



education

Department:
Education
PROVINCE OF KWAZULU-NATAL

GREENBURY SECONDARY SCHOOL

INFORMATION TECHNOLOGY P2

GRADE 12

JUNE 2016

DATE OF EXAMINATION: 7 JUNE 2016

MARKS: 150

TIME: 3 hours

EXAMINER(S): Umlazi District

MODERATOR(S): Pinetown District

This question paper consists of 15 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX sections:

Section A:	Short questions	(15)
Section B:	System Technologies	(28)
Section C:	Communication and Network Technologies	(17)
Section D:	Data and Information Management	(27)
Section E:	Solution Development	(25)
Section F:	Integrated Scenario	(38)

2. Read **ALL** the questions carefully.
3. Answer **ALL** the questions.
4. The mark allocation generally gives an indication of the number of facts/reasons required.
5. Number the answers correctly according to the numbering system used in this question paper.
6. Write neatly and legibly.

SECTION A: SHORT QUESTIONS**QUESTION ONE**

- 1.1 Give ONE word/term for each of the following descriptions. Write only the word/term next to the question number (1.1.1 – 1.1.10) in the ANSWER BOOK.
- 1.1.1 A temporary storage space reserved for data and instructions that is currently in use. (1)
- 1.1.2 A computer attached to a network that has had its security compromised and as a result is remotely controlled. (1)
- 1.1.3 All web pages available to computers and devices connected to the internet. (1)
- 1.1.4 A method that gives access to an object's attribute without changing the object in any way. (1)
- 1.1.5 Encryption that uses a single 'secret' key for both encryption and decryption. (1)
- 1.1.6 A peer-to-peer protocol used for the transfer and sharing of large files across a network of computers such as the Internet. (1)
- 1.1.7 A person who uses a virus template to modify and create viruses of their own, as they do not know how to create one themselves. (1)
- 1.1.8 Businesses that use groups of low paid workers whose work it is to repetitively click on links to fake high web traffic. (1)
- 1.1.9 The process of ensuring that data meets a set of requirements. (1)
- 1.1.10 An attack that makes a website unavailable by using thousands or millions of computers to request data from the site at the same time. (1)

1.2 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A-D) next to the question number (1.2.1 – 1.2.5) in the ANSWER BOOK, for example 1.2.6 E.

1.2.1 A device that makes communication between networks over the internet possible directing data to its correct destination.

- A Modem
- B Router
- C WiFi
- D Switch

(1)

1.2.2 Consider the following code to count the number of words in a sentence.

```
sent = "How many words are there in this sentence"
count = 1;
pos = sent.IndexOf(" ");

while (pos > 0) do
begin
    sent = sent.substring(pos+1);
    pos = sent.IndexOf(" ");
end;

jTextArea1.append("\n"+count);
```

What will the output be?

- A 8
- B 7
- C 9
- D 1

(1)

1.2.3 The design of a database that prevents a user from capturing data when they want or need to

- A Delete anomaly
- B Insert anomaly
- C Update anomaly
- D Data redundancy

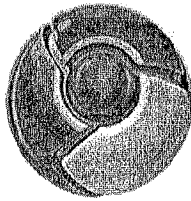
(1)

1.2.4 Convergence refers to...

- A Technology that is always on.
- B Technology that does not need to be tethered to wired connections.
- C Functionalities of many devices built into one.
- D The ability of mobile devices to connect to one another. (1)

1.2.5 Which ONE of the following icons is NOT an example of a web browser?

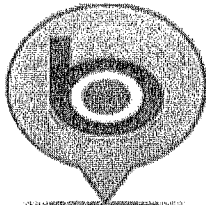
A



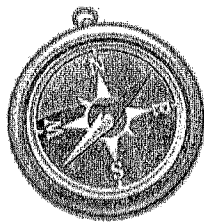
B



C



D



(1)

TOTAL SECTION A: [15]

Scenario

Your school is holding a fund-raising event in the form of a variety concert with guest artists. The school has decided to use FIVE computers to make this task easier.

Grade 12 IT learners have been asked to assist with this project and you have been appointed as the team leader.

The team will have to:

- provide advice on the computer systems and suitable software needed.
- give general support on all computer-related issues including networking of hardware.

SECTION B: SYSTEM TECHNOLOGIES**QUESTION TWO**

The school has decided to purchase new computers.

Study the advertisement below and answer the questions that follow:

Intel® Core™ i3-4150 Processor (3M Cache, 3.50 GHz)
4GB DDR3 Memory
500GB SATA 2 HDD
Integrated Graphics card
DVD-Super 8X Multi DL drive
2 x USB 2.0,
Windows 8.1

2.1 The principal does not understand what some of the specifications mean.

What does each of the following refer to and explain its function.

2.1.1 3.50 Ghz (2)

2.1.2 4GB DDR3 (2)

2.2 Which TWO aspects of the CPU influence the performance of the computer? (2)

2.3 The graphic designer for the fund-raiser wants a new computer with an Intel i7 processor. The i7 is quad core, hyperthreading and has a 64-bit processor with a CPU speed of 3.9Ghz, 8 MB cache memory and GeForce GTX 680M with 2GB RAM

2.3.1 How many CPU's does a quad-core chip have? (1)

- 2.3.2 Give a short description of what hyperthreading is. (2)
- 2.3.3 List the FOUR steps that the CPU performs during the machine cycle. (4)
- 2.3.4 The computer mentioned above, has 8MB of cache memory.
- a) Explain how cache memory works. (2)
- b) Give TWO reasons why cache memory on computers is limited (2)
- 2.4 The i3 machine described above has an integrated graphics card. However, the machine described in question 2.3 has a dedicated graphics card.
- 2.4.1 Identify the graphics card mentioned in Question 2.3. (1)
- 2.4.2 Explain why having a dedicated graphics card is better than having an integrated graphics card. (1)
- 2.5 The graphic designer keeps getting a message displayed on his screen that virtual memory is low.
- 2.5.1 What is virtual memory? (1)
- 2.5.2 Why is he getting this message? (1)
- 2.6 Windows 8.1 is the operating system on this machine.
- 2.6.1 State TWO aspects of memory management that the operating system is responsible for? (2)
- 2.7 An alternative to purchasing the software was SaaS.
- 2.7.1 Expand the acronym 'SaaS'. (1)
- 2.7.2 Explain how 'SaaS' works. (1)
- 2.8 Data stored on guest artists must be protected against loss or damage.
- 2.8.1 Describe how loss of data due to unexpected power failure can be prevented. (2)
- 2.8.2 Give TWO reasons, other than power failure, for the loss of or damage to data. (2)
- 2.8.3 Justify why the local hard drive would not be suitable for backup purposes. (1)

TOTAL SECTION B: [30]

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

- 3.1 The learners have asked the principal for permission to network the computers.
- 3.1.1 Define the term network. (2)
- 3.1.2 The learners have been given an option to choose between a cabled network and a wireless network.
- (a) State TWO advantages of having a wireless network over a cabled network. (2)
- (b) Sketch a simple diagram of star topology network. (2)
- 3.1.3 Distinguish between a router and a switch. (2)
- 3.1.4 Which of the devices mentioned above can function as both? (1)
- 3.2 The computing devices will have to be connected to the internet as well.
- 3.2.1 Suggest an appropriate type of connection. (1)
- 3.2.2 It is essential to have a firewall when using the internet? Explain the function of a firewall. (2)
- 3.3 You are encouraged to create a podcast. What is a podcast? (2)
- 3.4 The existing school website needs to be amend to promote the concert and sell tickets online. In order to ensure that the website is secure, you will have to apply for a SSL certificate.
- 3.4.1 What is an SSL certificate, and what type of information does it contain? (2)
- 3.4.2 How will the public know that this website is secure? (1)

TOTAL SECTION C: [17]

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION FOUR

4.1 One of the characteristics of computers that make them so attractive is their accuracy, which is heavily dependent on the quality of the data that is supplied. Working with inaccurate data can have huge consequences.

4.1.1 In view of the above statements, explain what is meant by the '**GIGO**' principle. (2)


4.1.2 Besides accuracy, name TWO other characteristics of quality data. (2)


4.1.3 Define the term 'data validation' from a programming point of view. (2)

4.1.4 Name TWO data validation techniques that can be used in a program. (2)

4.2 A central database has been created for the organisers of the variety concert to record details of participants and the events they are participating in.

The following tables have been designed :

ParticipantTbl		
Key	Field Name	Data Type
	Participant_ID	Text
	Participant_Name	Text
	Participant_Category	Text

ItemTbl		
Key	Field Name	Data Type
	Item_No	Text
	Item_Category	Text
	Participant_ID	Text
	Duration	Number

Examples of data from **ParticipantTbl** and **ItemTbl** :

ParticipantTbl		
Participant_ID	Participant_Name	Participant_Category
001	Yasteer's Dance Troupe	Group
002	Wesden & Waiden's Comedy Circus	Duo
003	Hannah & Group	Group
004	Zime's Dance Diva's	Group
005	Bevash Mohan	Solo
006	Thabiso's Showband	Group
007	Jeremy & Prineshri	Duo
008	Ashveer & Group	Group
009	Reon Chetty	Solo
010	Sushmita & Junaid	Duo

ItemTbl			
Item_No	Item_Category	Participant_ID	Duration
1	Song	005	5
2	Dance	002	10
3	Song	010	8
4	Dance	003	12
5	Dance	009	10
6	Play	003	20
7	Dance	004	10
8	Song	010	7
9	Play	002	15
10	Dance	007	12
11	Song	005	6
12	Play	008	25

4.2.1 **Normalisation** forms an integral part of database design as it increases the effectiveness and efficiency of a database.

Define the term normalisation.

(2)

4.2.2 Describe the relationship that can be formed between **ParticipantTbl** and **ItemTbl** by clearly indicating the following:

(a) The type of relationship formed as from the **ParticipantTbl** side.

(1)

(b) The primary key and the foreign key used in the relationship and the table names in which they occur.

(2)

- 4.3 Use the table structures on the previous page to formulate SQL statements for each of the following queries :
- 4.3.1 Display all details of the **ItemTbl** table sorted in descending order according to the **Duration** field. (3)
 - 4.3.2 Display the Participant names, Item number and duration of all Items that belong to the item category *Play*. (4)
 - 4.3.3 *Yasteer's Dance Troupe* has decided not to participate in the concert. Remove their record from the **ParticipantTbl** table. (3)
 - 4.3.4 The organisers of the variety concert would like to know the total duration of the concert. Calculate and display the total duration and store this value in a variable called **Total**. (4)

TOTAL SECTION D: [27]

SECTION E: SOLUTION DEVELOPMENT

QUESTION FIVE

- 5.1 Various errors can occur while coding and executing a program.

Discuss the THREE types of errors that can occur while programming and provide an example for each type of error. (6)

- 5.2 The IT learners have created a project to help capturing the data for the guest artists performing.

Study the class diagram below and answer the questions that follow:

Artist
-ArtistID : String -ArtistFirstName : String -ArtistSurname : String
+ Constructor() + Constructor(ArtistID, ArtistFirstName, AristSurname) + getArtistFirstName() + toString():String

- 5.2.1 A mutator method for ArtistSurname has been omitted. Rectify the situation by writing down a mutator method for the ArtisSurname? (2)

5.2.2 Identify the accessor method from the given class diagram. Identify and correct the error in that method. (2)

5.2.3 What is the usual purpose of a:

- (a) toString method
- (b) Parameterised constructor (2)

5.3 The following GUI is currently used to allow a learner to input information about the artist.

The image shows a Java Swing window titled "Enter details of artist". Inside the window, there are three text input fields. The first field is labeled "Enter Artist Code" and has the text "jTextField1" inside it. The second field is labeled "Artist Name" and has the text "jTextField2" inside it. The third field is labeled "Surname" and has the text "jTextField3" inside it. In the top right corner of the window, there is a button labeled "Save details".

5.3.1 Critically comment on THREE design aspects of the given GUI. (3)

5.4 The IT learners were debating which the most popular email address is.

They have on record a text file containing email addresses, entered by all people who have purchased a ticket. One of the learners insisted that gmail is the most popular.

Text file contain email addresses:

yastheer12@yahoo.com
weswal@gmail.com
hannahgrp@telkom.co.za
zime@gmail.com
bev445@gmail.com
thabiso@yahoo.com
JerPrin@telkom.co.za
ashgroup@gmail.com
ReonC@vodamail.com
Sushmita@gmail.com

They have written the following algorithm to determine whether that learner is correct in his assumption.

```

1  Total ← 0;
2  Count ← 0;
3  Loop to the end of file
4  Begin
5    Read line of text
6    Increment(Total)
7    Spilt line using @ delimiter and extract domain
8    If (domain = 'gmail') then
9      Increment(count)
10 End loop
11 if (count > (0.5 of total) then
12   display gmail is popular
13 else
14   display gmail not as popular as you think

```

5.4.1 Copy the table below and trace through the algorithm using the given headings:

Line	Total	count	domain	domain= gmail ?	count > 0.5*total?	display

(8)

TOTAL SECTION E: [23]

SECTION F: INTEGRATED SCENARIO**QUESTION SIX**

- 6.1 The Fundraising committee of your school has decided to upload information concerning the variety concert to the school website as the school currently runs a dynamic website, which is often updated with current news and events.

6.1.1 The website offers an RSS feed.

Give TWO reasons why an RSS feed is useful. (2)

6.1.2 Lossy compression is used for the photographs that are uploaded.

Explain the concept *lossy compression*. (2)

6.1.3 Tabulate THREE differences between **static** and **dynamic** web pages. (3)

6.1.4 Multimedia files from the Internet, such as music and video files can be *downloaded* or *streamed*.

Clearly differentiate between **downloading** and **streaming**. (4)

- 6.2 The chairperson of the fundraising committee received the following email.



Dear valued customer of TrustedBank,

We have recieved notice that you have recently attempted to withdraw the following amount from your checking account while in another country: \$135.25.

If this information is not correct, someone unknown may have access to your account. As a safety measure, please visit our website via the link below to verify your personal information:

<http://www.trustedbank.com/general/custverifyinfo.asp>

Once you have done this, our fraud department will work to resolve this discrepancy. We are happy you have chosen us to do business with.

Thank you,
TrustedBank

Member FDIC © 2005 TrustedBank, Inc.

- 6.2.1 Give THREE reasons why you will be cautious or suspicious of this e-mail. (3)
- 6.2.2 Name TWO ways in which you can confirm that this e-mail is fraudulent (not 'genuine'). (2)
- 6.2.3 What is the generic or general name given to this type of activity? (1)
- 6.2.4 Recommend TWO ways to ensure that you do not become a victim of this type of activity. (2)
- 6.3 "Cyber space can often be viewed as a mysterious and dangerous place with ever present threats that make people mistrust and fear technology."
Supply THREE reasons why you would agree with this statement. (3)
- 6.4 The organisers of the variety concert have advised the school to use cloud storage to store video material.
- 6.4.1 'Ubiquity' is considered to be one of the benefits of cloud computing. What does this term refer to with respect to cloud computing? (2)
- 6.4.2 Cloud computing can be beneficial for green solutions in terms of hardware. Substantiate the above statement by explaining how cloud computing aids green computing. (2)
- 6.4.3 Cloud computing is said to rely heavily on virtualisation technologies.
What does the term *virtualisation* refer to in this context? (2)
- 6.5 "When many devices are connected to one another and to the Internet, files can be shared by simply making them downloadable from a website".
- 6.5.1 What is BitTorrent? (2)
- 6.5.2 Briefly explain how BitTorrent works. (3)
- 6.5.3 Outline TWO benefits of using BitTorrent. (2)
- 6.6 Encryption is used in a variety of data communication applications.
- 6.6.1 What is the general aim of encryption? (1)
- 6.6.2 Applications like Dropbox, make use of automatic encryption.
Why is it important for these services to make use of encryption? (2)

TOTAL SECTION F: [38]

TOTAL : 150



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GREENBURY SECONDARY SCHOOL

INFORMATION TECHNOLOGY P2

GRADE 12
JUNE 2016
Memorandum

MARKS: 150
TIME: 3 hours

EXAMINER(S): Umlazi District
MODERATOR(S): Pinetown District

This memo consists of 22 pages.

SECTION A: SHORT QUESTIONS

QUESTION ONE

- 1.1 Give ONE word/term for each of the following descriptions. Write only the word/term next to the question number (1.1.1 – 1.1.10) in the ANSWER BOOK.

1.1.1	RAM / primary memory✓	1
1.1.2	botnet✓	1
1.1.3	World wide web✓	1
1.1.4	Accessor method✓	1
1.1.5	Private key encryption✓	1
1.1.6	Topology✓	1
1.1.7	Script kiddie✓	1
1.1.8	Click farms✓	1
1.1.9	Data validation✓	1
1.1.10	Denial of service (DoS)✓	1

- 1.2 Various options are provided as possible answers to the following questions. Choose the most appropriate answer and write only the letter (A-D) next to the question number (1.2.1 – 1.2.5) in the ANSWER BOOK, for example 1.2.6 E.

1.2.1	B✓	1
1.2.2	D✓	1
1.2.3	B✓	1
1.2.4	C✓	1
1.2.5	C✓	1

TOTAL SECTION A: [15]

Scenario

Your school is holding a fund-raising event in the form of a variety concert with guest artists. The school has decided to use FIVE computers to make this task easier.

Grade 12 IT learners have been asked to assist with this project and you have been appointed as the team leader.

The team will have to:

- Provide advice on the computer systems and suitable software needed.
- Give general support on all computer-related issues including networking of hardware.

SECTION B: SYSTEM TECHNOLOGIES

QUESTION TWO

The school has decided to purchase new computers.

Study the advertisement below and answer the questions that follow:

Intel® Core™ i3-4150 Processor (3M Cache, 3.50 GHz)
4GB DDR3 Memory
500GB SATA 2 HDD
Integrated Graphics card
DVD-Super 8X Multi DL drive
2 x USB 2.0
Windows 8.1

2.1 The principal does not understand what some of the specifications mean.

What does each of the following refer to and explain their function.

2.1.1 3.50 Ghz

- Refers to the processing speed of the computer ✓ 3500 MHz per computer second.
- Ghz refers to Gigahertz ✓

(2)

2.1.2 4GB DDR3

- Ram – primary memory of type Double Data Rate 3 that stores data temporarily during execution ✓
- Available storage space is 4 Gigabytes ✓

(2)

2.2 Which two aspects of the CPU influence the performance of the computer?

- The speed of the CPU ✓
- The number of cores ✓

(2)

2.3 The graphic designer for the fund raiser wants a new computer with an Intel i7 processor. The i7 is quad core, hyperthreading and has a 64-bit processor with a CPU speed of 3.9Ghz, 8 MB cache memory and GeForce GTX 680M with 2GB RAM

2.3.1 How many CPU's does a quad-core chip have?

- 4 ✓

(1)

2.3.2 Give a short description of what hyperthreading is.

- Hyper-Threading is a technology used by some Intel microprocessors that allows a single microprocessor to act like two separate processors to the operating system. ✓
- It can execute two (rather than one) concurrent streams (or threads) of instructions sent by the operating system ✓

(2)

2.3.3 List the FOUR steps that the CPU performs for every instruction during the machine cycle.

Machine cycle

- Fetch instruction from RAM to CPU ✓
- Decode the instruction ✓
- Transfer the data from registers to CPU ✓
- Execute the instruction ✓

(4)

2.3.4 The computer mentioned above, has 8MB of cache memory.

a) Explain how cache memory works.

- Cache memory works by pre-fetching the instructions/data most likely to be used next by the CPU ✓ in order to assist the CPU from not reading the instructions/data from the slower RAM. ✓

(2)

b) Give TWO reasons why cache memory on computers is limited

- Cache is very expensive ✓
- Cache is located in the CPU and the space is restricted ✓

(2)

2.4 The i3 machine described above has an integrated graphics card. However, the machine described in question 2.3 has a dedicated graphics card.

2.4.1 Identify the graphics card mention in Question 2.3

- GeForce GTX 680M ✓

(1)

2.4.2 Explain why having a dedicated graphics card is better than having an integrated graphics card.

- A dedicated, or discrete, GPU has its own independent source of video memory, leaving the RAM your system uses untouched. ✓

(1)

- 2.5 The graphic designer keeps getting a message displayed on his screen that virtual memory is low.

2.5.1 What is Virtual memory?

- Virtual memory is a feature of an operating system (OS) that allows a computer to compensate for shortages of physical memory by temporarily transferring pages of data from random access memory to an area on the hard drive. ✓

OR

- Is an area of storage that the operating system keeps for its own use. ✓

2.5.2 Why is he getting this message?

- When the amount of virtual memory is too small for the amount of data that needs to be stored ✓

- 2.6 Windows 8.1 is the operating system on this machine.

State TWO aspects of memory management that the operating system is responsible for.

The OS (any TWO ✓✓)

- Ensures that the same area of memory is not used by programs at the same time so that data/instructions are not corrupted.
- Allocates memory to programs as required
- Makes memory available that is no longer being used.

- 2.7 An alternative to purchasing the software was SaaS.

2.7.1 Expand the acronym 'SaaS'.

- Software as a Service ✓

2.7.2 Explain how 'SaaS' works.

- It is the concept of renting software instead of buying a licence to use it. ✓

- 2.8 Data stored on guest artists must be protected against loss or damage.

2.8.1 Describe how loss of data due to unexpected power failure can be prevented.

- Make use of a UPS ✓ to supply power to the PC for a limited time so that the user can save/ backup data being used and safely shut down ✓

- 2.8.2 Give two reasons other than power failure for the loss of or damage to data. (2)

(accept any TWO ✓✓)

- damaged equipment / computer crashing
- hacking/ cracking
- data theft
- deletion of data by the user
- deletion of data via viruses

- 2.8.3 Justify why the local hard drive would not be suitable for backup purposes. (1)

(accept any ONE ✓)

- Difficult to remove and keep in a safe place somewhere else.
- Space can be a problem for backup of large volumes of data
- Many copies on different local hard drives can become a problem to manage
- Local hard drive may be susceptible to virus attacks - destroying the files
- Computer crash – can cause read/write heads to damage hard drive platters while spinning

TOTAL SECTION B: [30]

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION THREE

3.1 The learners have asked the principal for permission to network the computers.

3.1.1 Define the term network.

- A network is a group of two or more computers or devices that are linked together ✓ via a communication media for the purpose of transferring data and communicating ✓

(2)

3.1.2 The learners have been given an option to choose between a cabled network and a wireless network.

(a) State two advantages of having a wireless network over a cabled network.

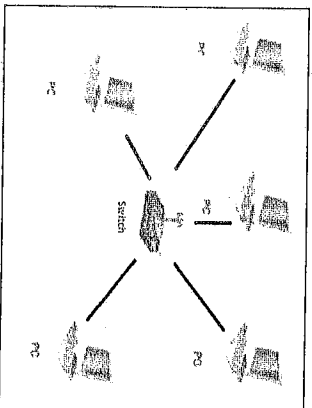
Advantages (any TWO ✓✓):

- No planning
- No extra cost involved for new devices
- Users can move around with devices
- Less expensive to setup
- Less running cost

(2)

(b) Sketch a simple diagram of the wireless network.

(2)



- Wireless router ✓
- Wireless devices ✓

3.1.3 Distinguish between a router and a switch.

(2)

- A router is a device that forwards data packets along two networks to a specific address ✓ whereas;
- A network switch is a computer networking device that connects devices together on a computer network, by using packet switching to receive, process and forward data to the destination device. ✓

3.1.4 Which of the devices mentioned above can function as both?

(1)

- Router ✓

3.2 The computing devices will have to be connected to the Internet as well.

3.2.1 Suggest an appropriate type of connection.

(1)

- 3G /4G ✓

3.2.2 It is essential to have a firewall when using the Internet. Explain the function of a firewall.

(2)

- A firewall is hardware or software ✓ that monitors which applications are using the communication link. ✓

3.3 You are encouraged to create a podcast. What is a podcast?

(2)

- A podcast is an audio/video/media file ✓ that is made available for download/store on your device from the Internet. ✓

3.4 The existing school website needs to be amended to promote the concert and sell tickets online. In order to ensure that the website is secure, you will have to apply for a SSL certificate.

3.4.1 What is an SSL certificate, and what type of information does it contain.

(2)

- SSL certificate is a file that contains the credentials of the company like: ✓

(any ONE ✓)

- ❖ Which Certificate Authority issued them with the certificate
- ❖ Who was the certificate issued too
- ❖ Till when is it valid
- ❖ Public key
- ❖ Digital certificate

3.4.2 How will the public know that their website is secure? (accept any ONE ✓)

(1)

- Website starts with https rather than http
- Padlock
- Green browser bar
- Secure site seal

TOTAL SECTION C:

[17]

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION FOUR

4.1 One of the characteristics of computers that make them so attractive is their accuracy, which is heavily dependent on the quality of the data that is supplied. Working with inaccurate data can have huge consequences.

4.1.1 In view of the above statements, explain what is meant by the 'GIGO' principle. (2)

- The GIGO (Garbage in garbage out) means that if incorrect, nonsensical data has been input, the results produced will also be likewise (garbage). ✓

4.1.2 Besides accuracy, name TWO other characteristics of quality data. (2)
(Accept any TWO ✓ ✓ - NOTE: do NOT accept accuracy as an answer)

- Currency
- Correctness
- Completeness
- Relevance

4.1.3 Define the term 'data validation' from a programming point of view. (2)

- Data validation refers to any technique used to reduce the number of errors that can be made during the input of data. ✓

4.1.4 Name TWO data validation techniques that can be used in a program. (2)

- Format check
- Data type check
- Range check
- Presence check
- Check digit

4.2 A central database has been created for the organisers of the variety concert to record details of participants and the events they are participating in.

The following tables have been designed :

ParticipantTbl		ItemTbl	
Key	Field Name	Field Name	Data Type
	Participant_ID	Participant_ID	Text
	Participant_Name	Participant_Name	Text
	Participant_Category	Participant_Category	Text
		Item_No	Text
		Item_Category	Text
		Duration	Number

Examples of data from ParticipantTbl and ItemTbl :

ParticipantTbl		
Participant_ID	Participant_Name	Participant_Category
001	Yasteer's Dance Troupe	Group
002	Wesden & Waiden's Comedy Circus	Duo
003	Hannah & Group	Group
004	Zine's Dance Dival's	Group
005	Bवेश Mohan	Solo
006	Thabiso's Showband	Group
007	Jeremy & Prineshri	Duo
008	Ashveer & Group	Group
009	Reon Chetty	Solo
010	Sushmita & Junaid	Duo

ItemTbl			
Item_No	Item_Category	Participant_ID	Duration
1	Song	005	5
2	Dance	002	10
3	Song	010	8
4	Dance	003	12
5	Dance	009	10
6	Play	003	20
7	Dance	004	10
8	Song	010	7
9	Play	002	15
10	Dance	007	12
11	Song	005	6
12	Play	008	25

4.2.1 Normalisation forms an integral part of database design as it increases the effectiveness and efficiency of a database. (2)

Define the term normalisation.

- Normalisation is the process of following certain formal rules in dividing a database into two or more tables, assigning fields to every table and establishing a relationship between them in order to increase the effectiveness and efficiency of a database and to ensure that the database is designed correctly. ✓

4.2.2 Describe the relationship that can be formed between ParticipantTbl and ItemTbl by clearly indicating the following: (1)

- (a) The type of relationship formed as from the ParticipantTbl side.
a) One to many ✓

- (b) The primary key and the foreign key used in the relationship and the table names in which they occur.
 b) Primary key – ParticipantID in ParticipantTbl ✓
 Foreign key - ParticipantID in ItemTbl ✓

(2)

4.3

Using the above table structures formulate SQL statements for each of the following queries :

- 4.3.1 Display all details of the **ItemTbl** table sorted in descending order according to the **Duration** field.

(3)

```
SELECT * FROM ItemTbl ORDER BY Duration desc
```

- 4.3.2 Display the Participant names, Item number and duration of all Items that belong to the item category **Play**.

(4)

```
SELECT ParticipantTbl.Participant_Name, ItemTbl.Item_No,
ItemTbl.Duration ✓
FROM ParticipantTbl, ItemTbl ✓
WHERE ParticipantTbl.Participant_ID = ItemTbl.ParticipantID ✓
AND ItemTbl.Item_Category = 'Play' ✓
```

- 4.3.3 *Yastee's Dance Troupe* has decided not to participate in the concert. Remove their record from the **ParticipantTbl** table.

(3)

```
DELETE FROM ParticipantTbl WHERE
Participant_Name='Yastee's Dance Troupe'
```

OR
 DELETE FROM ParticipantTbl WHERE Participant_ID='001'

- 4.4.4 The organisers of the variety concert would like to know the total duration of the concert. Calculate and display the total duration and store this value in a variable called **Total**.

(4)

```
SELECT SUM(Duration) AS [total] FROM ItemTbl
```

TOTAL SECTION D: [27]

SECTION E: SOLUTION DEVELOPMENT

QUESTION FIVE

- 5.1 Various errors can occur while coding and executing a program.

Discuss the **THREE** types of errors that can occur while programming and provide an example for each type of error

- Syntax - A syntax error occurs when the programmer fails to obey one of the rules of the programming language. ✓ e.g. a missing semi colon at the end of a statement ✓
- Logic - is a mistake in a program's source code that results in incorrect or unexpected behaviour ✓ e.g. a+b/2 instead of (a+b)/2 ✓
- Runtime errors - An error that occurs during the execution of a program. ✓ e.g. division by zero error ✓

(6)

5.2

The IT learners have created a project to help capturing the data for the guest artists performing.

Study the class diagram below and answer the questions that follow:

Artist	
-ArtistID : String	
-ArtistFirstName : String	
-ArtistSurname : String	
+ Constructor()	
+ Constructor(ArtistID, ArtistFirstName, ArtistSurname)	
+ getArtistFirstName()	
+ toString():String	

- 5.2.1 A mutator method for ArtistSurname has been omitted. Rectify the situation by writing down a mutator method for the ArtistSurname?

(2)

• + setArtistSurname(String ArtistSurname) ✓

- 5.2.2 Identify the accessor method from the given class diagram. Identify and correct the error in that method.

(2)

• getArtistFirstName() ✓ - Data type is missing. should be getArtistFirstName(): String ✓

- 5.2.3 What is the usual purpose of a:

(a) toString method: To join the attributes and return its value as a string. ✓

(b) Parametrised constructor: To pass values to the fields of an object or to give actual values to the attributes of an object. ✓

(2)

5.3 The following GUI is currently used to allow a learner to input information about the artist.

Enter Artist Code

TextField1

Artist Name

TextField2

Surname

TextField3

Save details

Enter details of artist

Critically comment on THREE design aspects of the given GUI.
(accept any THREE valid practical suggestion ✓✓✓)

- No heading
- Button not well positioned
- Text fields are not consistent
- Removing default text
- Instruction without an input component.

(3)

5.4 The IT learners were debating on which is the most popular email address.

They have on record a text file containing email addresses, entered by all people who have purchased a ticket. One of the learners insisted that gmail is the most popular.

Text file contain email addresses:

```

yastheer12@yahoo.com
weswal@gmail.com
hannahrp@telkom.co.za
zime@gmail.com
bev445@gmail.com
thabiso@yahoo.com
JerPrin@telkom.co.za
ashgroup@gmail.com
ReonC@vodamail.com
Sushmita@gmail.com
    
```

They have written the following algorithm to determine if that learner is correct in his assumption.

1	Total ← 0;
2	Count ← 0;
3	Loop to the end of file
4	Begin
5	Read line of text
6	Increment(Total)
7	Split line using @ delimiter and extract domain
8	If (domain = 'gmail') then
9	Increment(count)
10	End loop
11	if (count > (0.5 of total) then
12	display gmail is popular
13	else
14	display gmail not as popular as you think

Trace through the algorithm using the following headings:

Line	Total	count	domain	domain 'gmail'	= Is count > 0.5 of total	display
1	0					
2		0				
5/6	1					
7/8/9			yahoo	No		
5/6	2					
7/8/9		1	gmail	yes		
5/6	3					
7/8/9			telkom	No		
5/6	4					
7/8/9		2	gmail	yes		
5/6	5					
7/8/9		3	gmail	yes		
5/6	6					
7/8/9			yahoo	No		
5/6	7					
7/8/9			telkom	No		
5/6	8					
7/8/9		4	gmail	Yes		
5/6	9					
7/8/9			vodamail	no		
5/6	10 ✓					
7/8/9		5 ✓	gmail ✓	Yes ✓		
11 ✓					No ✓	
14 ✓						Not as popular as you think ✓

OR

(8)

Line	Total	count	domain	domain= gmail ?	count > 0.5*total?	display
1	0					
2		0				
6	1					
7			yahoo			
8				False		
6	2					
7			Gmail			
8				True		
9		1				
6	3					
7			Telkom			
8				False		
6	4					
7			Gmail			
8				True		
9		2				
6	5					
7			Gmail			
8				True		
9		3				
6	6					
7			Yahoo			
8				False		
6	7					
7			Telkom			
8				False		
6	8					
7			Gmail			
8				True		
9		4				
6	9					
7			Vodamail			
8				False		
6	10					
7			Gmail			
8				True		
9		5 ✓				
11 ✓				False		
14 ✓					False ✓	Not as popular as you think ✓

(must end of with 11 and 14. The rest are 1 mark per completed column)

TOTAL SECTION E: [23]

SECTION F: INTEGRATED SCENARIO

QUESTION SIX

- 6.1 The Fundraising committee of your school has decided to upload information concerning the variety concert to the school website as the school currently runs a dynamic website, which is often updated with current news and events.
- 6.1.1 The school's website offers an RSS feed.
- Give TWO reasons why an RSS feed is useful.
- It automatically provides users with updated content or notifications of new content. ✓ The new content can be accessed from a central application without having to log on to each website separately. ✓
- (2)
- 6.1.2 Lossy compression is used for the photographs that are uploaded.
- Explain the concept *lossy compression*.
- Lossy compression refers to compressing data ✓ by sacrificing some insignificant or virtually undetectable portion of the data. ✓
- (2)
- 6.1.3 Tabulate THREE differences between static and dynamic web pages.
- (accept any THREE correct differences ✓ ✓ ✓)
- (3)

STATIC	DYNAMIC
Does not require much server power.	Needs more powerful servers
Designed for client-side programming only	Need server side programming skills
Displays exactly the same information to the user every time.	Content displayed may differ each time based on users and their preferences.
Best for pages that are not customisable or do not need frequent updating.	Best for customisable pages or pages that need to be frequently updated.

- 6.1.4 Multimedia files from the Internet, such as music and video files can be downloaded or streamed.

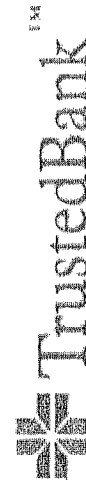
Clearly differentiate between *downloading* and *streaming*.

(4)

With **downloading**, the audio or video file is saved to your computing device. You can then play the file at a later stage without being connected to the Internet. ✓
You have to wait until the whole file is downloaded before watching or listening to the media. ✓ whereas;

With **streaming**, the media file starts playing as soon as the file is opened. It is streamed in real time to your device. ✓
The file is not saved to your computer. ✓

- 6.2 The chairperson of the fundraising committee received the following email.



Dear valued customer of TrustedBank,

We have recieved notice that you have recently attempted to withdraw the following amount from your checking account while in another country. \$135.25.

If this information is not correct, someone unknown may have access to your account. As a safety measure, please visit our website via the link below to verify your personal information:

<http://www.trustedbank.com/general/customerinfo.asp>

Once you have done this, our fraud department will work to resolve this discrepancy. We are happy you have chosen us to do business with.

Thank you,
TrustedBank

Member FDIC © 2005 TrustedBank, Inc

6.2.1 Give THREE reasons why you will be cautious or suspicious of this e-mail.

(accept any THREE ✓✓✓)

(3)

- The banks do not contact customers via email to ask them to log on to their website to verify their personal information.
- There are spelling errors in the email (checking account).
- There is no name or contact details of the person sending the email- only a link is provided.
- The site is not secure: starts with http.

6.2.2 Name TWO ways in which you can confirm that this e-mail is fraudulent (not 'genuine').
(accept any TWO ✓✓)

(2)

- Contact the bank personally/telephonically
- Check the actual web address by looking at the properties of the hyperlink
- Check online to check for similar schemes.

6.2.3 What is the generic or general name given to this type of activity?

(1)

- Phishing✓

6.2.4 Recommend TWO ways you can make sure you do not become a victim of this type of activity.
(accept any TWO ✓✓)

(2)

- Do not click on hyperlinks to gain access to a bank's website, type the name of the bank's URL in the web browser yourself.
- Ensure you have security software installed in your computer.
- Use good password practice
- Do not give out personal information to any person/institution you do not know of.

6.3 "Cyber space can often be viewed as a mysterious and dangerous place with ever present threats that make people mistrust and fear technology."

Supply THREE reasons why you would agree with this statement

(3)

(Accept any THREE valid responses ✓✓✓ to outline the dangers of the Internet.)

- Danger lurking in social networking sites, communication is anonymous as one does not know the true identities of people they communicate with. They can be stalkers, paedophiles etc
- Various forms of computer crimes for example identity theft, hacking, cyber terrorism etc.
- Spread of malware eg viruses, Trojans etc in order to corrupt your data.
- Social Engineering etc.

6.4 The organisers of the variety concert have advised the school to use cloud storage to store video material.

6.4.1 'Ubiquity' is considered to be one of the benefits of cloud computing. What does this term refer to with respect to cloud computing?

(2)

- Ubiquity refers to the fact that access to data in the 'cloud' is not limited by time and distance, ✓ as long as one has an Internet connection 'the cloud' is there all the time no matter where you are, what time it is and what device you are using.

(The 'cloud' is truly everywhere) ✓

6.4.2 Cloud computing can be beneficial for green solutions in terms of hardware. Substantiate the above statement by explaining how cloud computing aids green computing.

(2)

- Making use of cloud computing reduces the use of electricity as fewer hardware devices are required for onsite storage ✓ for example local hard drives with huge capacities are not required. ✓

6.4.3 Cloud computing is said to rely heavily on virtualisation technologies. What does the term *virtualisation* refer to in this context?

(2)

- in the 'cloud' resources of very powerful machines are split between multiple users ✓ or the resources of many machines is combined to create a super powerful service. The illusion is created of a single computer, which in reality is a 'virtual machine'. ✓

6.5 "When many devices are connected to one another and to the Internet, files can be shared by simply making them downloadable from a website."

6.5.1 What is BitTorrent?

- BitTorrent is a peer to peer protocol ✓ used to transfer and share large files across a network such as the Internet. ✓

(2)

6.5.2 Briefly explain how BitTorrent works.

- One needs to firstly install and run BitTorrent client software. ✓
- When the software is installed you have to specify which folder your own downloads should be stored in and which folder contains the files you are sharing with other people. ✓
- Any files in these shared folders become available for anyone else using BitTorrent. A list of the contents of your shared folders is then sent off to a BitTorrent server. ✓

(3)

6.5.3 Outline TWO benefits of using BitTorrent.

(Accept any TWO ✓✓)

- It allows many users to download popular files quickly because it eliminates the bottleneck problem of sharing resources from a single source/server.
- It reduces the cost to the host as no single host has to pay for millions of people downloading the file from their server.
- BitTorrent client software is usually free.
- It offers an effective use of available download bandwidth.

(2)

6.6 Encryption is used in a variety of data communication applications.

6.6.1 What is the general aim of encryption?

- To ensure privacy of data during communication. ✓

(1)

6.6.2 Applications like Dropbox, make use of automatic encryption.

Why is it important for these services to make use of encryption?

- So that not even the employees of the company can access ✓ the files that you store in the cloud. ✓

(2)

TOTAL SECTION F: [38]

GRAND TOTAL: [150]

