prevent a correct solution from being executed.
- (a)
- (2)
- 5.1.3 A runtime error is an error that causes termination or break in the running of a program. ✓
- (b)(i)
- (1)
- 5.1.3 *Any ONE example of runtime error: ✓*
- (b) (ii)
- Division by 0
  - Data type mismatch/typing in a word instead of a number
  - Reference to an index in an array that is not part of the declaration
  - Attempting to access a resource that is not available.
- Also accept other valid examples.
- (1)
- 5.1.4
- | <b>WHILE...DO</b>  | <b>REPEAT...UNTIL</b>                            |   |
|--|--|---|
| Executed while condition is true                                     | Executed until condition is true                 | ✓ |
| The statements may not be executed at all depending on the condition | Executed at least once irrespective of condition | ✓ |
- (2)
- 5.1.5 Statement 1: variable X := 5 mod 2;  
Integer ✓
- Statement 2: variable Y := 5 mod 2 = 0;  
Boolean ✓
- (2)
- 5.2 5.2.1 Creates a link between the external file ✓ on storage and file processing variable ✓ in the program
- (2)
- 5.2.2 Rewrite statement will delete ✓ the current contents ✓ of the text file.
- (2)

- 5.2.3 Any ONE reason for I/O Error: ✓
- The file was not closed in during a previous procedure/The file buffer was not cleared
  - The file was not correctly assigned
  - Append or rewrite was not used to open the file/Reset was used to open the file
  - Writeln-statement does not refer to the text file (example: writeln(sline))
  - The executable file is not in the same directory/folder as the text file
- (1)

5.3 5.3.1

| PIN | x      | c  | Is x < 1? | Is c <>5 ? | Display        |
|-----|--------|----|-----------|------------|----------------|
| 623 | 623    | 0  |           |            |                |
|     | 62.3✓  |    |           |            |                |
|     |        | 1✓ |           |            |                |
|     |        |    | False✓    |            |                |
|     | 6.23✓  |    |           |            |                |
|     |        | 2✓ |           |            |                |
|     |        |    | False✓    |            |                |
|     | 0.623✓ |    |           |            |                |
|     |        | 3✓ |           |            |                |
|     |        |    | True✓     |            |                |
|     |        |    |           | True✓      |                |
|     |        |    |           |            | Error in PIN✓✓ |

(12/2 = 6)

- 5.3.2 Any ONE of: ✓
- c = 5
  - The user must enter a pin number which contains 5 digits.
- (1)

5.4

| Line | Algorithm_Display_Pattern        |
|------|----------------------------------|
| 1    | Input number                     |
| 2    | Loop counter ← 1 to number       |
| 3    | output ← " ✓                     |
| 4    | Loop counter2 ✓ ← 1 to counter ✓ |
| 5    | output ← output + counter2 ✓     |
| 6    | Display output✓                  |
|      | EndLoop counter2                 |
| 8    | EndLoop counter                  |

Concepts:

- 1 mark – Clear output variable in correct position
  - 1 mark – Inner loop correct position
  - 1 mark – Inner loop (counter2) from 1 to outer loop counter
  - 1 mark – Add inner loop counter to output string
  - 1 mark – Display output string outside inner loop, inside outer loop
- (5)

**TOTAL SECTION E: 29**

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

- 6.1 6.1.1 Public area ✓ where Wi-Fi internet access is available ✓ (2)
- 6.1.2 Un-encrypted data/files that are sent can be intercepted ✓  
Or any other acceptable explanation of personal information being exposed. (1)
- 6.1.3(a) A peer-to-peer protocol ✓ for downloading files from the internet (1)
- 6.1.3(b) *Any TWO reasons to block BitTorrent* ✓✓
- Security issues/to prevent piracy of software
  - Data use/Data cap
  - Congestion/Slow down performance of network (2)
- 6.2 6.2.1 Virtual Private Network ✓ (1)
- 6.2.2 Allows users to log into a network via the internet ✓ with the same security of a LAN. ✓ (2)
- 6.3 6.3.1 (a) Dynamic page ✓  
Any ONE motivation: ✓
- Additional parameters are included that provide information to the software on the server in order to generate a dynamic page.
  - ASP (Active Server Pages) are dynamic in nature. (2)
- 6.3.1 (b)
- M prefix ✓
  - Ends with .mobi ✓ (2)
- 6.3.2 (a) *Any TWO to use less power* ✓✓
- Turn off devices when not in use
  - Change screen settings to dim
  - Use automatic app that puts apps to sleep/Power management
  - Close unnecessary apps
  - Turn off Wi-Fi when not in use
  - Turn off Bluetooth/GPS when not in use (2)
- 6.3.2 (b) *Any ONE way to reduce impact on environment* ✓
- Send old equipment to e-cycler/for recycling
  - Donate useful equipment to others
  - Re-use parts, that is still usable, in other computers (1)

- 6.3.3 SEO/Search engine optimisation ✓ (1)
- 6.4 6.4.1 *DDoS:*
- Many bot computers are used to bombard the servers hosting the restaurants website with a large number of requests ✓, the servers are over loaded and cannot respond so the website becomes unavailable ✓ (2)
- 6.4.2 *Any TWO examples ✓✓*
- Install and update anti-virus software
  - Use a firewall
  - Use a good password policy
  - Make sure software is updated regularly
  - Be aware of trends in cybercrime/Training of staff to be vigilant
  - Not answering to phishing mail (2)
- 6.5 6.5.1 Software is installed on the device✓, but the app relies on data stored in the cloud. ✓ (2)
- 6.5.2 *Any TWO of: ✓✓*
- Interface is easier to navigate
  - Has a dedicated purpose
  - Apps knows where to find data/do not have to enter URL's
  - All the interface data already installed on your device/speeds up responsiveness
  - Can fetch data in the background/give notifications
  - Can work with syncing device/online storage
  - Can use additional sensors like GPS (2)
- 6.5.3(a) GPS ✓ (1)
- 6.5.3(b) *Any TWO of: ✓✓*
- Users will know if friends visit restaurant and can join them
  - Profiling of customers
  - Advertising specific deals
  - When some-one is near restaurant invite them
  - Easily reached for online orders (2)

|                         |       |  |            |
|-------------------------|-------|--|------------|
| 6.6                     | 6.6.1 | The purpose of a data warehouse is to provide storage for large amounts of data ✓ and tools to access the data ✓ for data mining purposes.   | (2)        |
|                         | 6.6.2 | Any TWO ✓✓ <ul style="list-style-type: none"> <li>• Select and prepare data sets</li> <li>• Develop data mining software and algorithms</li> <li>• Interpret and verify data mining results</li> </ul>   | (2)        |
|                         | 6.6.3 | To identify hidden trends which can be used to make management decisions like purchasing of stock.<br><br>Concepts: <ul style="list-style-type: none"> <li>• Identifying trends ✓</li> <li>• Using information in a practical way ✓</li> </ul> | (2)        |
| 6.7                     | 6.7.1 | Any TWO ✓✓ <ul style="list-style-type: none"> <li>• Is not install on system/saves hard disk space</li> <li>• Always the latest version available</li> <li>• Run in the browser</li> <li>• Can be used on any device</li> </ul>                | (2)        |
|                         | 6.7.2 | Do not need internet access ✓ to use the software.   | (1)        |
| <b>TOTAL SECTION F:</b> |       |  | <b>37</b>  |
| <b>GRAND TOTAL:</b>     |       |  | <b>150</b> |