GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

COMPUTER STUDIES SG
(Second Paper: Theory)

TIME: 3 hours

MARKS: 150

INSTRUCTIONS:

- Answer ALL the questions.

- This paper consists of 17 pages. Please check that your paper is complete.

QUESTION 1
BINARY LOGIC

1.1 $F(a,b,c) = ac' + a(b + c')$. Determine the value of this function if $a = 1$, $b = 0$ and $c = 1$. (4)

1.2   Consider the two functions, F and G:

$F(x, y) = xy'$

$G(x, y) = x + y'$

Which one of F or G is represented by the truth table below?

x	y	?
0	0	1
0	1	0
1	0	1
1	1	1

(2)

1.3   Reliable Rentals is a car hire company. Below is a list showing 6 of their cars.

Model	Registration number	Boot type	Automatic or manual
Toyota	MDR 134 GP	hatchback	automatic
Volkswagen	DRT 321 GP	boot	automatic
Hyundai	RHP 652 GP	hatchback	manual
Opel	HWF 829 GP	hatchback	manual
Kia	KLG 577 GP	boot	manual
Isuzu	JMB 311 GP	canopy	automatic

Write down the model(s) of the car(s) which meet the following criteria:

1.3.1   Manual AND NOT hatchback

1.3.2   NOT automatic OR canopy   (4)

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QUESTION 2
COMPUTER ARCHITECTURE

2.1   A computer uses different types of memory for the storage of data and instructions. Four kinds of memory are:

A.   RAM
B.   Cache memory
C.   ROM
D.   Virtual memory

Questions 2.1.1 to 2.1.6 refer to these four kinds of memory. Answer each question by writing down the correct letter(s) chosen from A to D above.

2.1.1   Which type(s) of memory retain(s) data when the computer is switched off?

2.1.2   Which kind of memory is used as the main storage area for programs that are running on the computer?

2.1.3   Which of these memory types can be upgraded by plugging more memory modules into the motherboard?

2.1.4   The storage space for one of these types of memory is actually found on the hard disk. Which one is it?

2.1.5   Which type of memory must be refreshed constantly to retain its contents?

2.1.6   Which type of memory is referred to in the following sentence? "This memory is also known as static RAM – it uses transistors in a flip-flop configuration."   (6)

2.2   The memory types shown in Question 2.1 are forms of primary memory. The hard disk of a computer is referred to as secondary memory.

2.2.1   Name TWO other types of secondary memory.   (2)

2.2.2   Which of the following is typical of the amount of space on a hard disk?

256 MB   512 KB   80 GB   (1)

2.3   An advertisement shows two CPUs as follows:

CPU A	CPU B
Intel P3 1.13 GHz 32 KB L1 512 KB L2 Bus speed 133 MHz	Intel 2.4 GHz CPU cache 32KB L1 512KB L2 Bus speed 400 MHz

What is the speed at which CPU B processes instructions?   (1)

2.4   Which of the following are found inside a CPU?

A.   CU (Control Unit)
B.   RAM
C.   BIOS
D.   System clock
E.   ALU (Arithmetic Logic Unit)
F.   Registers   (3)

2.5   CPU manufacturers are always trying to improve processors (CPUs), so that computers can perform faster and better. One method of doing so is to make use of hyperthreading.

2.5.1   What is **hyperthreading**?   (2)

2.5.2   Name TWO other methods that are used to improve the speed of processors.   (2)

2.6   Data is transferred between the CPU and RAM by means of the internal bus (also called the system bus).

    2.6.1   The system bus actually consists of three different buses. Name these THREE buses.   (3)

    2.6.2   New technology has been designed to replace this system bus (and join together internal and external buses). What is this new technology called?   (1)

2.7   A USB interface can be used to connect a modem, digital camera, memory stick and many other devices to one's computer.

    2.7.1   What does **USB** stand for?   (1)

    2.7.2   Apart from the types of devices that can be plugged into a USB port, name TWO other characteristics of USB.   (2)

2.8   The table below shows different buses or interfaces on the left, and descriptions on the right. Match each item 2.8.1 to 2.8.4 to the correct description. Write only the question number and the letter (e.g. 2.8.5 E).

2.8.1 Firewire	A. A bus which has its own controller; the presence of this controller makes it a faster bus than older buses
2.8.2 PCI	B. A high speed interface, often used on servers; one can attach hard drives, CD drives and scanners to it
2.8.3 SCSI	C. A graphics port which has direct access to the main memory
2.8.4 AGP	D. A serial port which is often used to transfer digital video images from a camera to a desktop computer

(4)

2.9   Graphics in computer games display faster if one has a 3D video card, rather than a standard video card. Name the TWO components on a 3D video card which are not built into a standard video card.   (2)

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QUESTION 3
SYSTEM SOFTWARE

3.1 The system software on a computer is made up of several different types of programs. The operating system, such as Windows XP or Linux, is only one of these types.

    3.1.1 Name TWO other types of system software (that is: programs other than operating systems). You may answer by giving the types of software, or the names of such programs. (2)

    3.1.2 Give TWO facts about the Linux operating system, that distinguish it from Windows XP. (2)
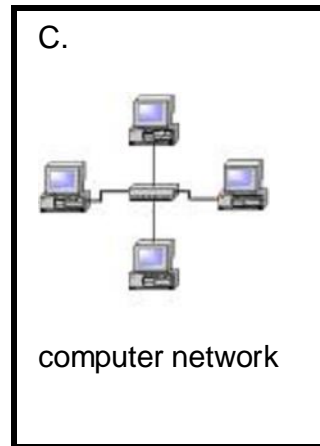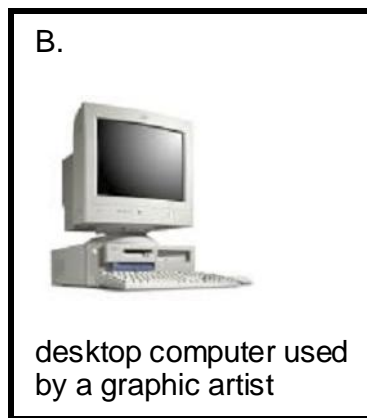
3.2 Three other operating systems are:

    3.2.1 Unix

    3.2.2 Palm OS

    3.2.3 Mac OS X

Match each one of these to the appropriate computer or network, as shown in the diagram below. Write only the question number and the letter (e.g. 3.2.4 D).

A.

B.

desktop computer used by a graphic artist

C.

computer network

(3)

3.3   The table labelled A to E shows different functions of an operating system.

The table numbered 3.3.1 to 3.3.5 shows descriptions of user actions and operating system responses. Match each description to the correct function. Write only the question number and the letter (e.g. 3.3.6 F).

A	process management
B	device I/O management
C	file I/O management
D	security management
E	management of primary memory

User actions		How the operating system (OS) responds
Tommy logs on at his computer by typing in his username and password.	3.3.1	OS checks to see if the password that Tommy typed matches his username.
Tommy clicks on an icon to open the program "MSWord".	3.3.2	OS allocates space in RAM for the data and instructions of the "MSWord" program.
	3.3.3	OS allocates CPU time to the instructions of the "MSWord" program.
Tommy clicks on the print icon to print a document.	3.3.4	OS sends characters to the printer.
Tommy saves the document that he has just created.	3.3.5	OS uses the FAT (File Allocation Table) to keep track of where this document is saved.

(5)

3.4   One of the goals of a well-designed operating system is to have minimal turnaround time. What is **turnaround time**? (2)

3.5   Write down the missing word for each of the following statements.

3.5.1   The _____ is the critical part of the operating system, which stays in primary memory at all times.

3.5.2   The _____ is a program which collects print jobs into a queue, and sends them to the printer one by one. (2)

3.6   Network operating systems perform special functions to run and manage a network. List THREE of these functions. (3)

3.7 Any computer user should perform certain tasks regularly, in order to keep a computer well maintained and functioning properly. Name TWO of these tasks. (2)

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QUESTION 4
DATA COMMUNICATION

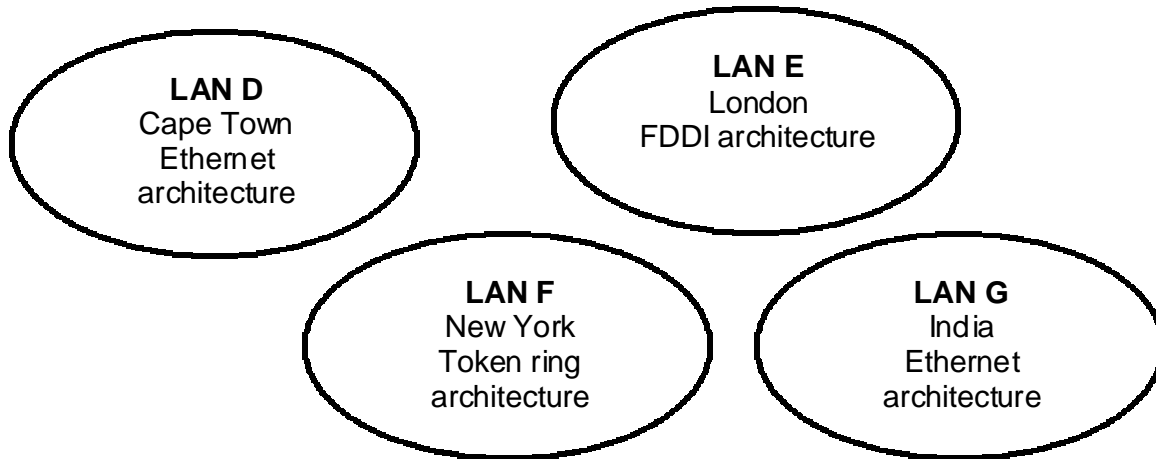| Welcome to |
Digita Network
Username: _____
Password: _____
Logon

Diagram A

Digita Network
Access Denied
You do not have permission to access this file. Please contact the system administrator.

Diagram B

4.1 Janet Smith works in a company that has a client-server network. Diagram A above shows the window where Janet logs on with the username "JanetS".

4.1.1 What is a client-server network? (2)

4.1.2 (a) Name another type of network. (1)

(b) Explain how the network you named in 4.1.2 (a) differs from a client-server network. (1)

4.1.3 When Janet clicked on Staffsalaries.xls. she received an "Access denied" message (Diagram B). This shows that the user JanetS does not have permission to view this file. Who normally sets these rights and permissions on a server? (1)

4.2 The diagram below shows four LANs. Study the **LAN architectures** indicated for each LAN and answer the questions which follow.

LAN D
Cape Town
Ethernet
architecture

LAN E
London
FDDI architecture

LAN F
New York
Token ring
architecture

LAN G
India
Ethernet
architecture

4.2.1 Draw a sketch showing the topology which would be used in **LAN F**. (Use five computers in your sketch; you can use a symbol like this to represent a computer: ⌐⌐ .)

(2)

4.2.2 Write down the name of the topology that you sketched in your answer to Question 4.2.1. (1)

4.2.3 Can UTP cables be used in **LAN D**? (1)

4.2.4 Name an inter-network device which can be used to connect **LAN D** and **LAN G**. (These two networks use the same protocol.) (1)

4.2.5 **LAN D** and **LAN F** use different protocols. What inter-network device is needed to connect these two LANs? (1)

4.2.6 What is a **protocol**? (2)

4.2.7 What is the name of the protocol, commonly used today, which is needed for a network to have access to the Internet? (1)

4.3 The table below shows three kinds of cables (labelled A, B and C). Match each of the sentences 4.3.1 to 4.3.4 to the right kind of cable. Write only the question number and the letter (e.g. 4.3.5 D.)

A. UTP	B. coaxial	C. fibre optic

4.3.1 This cable has an inner conductor, an outer conductor and insulating material.

4.3.2 This cable is immune to eavesdropping.

4.3.3 This cable uses wires that are twisted around each other.

4.3.4 This cable uses light to transmit data. (4)

4.4 What term is used to describe the transmission of data when

4.4.1 data is transmitted one bit at a time?

4.4.2 several bits are transmitted at the same time?

4.4.3 data is transmitted from computer **A** to computer **B**, as well as from computer **B** to computer **A**, at the same time? (3)

4.5 Media access methods determine how and when computers send messages on a network. From the list below, choose the term(s) which apply to the descriptions in 4.5.1 and 4.5.2.

RAID, circuit switching, CSMA/CD, parallel transmission, token passing, asynchronous transmission

4.5.1 In this method, only one workstation can send a message at a time, therefore no collisions take place. (1)

4.5.2 In this method, messages are sent at random intervals and collisions can take place. (1)

4.6 Explain how cell switching works. (4)

4.7 More and more people use an ADSL connection to connect to the Internet. In such a connection there is more bandwidth when you download than when you upload data.

4.7.1 What is **bandwidth**? (2)

4.7.2 What should one consider when deciding whether or not to sign up for an ADSL line? (2)

4.8 When data is transmitted without the use of cables, this is referred to as transmission via unbounded media. Name THREE kinds of unbounded media. (3)

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QUESTION 5
INTERNET

5.1 A web browser is a program used to view Internet pages. Name TWO web browsers. (2)

5.2 Complete the missing word(s) in the following sentence.

"To be able to view pages on the Internet from your own computer, you need to sign up with an _____, pay a monthly amount, and connect to the Internet through their servers." (1)

5.3
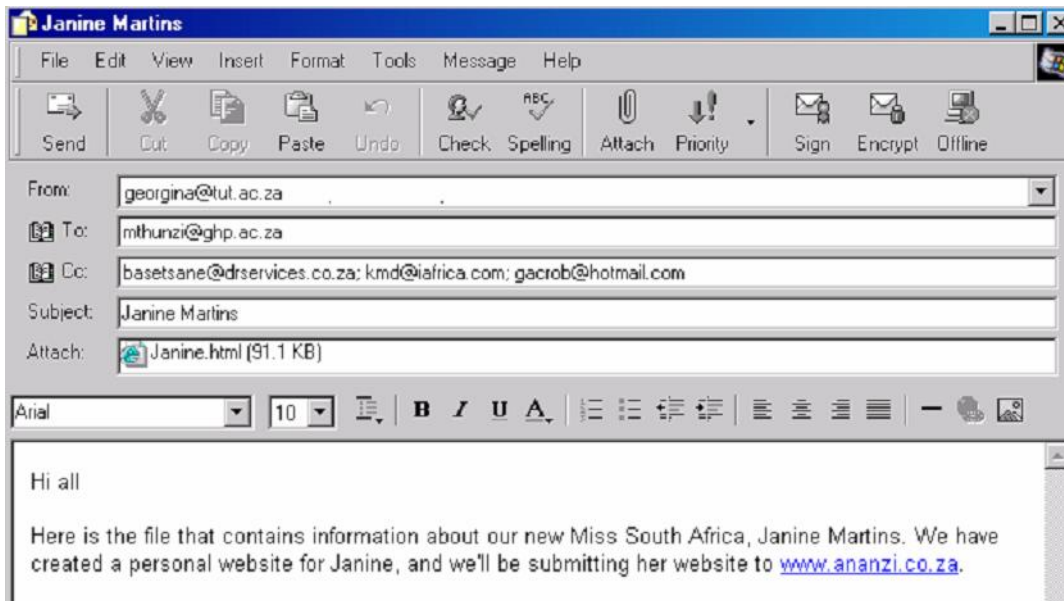
5.3.1 This e-mail has a document attached. What is the size of the attached document? (1)

5.3.2   The sender of this e-mail is georgina@tut.ac.za. Apart from her name, her e-mail address consists of three parts:

        X.   tut

        Y.   ac

        Z.   za

Which one of these indicates the following?

(a)   The type of organization which the sender belongs to   (1)

(b)   The country where that e-mail address is registered   (1)

Write only the question number and the letter (e.g. 5.3.2.(c) Q).

5.3.3   To how many persons is this e-mail being sent?   (1)

5.3.4   What search engine is mentioned in this e-mail?   (1)

5.4   Study this business card and answer the questions which follow:

5.4.1   Write down the URL that appears on this business card.   (1)

5.4.2   What is **web hosting**?   (2)

5.5   Study the following extract from a web site, and answer the questions which follow:
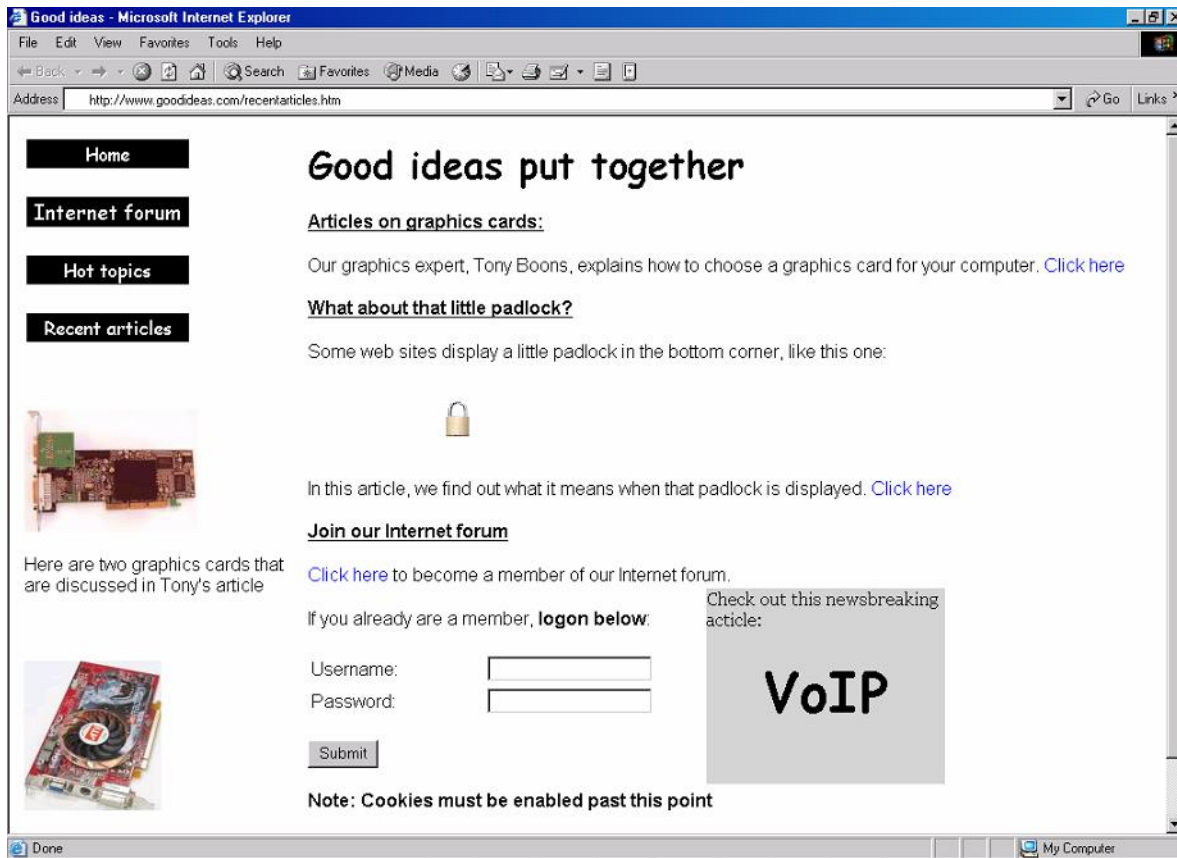
5.5.1   What is a **cookie**?   (2)

5.5.2   What is an **Internet forum**?   (2)

5.5.3   When a little padlock is shown in the bottom corner of a web page it indicates that this web page is displayed via a Secure Sockets Layer. What is the **Secure Sockets Layer**?   (2)

5.5.4   What is **VoIP**?   (2)
                                                                                                                              [19]

QUESTION 6
SOCIAL IMPLICATIONS

6.1   The existence of computer networks has changed our lives in many ways. Name
        THREE ways in which these networks have created new threats in our lives.   (3)

6.2   Sally received a stiffy disk with one spreadsheet file on it, which she needs to
        open and print. The person who created this file, encrypted it before saving it on
        the stiffy.

        6.2.1   What does it mean when a file has been **encrypted**?   (2)

        6.2.2   Name ONE other method that can be used to protect a document or
                  spreadsheet.   (1)

6.3   Computers are becoming more common in schools around our country. They
        can be used in education in many different ways.

        6.3.1   Name TWO different **types** of educational computer programs.   (2)

        6.3.2   Name TWO advantages of using a computer program in the learning
                  process.   (2)

6.4   Smart cards are also becoming more common in our society.

        6.4.1   What is a **smart card**?   (2)

        6.4.2   Name TWO uses of a smart card.   (2)

6.5   When shopping on the Internet, one is often asked to fill in one's e-mail address.

        6.5.1   Give ONE disadvantage of filling in one's e-mail address at an Internet
                  shopping site.   (1)

        6.5.2   Despite the disadvantages, people shop on the Internet anyway. Give
                  TWO reasons why it is still worth buying goods on the Internet.   (2)
                                                                                      [17]

QUESTION 7
APPLICATIONS AND PACKAGES

7.1 One type of program found in an Office suite is a word processor. Name THREE more **types** of programs that can be found in an Office suite. (3)

7.2 What is **freeware**? (1)

7.3 What is **shareware**? (1)

7.4 What is each of the following programs used for?

7.4.1 Flash (1)

7.4.2 Accpac (1)

7.4.3 Frontpage (1)

7.5 Any computer file can be compressed so that it takes up less space on disk. Name ONE program that is commonly used to compress files. (1)

7.6 Fantasy Fragrances is a company that employs students to demonstrate their perfumes in certain shops. Their secretary, Mary Booi, created the following spreadsheet. It shows the number of hours that each student worked in January, February and March. Students only get paid at the end of March for all the hours worked from January to March.

	A	B	C	D	E	F	G	H	I	J
1			Jan	Feb	Mar	Total hours	Paymen	Average per month	Paic	Possible bonus
2	Smith	Martin	12	17	13	42		14.000	Y	
3	Mampuru	Christina	14	18	11	43		14.333	Y	
4	Mbeki	Vusi	12	13	11	36		12.000	N	
5	Van Vuuren	Andries	10	11	13	34		11.333	N	
6	Tayob	Rabia	16	12	18	46		15.333	Y	
7										
8	Fee per hour:		120							

7.6.1   In the column Average per month Mary used a function to display the average of the hours worked by each student. What did she type in cell **H2**? (2)

Mary places the following in column J:

J
cell J2: =IF(H2>12, "Yes", "No")
cell J3: =IF(H3>12, "Yes", "No")
cell J4: =IF(H4>12, "Yes", "No")
cell J5: =IF(H5>12, "Yes", "No")
cell J6: =IF(H6>12, "Yes", "No")

7.6.2   What will be displayed in cell **J3**? (1)

7.6.3   What will be displayed in cell **J4**? (1)

7.6.4   The students are paid R120 per hour. This fee is displayed in cell C8. Mary wants to place a formula in cell **G2** that she can copy to the rest of the column, to show what each student must be paid. Which one of the following is a correct option for cell **G2**?

A. =F2*C8

B. =F2*C8 (2)

7.7   Fantasy Fragrances also lets the students sell perfumes for them. They keep details of the students' sales in the database table shown below:

Surname	Name	Received	Sold	Kept
Smith	Martin	60	35	5
Mononela	Christina	65	42	10
Mbeki	Vusi	55	12	5
Van Vuuren	Andries	75	38	8
Tayob	Rabia	25	21	2

7.7.1   Mary has started creating a query to show all students whose surnames start with an **M**. To complete the query, what must she type in the block marked **X**? (2)

Field:	Surname	Name
Table:	Students	Students
Sort:		
Show:	P	P
Criteria:		
or		

X

7.7.2   Students may keep some bottles of perfume which they can buy at a special price for themselves. Mary created a query (shown as Query 7.7.2) to show the amounts that students must pay her for bottles that they kept. The table **Results 7.7.2** shows the first row of the results when she runs query 7.7.2.

(a)   What will be displayed at (a)? (1)

(b)   What will be displayed at (b)? (1)

Query 7.7.2

Field:	Surname	Name	Received	Kept	Account: [Kept] * 10
Table:	Students	Students	Students	Students	
Sort:					
Show:	P	P	P	P	P
Criteria:					
or					

Results 7.7.2

Surname	Name	Received	Kept	(a)
Smith	Martin	60	5	(b)

[19]

TOTAL: 150

END