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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**INFORMATION TECHNOLOGY P2**

**NOVEMBER 2014**

**MEMORANDUM**

**MARKS: 150**

**This memorandum consists of 17 pages.**

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

|      |          |     |
|------|----------|-----|
| 1.1  | B ✓      | (1) |
| 1.2  | A ✓      | (1) |
| 1.3  | C ✓      | (1) |
| 1.4  | A ✓      | (1) |
| 1.5  | A ✓      | (1) |
| 1.6  | C ✓      | (1) |
| 1.7  | B ✓      | (1) |
| 1.8  | C ✓      | (1) |
| 1.9  | B ✓      | (1) |
| 1.10 | C or D ✓ | (1) |

**TOTAL SECTION A: 10**

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

- 2.1.1 Temporarily storing data and instructions ✓ to be processed before the CPU needs to work with this data. ✓  
Concepts:  
Storage  
Processing/working with (2)
- 2.1.2 Any TWO of: ✓✓  
• The amount of memory that can be used by the specific operating system used in the laboratory may not be able to use the upgraded amount of memory.  
• The RAM slots on the motherboard may be full/No space on the motherboard.  
• New RAM may not be compatible with the motherboard/Not the correct type/Not manufactured anymore. (2)
- 2.2.1 Any ONE of: ✓  
• Non-volatile  
• Fast memory to load the firmware  
• Prevents accidental changing of firmware (1)
- 2.2.2 Any TWO of: ✓✓  
• Resolve bugs in the operating firmware  
• Add features for the device  
• Improve the performance of the operating system  
• Make provision for newer hardware  
• Make provision for newer software (2)
- 2.2.3 Jail breaking is the process of loading a pirate/cracked/unofficial firmware/operating system ✓ onto the mobile device to add/allow features/functionality not available/allowed ✓ with the original firmware.  
OR  
Stripping a mobile device of certain programmed limitations in order to do things like buy, install and run third party applications that have not been approved or even change the device's processing speed.  
Concepts  
Software cracking/changing/replacing  
Add features previously not possible  
For 1 mark: changing the software/firmware of the device (2)
- 2.3.1  
• Instructions are written in a language that is easier to understand/simpler code. ✓  
• Libraries of pre-written code are supplied so that complex instructions can be written in a few lines of code/fewer program lines needed/easier to program. ✓ (2)

- 2.3.2 Any ONE of: ✓
- Small display area
  - Program must respond quickly/limited CPU or RAM
  - Program must be able to work on different platforms/operating systems/compatible software
  - Should be able to work with limited storage space/use less data
  - Keep power saving in mind
- (1)
- 2.3.3 Any TWO of ✓✓
- Software that is free to use
  - and for which the source code is available
  - to be changed or adapted.
- (2)
- 2.4.1 Recently accessed web pages are stored ✓ locally on the hard drive so that they can be retrieved quicker the next time they are visited. ✓  
Do not accept: pre-emptive
- (2)
- 2.4.2 Any ONE of: ✓✓
- CPU - modern CPUs run at speeds much higher than the motherboard. They need to make extensive use of cache which stores recently used instructions and instructions likely to be used again to improve processing speed.
  - Hard disk cache – RAM is used to speed up access to slower storage devices by storing data that is required in faster RAM instead of accessing the slower storage every time data is required.
- Mark Allocation:  
Type of caching  
Description
- (2)
- 2.5.1 Data is stored on remote servers/service/computer/hard drive  
✓ on the Internet ✓ rather than on a local server or personal computer.  
For 1 mark: Online storage
- (2)
- 2.5.2 Any TWO of: ✓✓
- Access to data is only possible if you have a good internet access.
  - Online threats to security of data.
  - If remote servers fail then there is no backup.
  - Cloud computing services are only available if subscription fees are paid/data costs.
  - When server/service is down, no access to your data
- (2)
- 2.6.1 Any ONE of: ✓
- You can interact with the technology hands free/wearable/ease of use.
  - Interactively provide information on your environment/continuous access to the Internet.
  - Any other acceptable answer
  - Do not accept: synchronisation
- (1)

2.6.2 *Any ONE of: ✓*

- Holographic/projection technology
- Bluetooth
- GPS
- Cellular/3G
- WiFi
- Google Glass

(1)

2.6.3 *Any ONE of: ✓*

- It is illegal to video or audio record people or aspects such as their performance without their consent. ✓
- Distraction in workplace
- Illegal use in tests
- Security issues
- Any other valid example

(1)

**TOTAL SECTION B: 25**

**SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES****QUESTION 3**3.1.1 *Any TWO of ✓✓*

- Fast, efficient communication for staff and learners.
- Centralisation of data.
- Centralised security
- Transfer of files.
- Sharing software.
- Leisure.
- Flexible access.
- Share a common Internet connection/account.

Do not accept : anything to do with hardware

(2)

3.1.2 *Any TWO of ✓✓*

- Easy to troubleshoot problems.
- Traffic is sent directly to receiver/network is more efficient/high speed.
- If there is a cable break, only that device is disconnected from the network.
- Easy to add/remove devices.
- Easy to set up
- Stable network

(2)

3.1.3 *Any TWO of ✓✓*

- Costly
- Needs an expert to install
- Short distances therefore no need for long range cables
- Limited number of users so no need for large bandwidth
- Lack of flexibility/break easily

(2)

3.1.4 To allow wireless devices to connect to the network ✓ /distribution point for network/send and receive signals.

Do not accept: Hotspot

(1)

3.2 VoIP – Transfer video and voice ✓ for real time communication. ✓

Concepts:

Understanding VoIP

Practical reason for using it in the learning environment.

OR

2 examples of using VoIP

For 1 mark: Expansion of the acronym

Do not accept: Interactivity

(2)

- 3.3.1 *Any TWO of: ✓✓*
- Permanent connection.
  - High speed Internet access.
  - Cost effective
  - Scalable
- (2)
- 3.3.2 *Any ONE of ✓*
- WiMAX/iBurst
  - Leased line
  - Cellular connection (3G/LTE/4G)
  - Satellite
- Don't accept: Wifi
- (1)
- 3.3.3 *Any TWO of: ✓✓*
- Restriction on log in times/time frame to log in.
  - Passwords/required to log in.
  - Anti spyware/malware/anti-virus.
  - Training of personnel.
  - Physical limitations e.g. unplugging connection.
  - Limiting specific IP addresses.
  - Limit the sites that can be visited.
  - Any other valid reason.
- (2)
- 3.4.1 *Push* technology is when the server notifies the device ✓ that a new message has arrived and then downloads it to the mobile device. ✓
- Concepts:  
Automated download  
FOR 1 mark: Notification only
- (2)
- 3.4.2 *Any TWO of: ✓✓*
- To reduce data usage as mobile data is expensive.
  - Small storage area.
  - Application may not be installed to open/read the attachment/cannot handle format of document.
- (2)
- 3.5 A podcast is an audio/video/media file ✓ that is made available for download/store on your device ✓ from the Internet.
- (2)
- 3.6.1 *Any ONE of: ✓*
- GPS receives signals from GPS satellite orbiting the earth.
  - A valid example of a device that uses GPS, e.g. Cell phone
  - Any description of the method to determine location.
- (1)
- 3.6.2 *Any TWO of: ✓✓*
- Geo-tagging - recording physical location of the project area.
  - To show where a photo was taken for the project.
  - To give coordinates for learners to find a location.
  - Verification that project was conducted at correct location.
  - Any other correct suggestion.
- (2)



3.7 *Any TWO of: ✓✓*

- Synchronising personal devices.
- Transferring data between devices.
- Connections can be made to other people in close proximity.
- Connect to hardware such as a printer, scanner or Internet modem.

Concepts:

Transfer of data

Practical example

**TOTAL SECTION B:** (2)  
**25**

**SECTION D: DATA AND INFORMATION MANAGEMENT**

- 4.1.1
- Data refers to raw, unprocessed facts. ✓
  - Information is the result of the processing of data and should be useful and meaningful. ✓
- OR
- Any suitable explanation (2)
- 4.1.2 *Describe or Name any THREE of: ✓✓✓*
- Currency/Up to date – This relates to how recent or up to date the data is e.g. daily capturing of sales data.
  - Relevance/useful – This relates to how closely the data matches your needs e.g. need to know when to purchase/how much stock to purchase.
  - Completeness – This refers to how comprehensive the data is e.g. product name and number of items sold must be entered in order to update database.
  - Accurate/correct data.
  - Valid data.
  - Unnecessary information is not included. *Any correct example in each case*
- Do not accept: Normalised data (3)
- 4.2.1 *Any TWO of: ✓✓*
- Manage and maintain databases.
  - Control the allocation and supervision of users of the databases.
  - Allocate user access rights – such as username and passwords.
  - Perform routine maintenance of the database.
  - Making backups.
  - Ensuring security of database.
- Do not accept: design of database (2)
- 4.2.2 The user types in SQL code instead of data ✓ which causes the database to do things the program does not expect it to do. ✓ (2)
- 4.3.1 The database contains two tables/more than one table that have a relationship that is formed ✓ via link between a primary key (SupplierID in SuppliersTb) and a foreign key (SupplierID in OrdersTb).  
OR  
Indication that implies that the tables are linked together. (1)
- 4.3.2(a) `SELECT * FROM OrdersTb ORDER BY QuantityOrdered DESC`
- Correct selection and table: `SELECT * from OrdersTb` ✓
  - Sorting: `ORDER BY` ✓
  - Correct field in descending order: `QuantityOrdered DESC` ✓
- Penalise for order of instructions in this question only (3)

- 4.3.2(b) `SELECT ItemName, UnitPrice, QuantityOrdered, (UnitPrice * QuantityOrdered) AS [Total Cost] FROM OrdersTb`
- Correct fields: ItemName, UnitPrice, QuantityOrdered ✓
  - Calculation: (UnitPrice \* QuantityOrdered) ✓
  - New field name: AS [Total Cost] ✓
  - Do not penalise if incorrect brackets were used. (3)
- 4.3.2(c) • `UPDATE OrdersTb SET UnitPrice = (UnitPrice * 0.05) + UnitPrice`
- Correct instruction and table: UPDATE OrdersTb ✓
  - Correct field to change: SET UnitPrice ✓
  - Correct calculation: = (UnitPrice \* 0.05) + UnitPrice ✓ **OR** UnitPrice \* 1.05 (3)
- 4.3.2(d) `DELETE FROM OrdersTb WHERE DateOrdered < '#01/01/2013#'`
- Correct instruction and table: DELETE FROM OrdersTb ✓
  - Correct condition: WHERE DateOrdered < #01/01/2013# ✓ (2)
- 4.3.2(e) `SELECT Name, ContactNumber, ItemName FROM SuppliersTb, OrdersTb WHERE (YEAR (DeliveryDate) = 2015) AND (SuppliersTb.SupplierID = OrdersTb.SupplierID)`
- Correct tables: SuppliersTb, OrdersTb ✓
  - Correct function: YEAR ✓ (DeliveryDate) = 2015 ✓
- Join tables: SuppliersTb.SupplierID = OrdersTb.SupplierID ✓ (4)
- OR**
- `SELECT Name, ContactNumber, ItemName FROM SuppliersTb INNER JOIN OrdersTb ON SuppliersTb.SupplierID = OrdersTb.SupplierID WHERE YEAR (DeliveryDate) = 2015`
- OR**
- DeliveryDate >= #01/01/2015# and deliveryDate < #01/01/2016#
- OR**
- Use between
- Like "%2015%"

**TOTAL SECTION D: 25**

**SECTION E: SOLUTION DEVELOPMENT****QUESTION 5**5.1.1 Any *THREE* of: ✓✓✓

- There is no heading on the form.
- The button caption does not indicate the function of the button.
- Button is not well positioned/Poor logical flow.
- The label instruction (Name) does not indicate full name or first name or surname only.
- Text fields are too large.
- Text fields do not prompt the user for information so the user is not sure what to enter.
- The label instruction (Complete the form) is unclear.
- Removing the default text.
- Any other practical suggestion.

(3)

- 5.1.2
- Button – On Click button event/mouse event/key event
  - Text Field/Edit Box – Focus on field/On click/On enter/mouse event/key event

OR

Any other valid example.

Concepts:

Component ✓

Event ✓

(2)

5.2 Marks are allocated for:

- Correct order of statements (inside and outside loop) ✓
- Check the first character is alphabetical ✓
- Loop from 2 - 4 and check last 3 characters are digits ✓

(3)

Possible solution:

```
Valid ← True

If Code Size = 4 then
    If First Code character is not letter then
        Valid ← False
    For Index ← 2 to 4
        If Character at index is not digit then
            Valid ← False
Else
    Valid ← False
```

5.3.1 Encapsulation is the concept of hiding the detail of an object. ✓ (1)

5.3.2

| <b>Learner</b>                          |
|---|
| - <b>Name</b> : <b>String</b>           |
| - <b>Age</b> : <b>Integer</b>           |
| + <b>Learner()</b> / <b>Constructor</b> |
| + <b>SetName(Name : String)</b>         |

Mark allocation:

- Attributes with appropriate data types Name – String✓, Age – Integer ✓  
Constructor without parameters ✓  
Check in Java that constructor name is same as class, in Delphi will use constructor create
- SetName with correct parameter and data type ✓
- Correct visibility/public and private/accessibility of attributes and methods ✓

Accept programming code

(5)

5.4

| <b>Number</b> | <b>Count</b> | <b>NumFactors</b> | <b>Count &lt;= Number ?</b> | <b>Number Modulus Count = 0 ?</b> | <b>Display</b> |
|---------------|--------------|-------------------|-----------------------------|-----------------------------------|----------------|
| 4             | 1            | 0                 |                             |                                   |                |
|               |              | 1                 |                             |                                   |                |
|               |              | 1                 | Yes                         |                                   |                |
|               |              | 1                 |                             | Yes                               |                |
|               | 2            |                   |                             |                                   |                |
|               |              | 2                 | Yes                         |                                   |                |
|               |              | 2                 |                             | Yes                               |                |
|               | 3            |                   |                             |                                   |                |
|               |              | 2                 | Yes                         |                                   |                |
|               |              | 2                 |                             | No                                |                |
|               | 4            |                   |                             |                                   |                |
|               |              | 3                 | Yes                         |                                   |                |
|               |              | 3                 |                             | Yes                               |                |
|               | 5            |                   |                             |                                   |                |
|               |              |                   | No                          |                                   |                |
|               |              |                   |                             |                                   | 3              |

- Count column increments from 1 to 5 ✓
- Correct values in NumFactors – starting at 1✓ up to 3 ✓
- Correct values in Count <= Number ✓
- Correct values in Number modulus Count = 0 ✓
- Displaying last value of NumFactors at the end ✓

(6)

**NOTE:** If a mistake is made in a column but the logic continues to be correct then allocate the marks for the other columns.  
2 marks: if only last row written down

## 5.5 Mark allocation:

- Outer loop with correct range ✓
- Inner loop with correct range ✓
- If statement comparing values in array ✓
- Perform swap of values ✓✓

(5)

Possible solutions where loops begin at 1 for array index.

**NOTE:** Loops may also begin at zero (0) for the array index.

Possible solution 1 – bubble sort

```
arrMarks ← (67,65,78,83,67,72,65)

For LoopCount1 ← 1 to arrMarks (size - 1)/6/7
  For LoopCount2 ← 1 to arrMarks size-LoopCount1/(size-1)/6
    If arrMarks[LoopCount2] < arrMarks[LoopCount2 + 1] then
      Swap { Temp ← arrMarks[LoopCount2]
            { arrMarks[LoopCount2] ← arrMarks[LoopCount2 + 1]
            { arrMarks[LoopCount2 + 1] ← Temp
```

Possible solution 2 (alternate solution) – selection sort

```
arrMarks ← (67,65,78,83,67,72,65)

For LoopCount1 ← 1 to arrMarks (size - 1)/(6/7)
  For LoopCount2 ← LoopCount1 + 1 to arrMarks size
    If arrMarks[LoopCount1] < arrMarks[LoopCount2] then
      Swap { Temp ← arrMarks[LoopCount1]
            { arrMarks[LoopCount1] ← arrMarks[LoopCount2]
            { arrMarks[LoopCount2] ← Temp
```

**TOTAL SECTION E: 25**

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

- 6.1.1 *ANY TWO of:* ✓✓
- Faster performance
  - Security more sophisticated
  - Administration is easier
  - Improved control of users and user access to resources
  - Many users
- (2)
- 6.1.2 *ANY TWO of:* ✓✓
- Higher performance RAM/primary memory/larger RAM
  - Higher performance CPU/faster than desktop CPU
  - Higher performance/high speed hard drives/storage/secondary memory
  - Larger HDD
  - Additional/Redundant power supply
- (2)
- 6.1.3(a) *ANY ONE of:* ✓
- Virtual Box
  - Parallels
  - VM Ware
  - Microsoft Hyper-V
  - Any other valid example
  - Do not accept remote desktop.
- (1)
- 6.1.3(b) The physical server runs a host operating system which is independent of the virtual servers that are hosted. ✓ The virtual servers run guest operating systems which are run on top of the current host operating system. ✓
- Concepts:  
Base software  
Host software
- (2)
- 6.2.1
- Automatically ✓ updates feeds so no reason to visit each site for new news
  - Notifications of changes to content ✓ are passed to user.
- OR
- Saves time as it efficiently scans lots of sites/scans headlines of many articles.
  - Prevents clutter by only showing latest important items.
  - Allows the user to use whichever application they would like to view the content/Read feeds from within the browser/Do not have to switch programs.
- Concepts:  
Automatic process  
only shows changed content
- (2)
- 6.2.2 *Lossy compression* compresses data by losing some of its quality/poor resolution. ✓
- (1)

- 6.2.3 *ANY TWO of: ✓✓*
- The mobile version allows the page to automatically resize to fit the screen/different layout.
  - The mobile version will make use of smaller images and files/less data.
  - The mobile version is a light weight version of the full website.
  - Different flash player. (2)
- 6.2.4
- Establishes user needs/profile ✓
  - Provides content personalised for specific users/interactive ✓
- Or
- Accept for 1 mark each
- Semantic web that can interpret information like humans.
  - Defined by its mobile capabilities.
  - More compatible in terms of hardware and software. (2)
- 6.3.1 *ANY ONE of: ✓*
- Ensure URL begins with https.
  - Lock sign/secure symbol on the browser. (1)
- 6.3.2 Encryption the scrambling text/data ✓ into a format that cannot easily be read by someone else, using a specified set of rules ✓ /algorithm/key/formula. (2)
- 6.3.3 *ANY TWO of: ✓✓*
- Use a reasonable number of characters (at least 8).
  - Use a mixture of alphabetical and numerical characters.
  - Use both uppercase and lowercase characters.
  - Do not use everyday words like pass/cat etc.
  - Include special characters.
  - Do not include personal information. (2)
- 6.4.1 *ANY TWO of: ✓✓*
- Promotes awareness of the school's activities.
  - Allows feedback from the community/provides an interactive platform.
  - Easy and convenient way to communicate with learners and parents.
  - Sharing of media such as photos and videos.
  - Marketing.
  - Any other valid example. (2)
- 6.4.2 Mark allocation
- ✓ public access to information
  - ✓ negative effect
- Learners' information will be publicly available and could be used for cyber-crimes/stalking/bullying.
- OR
- Social engineering techniques could be used to gain access to other confidential information using the learners' information.
- OR
- Any other acceptable example (2)



- 6.4.3 *ANY TWO of: ✓✓*
- Network managers need to monitor what users do on the network.
  - Clear and visible action must be taken if there is a violation of the AUP.
  - Network restrictions need to be put in place to prevent unacceptable use.
  - AUP needs to be actively communicated to learners.
  - Any other valid example.
- (2)
- 6.5.1 *ANY TWO of: ✓✓*
- Learners become responsible for their own learning.
  - Material is self-paced.
  - Immediate feedback.
  - Availability of information.
  - More attractive interesting learning.
  - Affordable.
  - Ease of access.
  - Mobile devices can be used in the learning process
  - Any other valid example.
- (2)
- 6.5.2
- Downloading: the entire file is downloaded before you can start watching. ✓ / One copy is saved and can be reused
  - Streaming: the file is played as it is streamed. ✓/Always need to obtain the file online
- (2)
- 6.5.3 *ANY TWO of: ✓✓*
- A high speed/high bandwidth Internet connection
  - Permanent/dedicated connection
  - Reliable and stable/strong connection
  - Affordable connection
  - Need a symmetrical connection/High upstream bandwidth
- (2)
- 6.6.1 *ANY TWO of: ✓✓*
- Receive and send work electronically.
  - Make use of devices for quizzes/assessments/tests/voting.
  - Create media such as videos and podcasts that can be downloaded to mobile devices.
  - Anytime, anywhere/portable access to content.
  - Use mobile technology as a textbook.
  - Any other acceptable answer.
- (2)
- 6.6.2 *ANY TWO of: ✓✓*
- Set the device to switch the screen off when not in use.
  - Do not run unnecessary apps.
  - Switch off back lighting.
  - Use power saving mode.
  - Turn off connectivity options such as GPS.
  - Turn off WiFi, Bluetooth.
  - Limit the use of music/video/media files
- (2)

- 6.7.1 *ANY TWO of: ✓✓*
- Internet connection
  - Services as Office 365/Google Docs/DropBox make Online collaboration possible Skype/VoIP client/video conferencing
  - VPN/remote connection
- (2)
- 6.7.2 *Any ONE of ✓*
- No socialisation
  - No physical interaction/No face to face contact
  - Sometimes difficult to assist people over the Internet.
  - Free time could be abused/Need to be online or available all the time.
  - Make excuses to stay away from work/Could take time off from work and say he is ill./Integrity issues
- (1)
- 6.8 *ANY TWO of: ✓✓*
- The school will have access to the software for a monthly fee/
  - Do not have to buy the software and pay for upgrades
  - Software is available on any computer or device anytime, anywhere/easy access to software.
  - Newest version of software.
  - Less hardware requirements.
- (2)
- TOTAL SECTION E: 40**  
**GRAND TOTAL: 150**