This memorandum consists of 19 pages.
SECTION A: MULTIPLE-CHOICE QUESTIONS

QUESTION 1

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

TOTAL SECTION A: 10
SECTION B: HARDWARE AND SOFTWARE

QUESTION 2

2.1 2.1.1 (a) Refresh rate is the number of times/speed of how often the screen must be refreshed or redrawn per second

NOTE: Do not accept the word rate/rating

(b) Any THREE valid reasons

• Uses less electricity/LCD more environmentally friendly
• Doesn't flicker/Less eye strain/Lower refresh rate
• Uses less space on desktop
• Lightweight screen
• LCD has better screen resolution/better image quality
• LCD is newer technology than CRT

NOTE:
Do not accept cheaper/faster

2.1.2 (a) (i) Metadata is data about data

Also accept:
Metadata is additional/detailed attributes/properties about data/file

NOTE: Do not accept any example

(ii) Any ONE correct example of metadata

• Model of camera
• Author (photographers name)
• Title/key words/comments/subject/category
• Last saved by/Date last saved/Last printed
• Revision number/Application name/Company
• Date created

Accept any alternative correct example

NOTE: Do not accept basic file properties e.g. size, filename, etc.

(b) Any ONE method

• Reducing the size of the read/write heads/density of tracks
• Change the process of storing data e.g. using vertical/perpendicular recording
• Using file compression
2.1.3 (a) **Any ONE fact ✓**
- It must be of the same size (number of pins) / Must fit into the slots on the motherboard
- The speed of the RAM must be compatible with the motherboard / FSB / System bus

**NOTE:**
Also accept any mention of motherboard compatibility / checking / comparing the specifications of the RAM (1)

(b) (i) **Any ONE of the following descriptions about virtual memory**
The operating system use secondary storage ✓ (hard drive) space as memory ✓ (temporary or simulated or additional RAM).

**OR**
Space on the hard disk that can be used to act as memory. (2)

(ii) **Any ONE fact why virtual memory isn't the solution ✓**
- Virtual memory is slow / using hard disk space as memory slows down the performance
- Thrashing may occur
- To be effective the need for a large amount of secondary storage (hard disk space) arises (1)

(c) • RAM and cache are different ✓ types of memory (DRAM and SRAM).
• Cache memory is found in the CPU, RAM on the motherboard. ✓
• Upgrading RAM means replacing DIMMs while upgrading cache means replacing the CPU ✓ (3)

2.1.4 (a) **Universal Serial Bus ✓** (1)

(b) **Accept any ONE of the following:** ✓
- Firewire (Windows)
- Thunderbolt (Mac)
- HDMI (1)

(c) **Any ONE of the following driver descriptions**
Program ✓ that tells an operating system how to communicate with a specific device. ✓

**OR**
Software designed to control a piece of hardware. (2)
(d) **Standard driver: Any ONE correct fact ✓**
   - is already part of the operating system
   - no need to load extra drivers

(e) **Any ONE device that connects to USB port that can make use of standard/generic driver ✓**
   Examples of devices:
   - Mouse.
   - Keyboard.
   - External storage device (e.g. hard drive/flashdisk).
   - Printer/scanner/camera

2.2 2.2.1 A computer virus is a software program ✓ that is intended to damage ✓ files on a computer system without the user's knowledge or permission.

   **OR**

   Potentially damaging software that affects a computer negatively.

2.2.2 Any TWO of ✓
   - Always scan a memory stick (or any other device) for viruses before it is used.
   - Install a firewall/antivirus.
   - Do not boot your computer from a device such as a memory stick or external hard drive of unknown origin.
   - Have an up-to-date antivirus program/software installed on your computer/Update your antivirus program regularly
   - Disable the "autorun" function.
   - Opening any unknown/suspicious e-mail attachments

   Or any other correct answer.

2.2.3 Any TWO of the following in any order: ✓
   - tracks
   - sectors
   - clusters
2.2.4 Accept any correct labelled visual diagram of a file structure showing three levels of file management. ✔ ✔

**NOTE:**
Any structure without labels – ONE mark

**EXAMPLE:**

![File Structure Diagram]

2.3 2.3.1 RFID: Radio Frequency Identification ✔

2.3.2 Each lion can have a tag (transponder) ✔ and a receiver can be on each of the feeding stations that need to be monitored ✔.

Also accept any correct alternative explanation ✔

2.4 Accept any TWO ways a server is better suited to ensure higher performance than a PC ✔ ✔

Examples:
- A higher performance CPU.
- More RAM.
- Higher performance hard drives/SCSI/higher RPM drives.
- Server software/more robust operating systems

**NOTE:**
A larger hard drive/more storage space not acceptable.
Giving an example is acceptable for one mark.

2.5 2.5.1 Accept any ONE correct function of the chipset ✔

- Control data transfer/data flow between components on the motherboard.
- Determine the maximum capability of the motherboard.

2.5.2 (a) South Bridge ✔

(b) North Bridge ✔

(c) South Bridge ✔

2.6 2.6.1 Pipelining is a method of processing where the processor is able to read new instructions ✔ from memory before the instruction that is busy being processed is completed. ✔
2.6.2  Any TWO correct facts about cache ✓✓

TWO MARKS FOR:
- Instructions/data probably needed next by the CPU are placed in cache memory which reduced time lost while waiting for instructions/data from RAM as a result it improves the performance of the CPU.

ONE MARK EACH FOR:
- Cache memory is situated inside the CPU or close by.
- Cache faster type of memory – can feed the CPU with instructions at a faster rate.
- Instructions/data probably needed next by the CPU are placed in cache memory.

2.6.3  (a) Over-clocking is when the settings of the CPU are changed in order for it to run at higher rates than it was designed for. ✓ Accept any similar explanation

NOTE: Also accept the following (due to translation error)
Clock multiplication:
- is the increasing of the CPU's speed in relation to the motherboard's speed
- allows the running of the CPU at a faster rate than the motherboard

(b) Any TWO correct facts about preventing overheating ✓✓
- Large heat sink on CPU/North Bridge chipset.
- Using thermal paste
- Heat conductive plate over system bus.
- Additional cooling fans in case.
- Alternative cooling systems – any sensible example.

2.7  2.7.1  Satellite/Microwaves ✓ communication

2.7.2  Any TWO valid examples from scenario (zoo/reptile park/aquarium) ✓✓
- Guiding someone to a specific animal enclosure.
- Give you information about the layout of the park.
- Together with audio feed it can give you information about animals at a specific location.
- Using satellite technology (GPS), audio and/or multimedia content is triggered based on a user's location in the park.

2.7.3  MP3/wav ✓

NOTE: Do not accept avi/MP4 or any other video format

TOTAL SECTION B:  50
SECTION C: APPLICATIONS AND IMPLICATIONS

QUESTION 3: e-COMMUNICATION

3.1 3.1.1 Accept any TWO advantages from the parks perspective ✓✓
- The park can use e-communication to promote their services and products.
- The park’s services get promoted world wide/potential visitors to the park may view the parks' services on the Internet before visiting the park.
- Visitors may be informed of disruptions in services using an e-mail/sms
- Cost effectiveness with explanation/example (2)

3.1.2 Accept any ONE disadvantage from a visitors viewpoint ✓
- People get distracted by phone calls/sms.
- Do not get away from work related issues.
- Chatting online can disrupt the outing.
- Public places have insecure Internet connections (1)

3.2 3.2.1 The http changes to https ✓://www.redpark.co.za (1)

3.2.2 Encryption is a method for changing data ✓ into an unreadable format ✓

ONE MARK FOR :
A correct example explaining encryption

TWO MARKS FOR:
Scrambling data (2)

3.2.3 The message must be decrypted using the private ✓ key ✓. (2)

3.2.4 A ✓ (1)

3.3 Accept any TWO sensible practical examples of using podcasting. ✓✓
- Daily commentary about the health of an endangered animal can be recorded.
- Keep the visitors updated on activities taking place at the park.
- Recordings of the actual birth process can be made and released via podcasting.
- Press releases regarding the arrival of new animals/babies can be released via podcasting. (2)

3.4 Trojan is a program with malicious intent ✓, presenting itself as some useful/harmless program ✓. (2) [13]
QUESTION 4: SOCIAL AND ETHICAL ISSUES

4.1 Any TWO correct ways to reduce electricity consumption – have to be IT related √√
   - Use "greener" hardware which uses less power.
   - Make use of laptops instead of desktop computers.
   - Turn off computers when not used.
   - Share resources such as printer, scanners and other peripherals.
   - Computer hardware may make use of sleep mode. (2)

4.2 4.2.1 Accept any TWO valid responsible recommendations to dispose of old computers √√
   - Request special e-waste centres to collect the old computers/Separate the metal and plastic parts and send to appropriate recycle centres.
   - Donate the computers to a school or charity.
   - Make old machines available to a second hand dealership. (2)

4.2.2 YES or NO
   NOTE: Must be supported by a valid reason to get the marks
   Accept any valid reason for replacing old computers √√

   If answered YES:
   - This is a cost effective approach.
   - Computers should last five years but will then be old enough to warrant an upgrade.
   - New technology advances in computing make it ideal to upgrade every five years.

   If answered NO:
   - Too expensive
   - The period of 5 years may be viewed as too long and a shorter term of 3 years may be advocated. (2)

4.3 Any TWO viable recommendations √√
   - Software is available that will perform a low level format on the hard drives to ensure that data cannot be retrieved.
   - If the hard drive is no longer required it can also be destroyed.
   - Lock the old hard drives in the vault of the nature park for archiving purposes.
   - Make use of file encryption software to encrypt the data and files.

   NOTE:
   Do not accept format/quick format of hard drive.
   Do not accept making backups (2)
4.4 YES or NO

**NOTE:** Must be supported by a valid reason to get the marks

*Accept ONE correct explanation ✓ ✓*

**If answered YES:**
- The company has the right to know what type of person they are employing.
- The employee may be a potential embarrassment to the company due to his statements on Facebook.
- By viewing the profile the company may prevent victimization of other employees.

**If answered NO:**
- It is intrusive on a person's private life.
- An employee has the right to confidentiality provided they do not do anything that jeopardizes the organization they work for.
- The constitution protects freedom of speech and association.

4.5 Computer crimes are illegal activities ✓ performed using a computer ✓.

**NOTE:**
- Also accept an example.
- Do not accept rephrasing of the question e.g. "crime using a computer"

[12]

TOTAL SECTION C: 25
SECTION D: PROGRAMMING AND SOFTWARE DEVELOPMENT

QUESTION 5: ALGORITHMS AND PLANNING

5.1  5.1.1  (a) Currency ✓
     Also accept: Number

     (b) Text ✓
     Also accept: Text with maximum 10 characters

5.1.2  Number is suitable because you can use any combination of two numbers e.g. 0 and 1 or 0 and -1 to indicate true/yes or false/no ✓

5.1.3  (a) Accept any correct explanation of the condition for validation in pseudo or programming code. ✓ ✓ ✓

     Examples:
     • "K" OR "U" OR "M"
     • IN("K","U","M")

     NOTE:
     Accept double/single/no quotes
     Do not accept rephrasing of the given question

     (b) Accept any appropriate error message ✓

     Examples:
     • Make only use of the letters K/M/U.
     • Only the letters K, M or U are allowed

5.2  5.2.1  (a) The table doesn't provide for more than two different types of trees ✓ ✓ to be bought per order.
     Accept any similar explanation

     (b) With the field OrderDate as primary key, only one record with a certain date is allowed in the table. It means you are only allowed one order for a certain date ✓ ✓
     Accept any similar explanation

5.2.2  (a) Combined primary key consists of two or more fields ✓ combined together as primary key ✓, in order to uniquely identify each record

     NOTE:
     Do not accept two primary keys per table
(b) Accept any TWO valid reasons ✓ ✓
   • To uniquely identify each record
   • So that one order may have more than two types of trees.

   • If TreeID is not part of primary key (KEY = OrderNo):
     • You can only buy one tree per order.
     • A new order has to be placed every time you buy more
       than one type of tree
   • If OrderNo is not part of primary key (KEY = TreeID):
     • You can order a certain type of tree only once
     • If you want to buy the same type of tree you have to
       assign a new TreeID for that tree.

(c) Partial dependency – each field in the table must be fully
dependant on the whole single primary key/part of the
combined primary key ✓

5.2.3 (a) One-to-Many ✓
   (note the order of the 1 and many)
   Also accept:
   • 1 to ∞ / 1 → ∞
   • 1 to M / 1 → M

(b) Any ONE of ✓
   • OrderNo
   • TreeID

(c) YES ✓
   Accept ONE correct explanation/reason ✓
   • The field TotalAmount can be a calculated field
   • The total for the order can be calculated using a
     function/formula in a query.
   • The field can be calculated using an aggregate function
     such as SUM

   NOTE:
   • If only answered YES – no mark allocated

5.3 5.3.1 Algorithm is a set of steps ✓ to solve a problem. ✓
Also accept any other valid/similar explanation
5.3.2 (a) (i) **Impact:** ✓ *(accept ONE correct impact)*  
- Nothing/The execution of the program won't be affected/The program will produce negative output.
- No run-time error will occur.
- The flow of the program will continue and the user will be asked to enter the next day's number of enclosures cleaned.

(ii) **Explanation:** ✓ *(accept a valid explanation for the impact mentioned)*  
- No data validation is done on the input value and therefore the program will accept the value typed in.
- The input data (-3) is an acceptable integer number but not valid/correct given the scenario. Being negative number it will be deducted from the total number of enclosures cleaned.
- A logical error will occur with the displayed value being incorrect - the total number of enclosures cleaned will be less than the actual number – the cleaning staff will be paid less than required

(b) Runtime ✓  

5.3.3 (a) Logical error is when the output received/displayed ✓ is incorrect or not as expected ✓ because of an error based on logic.  
*Also accept any other valid/acceptable explanation*  

(b) **Accept ONE correction for each logical error**  
**Correction for error Line 4:** ✓  
Move line 4 to any position above the starting point of the loop ✓.  
OR  
Move line 4 between lines 1/2 or 2/3.

**Correction for error Line 7:** ✓  
Change line 7 to: Pay ← Pay + (Number * 100) ✓  
OR  
Change line 7 to: Pay ← Total * 100  
Move line 7 to outside the loop, between lines 8 and 9.  
*(2 x 2)*

5.4 5.4.1 **Accept any ONE correct reason for using a WHILE in stead of FOR-loop ✓**  
- The size of the text file is unknown  
- For-loops are used when the number of repetitions is known

5.4.2 (a) **AND ✓**  
(b) **OR ✓**
5.4.3  All names ✓ ✓ ✓
Rose
Nugget
Peach
Suzi

NOTE: Subtract one mark for each error. (maximum three errors)  (3)

5.5  5.5.1  (a) Accept ONE correct purpose of the constructor method ✓
• It creates an instance of/initialises the object
• It reserves/creates memory space for the object in RAM  (1)

(b) The compiler will look at the arguments (parameters) and find
the constructor with matching number/type of parameter(s). ✓  (1)

(c) Overloading ✓  (1)

5.5.2  (a) Accessor ✓ (get)  (1)

(b) + getHospitalisation() ✓ : boolean ✓
Accept any alternative name for the method
Accept any appropriate return data type e.g. string/integer  (2)

5.5.3  (a) Accept ONE aim of toString() method ✓
• Give a standard output/description of the attributes of an object
• Allows the output of the values of the attributes of an object
• To combine all attributes of the class in a single string  (1)

(b) Accept ONE correct reason ✓ ✓
• The use of the class name as a reference to an object in
the program is not allowed
• The use of private attributes is not possible in another
unit/class

NOTE: Do not accept any programming syntax  (2)

(c) Accept ONE correct reason ✓ ✓
• The toString method's return type is string; whereas the parameter's data type is integer
• The method NeedTrees is a mutator method (setting a value) – cannot be part of another statement
• The IF statement requires a logical expression to evaluate.  (2)

TOTAL SECTION D:  48
SECTION E

QUESTION 6: INTEGRATED SCENARIO

6.1 6.1.1 Accept any TWO correct reasons for having a website ✓ ✓
- Many people use the Internet to search for tourist destinations or nature parks specifically.
- The website may be used in the marketing the park.
- The website can be an education tool in the parks social responsibility to the community.
- The website allows international contact.
- Online bookings

6.1.2 Accept any THREE recommendations/aspects of a well designed website ✓ ✓ ✓
- The website should have an attractive design with enough space between elements to make it easy to read.
- There should be appropriate use of graphics and colours.
- A standard template should be used across all the pages so that the user can easily understand the website.
- Content should be well written and up to date.
- The website should be easy to navigate.
- User friendly

Accept any correct alternative answer

6.1.3 (a) Accept any ONE of the following: ✓
- The website will not load.
- A webpage has been defaced such as an image changed.
- The site has been deleted or replaced by a different web page.
- Antivirus software detects a virus on the website when it is browsed.

Accept any correct alternative answer

(b) Accept any TWO ways of preventing hacking ✓ ✓
- The server should have all software updates installed.
- The website should be well programmed so that there is not a way that a hacker can gain entry through a particular webpage.
- A firewall should be used to protect the website.
- An administrator should monitor traffic to the website to catch any suspicious activity.
- Do not use the default password for the underlying database.
(c) **Accept any TWO reasons why hackers need access**

- For financial gain.
- To prove that they can to gain status amongst their peers.
- To point out security flaws in the website to the administrator.
- A political issue that the hacker has with the organisation behind the website.
- For entertainment

*Accept any correct alternative answer* (2)

6.1.4 (a) **Accept any ONE reason for having search engine friendly website**

- So that it receives the most visits possible to the website.
- People will most likely open the websites listed at the top of the result set.
- The name of the park gets promoted and more people are aware of the park.

*Accept any correct alternative explanation/reason* (1)

(b) **Accept any ONE explanation** (indexing) (database)

**TWO MARKS FOR:**

- Spiders are programs that index websites in a local database.
- Spiders are programs that traverse all linked pages where possible on the internet and store the content in a database. When a user searches, the search engine searches its own database which is fast.

**ONE MARK FOR:**

- A program that makes a lot of information accessible by linking it to the search engine/site.
- Spiders are programs that index websites (2)

6.1.5 **Accept any TWO aspects about good navigation**

- It should be clearly visible on every page.
- It should perform in a consistent and uniform manner.
- It should function on any browser.
- It should show the layout of the website.
- It should have a Home page link.
- Displays different categories on different pages (2)

6.1.6 (a) **FTP: A standard** that permits file uploading and downloading (2)

**ONE MARK FOR:**

File Transfer Protocol.
(b) **HTTP** is used to serve up web pages that can be interpreted by a browser and displayed in a graphical way.

**FTP** can only transfer complete files.

**NOTE:**
If FTP is explained in Question 6.1.6 (a) and only HTTP answered in (b) two marks.

(c) **Accept any ONE other way of updating website**
- He could make use of a content management system
- He could have a web-based file management system to update files
- He could update files directly on the server

6.1.7 (a) RAID 0 creates one logical drive and does not duplicate, mirror or backup data in any way. *Accept any correct alternative explanation.*

(b) RAID 1 operates by duplicating/mirroring the data across two hard disks having high fault tolerance.

(c) **Any TWO server operating systems**
- Ubuntu Server
- Windows Server
- FreeBSD
- Novell
- Unix
- Linux

(d) Web caching saves files of recently accessed websites on the hard disk. When the visited site is revisited the web browser does not have to re-download the website from the Internet again.

6.2 6.2.1 **Communication protocol** is a set of rules/procedures that is used to determine how data is sent between two devices in a network.

*Also accept any TWO of the following facts about protocol:*
The protocol determines:
- if compression of data is required
- the fault tolerance/control to determine if the data sent was received correctly
- the method that the sending device determines when transmission is terminated
- the method that the receiving device indicates that the complete message was received
6.2.2  
*Network topology* is the possible layout or physical connection of the devices in a network. √

6.2.3  
Star/Bus √

6.2.4  
*Accept any TWO correct reasons for not using UTP √ √*
- UTP is highly susceptible to signal loss/attenuation/cable length is limited to ± 100m
- Using UTP cable for 5 km would require signal boosters every 100m – extra cost implication
- UTP is susceptible to EMI
- UTP is susceptible to eavesdropping

6.2.5  
(a) VPN is a private network √ which uses the Internet to connect computers as if they are connected via a LAN √.

*Also accept any ONE of the following explanations:*
- This allows a client to join a private or secure network using a non-secure connection.
- VPN uses encryption to protect access to the network or the data on the network.

Also accept Virtual Private Network for one mark.

(b) *Accept ONE disadvantage of using a VPN √*
- Can be slow.
- Not available for all clients if internet connection not available/can be "off line" due to cable theft of Telkom lines.
- If user forget password – cannot connect to VPN
- Specialised security measures needed/security can be easily compromised

6.3  
6.3.1  
*Accept any TWO correct reasons for preferring RSS √ √*
- An RSS feed reader updates itself automatically/only supply the content that changed.
- User receives instant updates.
- Safer than browsing the website directly.

6.3.2  
*Accept any TWO correct online alternatives √ √*
- Facebook
- Twitter
- An e-mail newsletter/mailing lists.
- Podcasting
- Forums
- Blog
- UTube

*NOTE: Do not accept Wiki, IM, IRC, RSS Feed*
6.4   6.4.1 *Accept any TWO correct ways for e-mails not to be flagged as spam ✓✓*

- The e-mail should not contain too many hyperlinks
- The e-mail should be sent from an appropriate address
- There should not be full word capital letters in the subject or body
- The e-mail may not contain suspect words/phrases/attachments
- The e-mail needs an appropriate subject line
- Too many recipients  

6.4.2 *Accept any ONE correct fact for having a unsubscribe option ✓✓*

- A user should always have the option to unsubscribe
- If no unsubscribe option, the email is classed as spam and can be reported.

6.4.3 (a) PDF document ✓

(b) *Accept any ONE correct reason ✓✓*

- PDF is a compressed universal format that can contain text and images.
- PDF documents can be password protected to prevent editing of file
- TIFF is uncompressed and is not as widely supported.

TOTAL SECTION E: 47
GRAND TOTAL: 180