**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2012

INFORMATION TECHNOLOGY P2

MARKS: 180

TIME: 3 hours

INFDM2

This question paper consists of 12 pages.

INSTRUCTIONS AND INFORMATION

1.   This question paper consists of SIX questions.

2.   Answer ALL the questions.

3.   Read ALL the questions carefully.

4.   Number the answers correctly according to the numbering system used in this question paper.

5.   Write neatly and legibly.

SECTION A: MULTIPLE CHOICE QUESTIONS

QUESTION 1

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 (1.1 – 1.10) in the answer book.

1.1 USB and Firewire have many advantages. Which is NOT an advantage of these connection types?

    A   USB and Firewire is fast.
    B   There is USB support for many devices today.
    C   USB devices tend to be more expensive than other devices.
    D   USB and Firewire devices are portable   (1)

1.2 Which one of the following statements is incorrect?

To make Plug and Play possible, the ...

    A   BIOS must support Plug and Play.
    B   CPU must support Plug and Play.
    C   operating system must support Plug and Play.
    D   device being installed must support Plug and Play.   (1)

1.3 Connecting a device to a computer without first shutting it down is known as ...

    A   modular design.
    B   GUI.
    C   plug and play.
    D   hot plugging.   (1)

1.4 Splitting one physical drive into more than one "virtual drive" is known as …

    A   partitioning.
    B   booting.
    C   formatting.
    D   slack.   (1)

1.5 Which is NOT an attribute of a file?

    A   Size of the file
    B   Cluster of the file
    C   Creation date of the file
    D   The file type   (1)

1.6 Which is NOT a device required for a network?

    A   Network Card
    B   Switch
    C   USB hub
    D   NOS   (1)

1.7   Which is NOT a valid SQL statement?

    A   SELECT * FROM CD_Table ORDER BY genre
    B   SELECT * FROM CD_Table WHERE Genre = Jazz
    C   SELECT CD_Name, Artist FROM CD_Table WHERE Price > 100
          AND Price < 150
    D   SELECT CD_Name, Artist, Genre WHERE Genre IN ("Jazz", "Pop",
          "Reggae")   (1)

1.8   Which is the correct order of the machine cycle?

    A   Fetch, transfer, decode, execute
    B   Decode, fetch, transfer, execute
    C   Fetch, decode, transfer, execute
    D   Transfer, decode, fetch, execute   (1)

1.9   Which is the odd one out?

    A   Firewall
    B   Spyware
    C   Virus
    D   Worm   (1)

1.10   What is the best form of defence against Internet threats?

    A   Opening banking sites from a link in an email
    B   Opening attachments from unknown sources
    C   Loading two antivirus packages
    D   Applying common sense   (1)

Match COLUMN A with the correct answer in COLUMN B. Write down only the question number and the matching letter in COLUMN B in your answer book.

COLUMN A		COLUMN B	
1.11	This board houses the CPU	A	Object Oriented Processing
1.12	Networks	B	IRC
1.13	Ethernet	C	High speed, high bandwidth connection to the Internet
1.14	OOP	D	For loop
1.15	Social Networking	E	Disk based
1.16	Protocol	F	Sharing hardware
1.17	Virtual Memory	G	Motherboard
1.18	Broadband	H	Authenticity, validity, verification
1.19	Looping over a known number of records	I	Rules for determining data transfer
1.20	Trusting data	J	Object Oriented Programming
		K	Repeat – Until loop
		L	802.3	(10)

TOTAL SECTION A: 20

SCENARIO
You have just finished matric and you are wanting to gain experience in the IT world. The father of a friend owns an IT company. You approach Mr Bug and ask if he will employ you. He agrees and teams you up with one of his experienced technicians.

SECTION B: HARDWARE AND SOFTWARE

QUESTION 2

You are asked to supply specifications for a business that wants to start an Internet cafe and gaming lounge. The manager also requires a machine for the running of the business. You give the following specifications in a quote.

Machine 1	Machine 2	Machine 3 (Laptop)
TForce 6100-939 socket 939 motherboard 667MHz FSB Intel i7 Quad core Processor 2.90GHz Nvidia GeForce GTX 570 512MB PCI VGA card 620GB HDD Vista Ultimate CD/DVD rewriter 4GB RAM Ergonomically designed keyboard and mouse 10/100 Ethernet port 21" LCD screen	TForce 6000-775 socket 775 motherboard 667MHz FSB Intel dual core 3.60GHz Processor 1GB PCI-x graphics 1TB HDD Vista Home Edition CD/DVD rewriter 2GB RAM Ergonomically designed keyboard and mouse 10/100 Ethernet port 17" LCD screen	15.4" XGA screen 640GB HDD 2GB RAM Intel core i5 T3400 2.60GHz CPU CD/DVD writer Web cam 802.11 wireless Vista Home Premium 10/100 Ethernet port
R15 999	**R6 999**	**R7 500**

2.1   Study the machine specifications above and answer the following questions:

2.1.1   For the gaming lounge, which of the desktop machines above would you recommend? List THREE reasons for your answer.   (4)

2.1.2   Which machine would be appropriate for the Internet cafe? Give ONE reason for your choice.   (2)

2.1.3   Give FIVE questions one should ask of a person wanting to buy a computer system which would help you in recommending a system.   (5)

The owner of the Internet cafe is not too clued up on computers but he does have some specific requirements. One of his requirements is that the main machine which does all the accounting has to be very reliable and the performance must be good. The technician you are shadowing suggests using RAID technology.

2.2   2.2.1   Which TWO hardware components of a computer make up a RAID system?   (2)

        2.2.2   RAID level 1 is used in areas where data availability is critical. Name this RAID configuration and, with the aid of a diagram, explain how it works. Indicate whether it has a high, medium or low fault tolerance.   (6)

        2.2.3   What are the TWO main design goals of RAID technology?   (2)

        2.2.4   What is RAID 5 called?   (1)

You have learned that the motherboard and CPU play a very significant role in determining the performance of the computer. You don't really understand the significance of this so you have some queries regarding the quote.

2.3   2.3.1   What does FSB stand for?   (1)

        2.3.2   What is the reason for quoting this value?   (1)

        2.3.3   In terms of improving CPU performance, describe how increasing the register size would help.   (3)

        2.3.4   Name and describe THREE ways of improving CPU performance, excluding describing register size.   (6)

Following your advice, they decide to purchase 21" LCD monitors throughout.

2.4   2.4.1   What does 21" mean?   (1)

        2.4.2   Give TWO reasons why these screens are more advantageous than the older CRT screens.   (2)

A network server needs to be installed.

2.5   2.5.1   What network topology would you recommend and state a reason for your choice.   (2)

        2.5.2   Draw a labelled sketch of this topology.   (3)

        2.5.3   What cable type would you use for this network?   (1)

The technician invites you to meet with him and the owner of the Internet cafe and gaming lounge to discuss Internet connectivity. You tell the owner of the Internet cafe that he requires some additional hardware to enable him to connect to the ISP. This hardware, you explain, is a router.

2.6   2.6.1   What does ISP stand for?   (1)

      2.6.2   Describe the function of a router.   (3)

The solution requires that two buildings need to be connected together which are 150 m apart.

2.7   2.7.1   What cable type would you suggest?

               Give a reason for your choice.   (2)

      2.7.2   Give THREE advantages of your proposed solution over wireless.   (3)

To ensure a high speed network for the gaming lounge, you quote on a 1GB/s network card. After installing a new plug and play network card, a serious error is detected.

2.8   2.8.1   What is meant by the term plug and play?   (2)

      2.8.2   The drivers for this card are not included in the operating system and will have to be installed from the CD that came with the card. Explain what a driver is.   (3)

TOTAL SECTION B: 55

SECTION C: APPLICATIONS AND IMPLICATIONS

QUESTION 3 e-COMMUNICATIONS

The possibility of using wireless to connect gaming machines together and allowing Internet users to bring their own laptops to the Internet cafe has been discussed.

The problems associated with e-communications are two-fold. The Internet was designed to be a trustworthy environment and, secondly, e-communications is largely anonymous.

3.1 3.1.1 Discuss and critically comment on the above statement. (4)

3.1.2 What is a hacker? (2)

3.1.3 Using an example, explain what the purpose of phishing is. (3)

3.1.4 Using an example, explain what identity theft is. (3)

One way of providing security on certain web sites is to make use of digital signatures.

3.2 What security do digital signatures provide and to whom? (2)

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QUESTION 4 SOCIAL AND ETHICAL ISSUES

You also suggest to the Internet cafe owner the use of software to monitor keystrokes because you hear there are criminals who use the Internet for their activities and you want to gather information to help in the prosecution of these people.

4.1 What is this kind of software called? (1)

4.2 Is it ethical to load this software to monitor people's activities?

Justify your answer. (2)

It is obvious that information differs substantially from website to website.

4.3 Give TWO hints on how you can ensure the information is trustworthy. (2)

4.4 Name and explain FOUR forms of e-communication. (8)

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TOTAL SECTION C: 27

SECTION D: PROGRAMMING AND SOFTWARE DEVELOPMENT

QUESTION 5   ALGORITHMS AND PLANNING

The owner of the Internet cafe indicates the need for some form of accounting program as well as some software to control the Internet on each of the machines. Because of your programming knowledge, you decide to manage this project. Some of your friends are keen programmers but have not been taught the finer details of programming yet.

When testing the program a friend wrote to do the accounting, the program crashes with an overflow error.

5.1   5.1.1   What is meant by the term overflow error?   (2)

       5.1.2   What is the solution to such an error assuming there is no logic
                error in your code?   (2)

       5.1.3   Why does an overflow occur less with real numbers than with
                integers?   (2)

Your friend's program makes use of text files which are used in moving data between a database and the accounting program. To get data from Access to another software package, a CSV file is exported to.

5.2   5.2.1   What does CSV stand for?   (1)

       5.2.2   Could you use a FOR loop to read the records in the CSV file?

                Briefly motivate your answer.   (2)

       5.2.3   What type of loop should one use in this case?

                Motivate your answer.   (2)

The database is badly designed. There is a lot of data duplication. Multiple tables are being used but there is no use of primary keys or relationships.

5.3   5.3.1   How can one get rid of data duplication?   (1)

       5.3.2   What is a primary key?   (2)

       5.3.3   The integrity of the data is linked to the GIGO principle. Explain
                what this statement means.   (2)

Assume you have a database design with a table called Client_Details with the following fields:

- Initials: text
- Surname: text
- ID_Number: text
- Cell_No: text
- Id_Picture: image
- Start_hour: integer
- End_hour: integer
- Start_min: integer
- End_min: integer
- Data_used: real
- Credit: real
- Cost_per_min: real

The total time the person uses the Internet for is calculated using the start_hour, end_hour, start_min and end_min fields

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5.4   5.4.1   Which field would be appropriate to use for the primary key?

                 Motivate your answer.   (2)

        5.4.2   The ID_Number is declared as a text field. Why is it not a number field because an ID number is only digits?   (2)

        5.4.3   Explain why the Cell_No field is declared as text?   (2)

An application needs to be written which will use SQL to manipulate the database.

5.5   5.5.1   Explain in detail what SQL is (not what it stands for) and how it can be used in this particular system.   (6)

        5.5.2   Write an SQL statement which will display all fields   (2)

        5.5.3   Write an SQL statement which will display the client's surname, initials, ID number and their credit. The names must be sorted alphabetically. The data must only be displayed if their credit is over R100.   (5)

        5.5.4   An SQL statement is required to calculate the amount owing for a particular session based on the time spent on the Internet and their credit. Display the client surname, initials and amount owing. Sort the names alphabetically.   (7)

TOTAL SECTION D: 42

SECTION E: INTEGRATED SCENARIO

QUESTION 6

Now that you have had experience with a large client, Mr Bug decides to send you on a job on your own. This is a client who is requiring a network upgrade, connectivity to the Internet, email and a POS (point of sale) terminal. The client is situated in an extremely rural area, far away from services.

Your first challenge is to decide on the network infrastructure. You decide on a star topology, client/server configuration with one machine serving as an Internet mail/proxy/cache server. You are also asked to look into the possibility of setting up a small computer lab of 15 thin clients to be used as a training venue for the local people.

6.1   6.1.1   What is meant by the "topology" of a network? (1)

      6.1.2   What THREE advantages does this topology have over a bus topology? (3)

The server has to be powerful because of all the machines it is going to control and because of the thin clients. You specify an i7 quad core processor, 12GB RAM and a SCSI disk array of 5 disks running in a RAID 5 configuration with a hot swappable drive bay.

6.2   6.2.1   What does quad core mean? (1)

      6.2.2   What does the term hot swappable mean? (1)

      6.2.3   You explain that the server is capable of multitasking. Describe in your own words what multitasking is. (3)

The machine only has 12GB RAM. When you open the task manager, you notice the total memory used is 14.5GB.

6.3   6.3.1   How is this possible to use more memory than there is RAM? (1)

      6.3.2   Explain how this "extra" memory works. (3)

You connect a shared printer on the network. However, it is not working.

6.4   List THREE troubleshooting steps you can perform to get the printer working. (3)

Based on the fact that the client is in a rural area with few services, you recommend a dedicated Internet server be configured. This server will run Linux and will run a proxy server to cache web pages and it will run mail services as well as a firewall.

6.5   6.5.1   Explain what web caching is and how this will help this client.   (3)

6.5.2   A firewall uses ports to control Internet traffic. Explain the concept of a port as used on networks.   (3)

6.5.3   SSL could be used to access the linux machine. What is SSL?   (2)

6.5.4   After using the mail system for a while, one user starts getting a lot of junk mail. What is this junk mail called?   (1)

This client is in a very rural town where communications is very unreliable to non-existent. Power is also a major problem in that there are frequent power failures.

6.6   6.6.1   What would you recommend for this business to connect to the Internet? Justify your choice.   (2)

6.6.2   What device could this company purchase against power failures? How will it protect their system?   (4)

Your client asks about how the network would connect together. You recommend using switches. The client says hubs are cheaper and would prefer to use them.

6.7   Argue why it would be better to use switches rather than hubs by describing the differences between them. What is the result of using a switch in place of a hub?   (4)

TOTAL SECTION E: 35

GRAND TOTAL: 180