Province of the
EASTERN CAPE
EDUCATION

NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2011

INFORMATION TECHNOLOGY P2

MARKS: **180**

TIME: **3 hours**

INFTE2

This question paper consists of 14 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 The following does not influence the performance of a computer:

A The processor
B The amount of RAM
C The BIOS
D The bus width (1)

1.2 Striping is a technology used with …

A memory.
B caching.
C busses.
D hard drives. (1)

1.3 The best connectivity method for continuous Internet access for a laptop is …

A a LAN connection.
B a fibre optic cable.
C a 3G card.
D an ADSL. (1)

1.4 Which best describes the North Bridge on a motherboard?

A The chip on the motherboard which connects the fast components together
B A type of Random Access Memory
C A processor type
D A type of integrated network card (1)

1.5 Which ONE of the following is not considered as one of the suite of TCP/IP protocols?

A Telnet
B SMTP
C FTP
D IPX (1)

1.6 A USB 2.0 port …

A is the most efficient method of connecting video to a PC.
B can daisy chain up to 127 devices.
C refers to Universal Software Bridge.
D is slower than a USB 1 port. (1)

1.7 The technique of making provision for possible errors made by the user is known as …

A RAID.
B Defensive programming.
C Format check.
D Input mask in Access. (1)

1.8 Which ONE of the following is not a valid SQL statement?

A SELECT * FROM music_table WHILE artist = “UB40”
B SELECT * FROM music_table WHERE artist = “UB40”
C SELECT DISTINCT artist FROM music_table
D SELECT * FROM music_table (1)

1.9 Which ONE of the following is not an example of a security threat?

A Phishing
B Hacking
C Backups
D Data theft with mobile storage devices (1)

1.10 The purpose of a firewall is to …

A minimize the risk of fire in a computer room.
B allow software on a network to communicate with programs outside the network.
C protect a network from viruses.
D protect a network, preventing unauthorised users and software from accessing it. (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	Email, IM, IRC, Forums	A	Infected by a virus
1.12	Registers	B	Scramble text or data into a new format
1.13	Trusting data	C	Read only memory
1.14	Encryption	D	Temporary storage inside the CPU
1.15	ZIP file	E	Associated with compressed files
1.16	Phishing	F	Operating system for mobile devices
1.17	Computer is slow, erratic	G	Social Networking
1.18	BIOS	H	Free operating system for PCs
1.19	Symbian	I	GIGO
1.20	Linux	J	Associated with Database files
		K	Authenticity, validity, verification
		L	Email trying to get you to click a link to site that looks official but is fake

(10)
[20]

TOTAL SECTION A: 20

SCENARIO

Your father owns an IT service centre and offers to employ the top five students in your IT class in order to gain hands-on experience in an IT environment. You are expected to deal with customers in the shop front as well as go to customers to solve problems on site.

SECTION B: HARDWARE AND SOFTWARE

QUESTION 2

One of your first call-outs is to a local doctor's surgery. The doctor does a lot of work in the evenings from home, researching new procedures on the Internet. The doctor needs advice on computerising his practice. He has a few old computers which are not networked and will need upgrading. He shows you the specifications below for new machines he was quoted on as an alternative.

Machine 1	Machine 2	Machine 3 (Laptop)
Core 2 Quad Intel Processor 2.50GHz 512MB VGA card 320GB HDD Vista Ultimate CD/DVD rewriter 2GB RAM Ergonomically designed keyboard and mouse 10/100 Ethernet port R5 999	Dual Core 2.80GHz Intel Processor 1GB PCI-x graphics 160GB HDD Vista Home Edition CD/DVD rewriter 1GB RAM Ergonomically designed keyboard and mouse 10/100 Ethernet port R4 999	15.4" XGA screen 250GB HDD 2GB RAM Dual core T3400 2.60GHz CPU CD/DVD writer Web cam 802.11 wireless Vista Home Premium 10/100 Ethernet port R5 500

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

2.1.1 Which of the desktop PCs is the better of the two? Justify your answer by listing THREE specifications which are better in the machine of your choice. (3)

2.1.2 The doctor needs to give his receptionist a new machine. Which machine should you recommend for this purpose? Give a brief reason for your choice. (2)

2.1.3 The doctor also requires a new machine rather than an upgraded one. Which one would you recommend for his use? Give a brief reason. (2)

2.1.4 The quote talks about "ergonomically designed keyboard and mouse". What does the term "ergonomically designed" mean? (2)

2.1.5 The doctor says he doesn't need an operating system, but does need Microsoft Office 2007. Explain to the Doctor the need for an operating system by describing TWO of the functions of the O/S. (2)

2.1.6 Intel is a CPU manufacturer. Name ONE other manufacturer of CPUs. (1)

2.1.7 A new requirement of the practice is that of reliability on a machine which will eventually become the server in a network. You recommend a RAID 5 configuration on this particular machine.

(a) What does RAID stand for? (1)

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

(c) Explain with the aid of a diagram RAID 5 technology. (3)

2.1.8 What is the significance of the "10/100" numbers in the above quote? (1)

2.2 The motherboard is the most important board in the computer. The overall performance of the computer can be seriously affected by a poor choice of this component.

2.2.1 The Front Side Bus is an important specification when deciding on a motherboard. Why is this specification so important? (1)

2.2.2 There are two chips on a motherboard, called the Chipset.

(a) Name these TWO chips. (2)

(b) Name the components which connect to one of these chips and state to which chip they connect. (4)

2.2.3 The motherboard contains a BIOS chip.

(a) What role does the BIOS play? (2)

(b) Give details of how it performs this task. (3)

2.2.4 One of your friends says he has heard that a CPU has "CPU Cache" but has no idea what it is.

(a) Explain what Cache Memory is and how it works. (3)

(b) Give ONE other example of caching. (1)

2.2.5 Your father gives you and your friends some group training. He discusses memory management. The operating system manages memory as one of its tasks. Your father explains that one can load more programs than there is memory to cope with them.

(a) What is this "extra" memory called? (1)

(b) Describe how this memory functions. (3)

(c) You suggest that RAM can be saved to cut costs. This results in the hard drive light burning constantly. Explain in terms of this 'extra' memory why this is not a good idea. (2)

(d) What is the condition in QUESTION 2.2.5 (c) known as? (1)

2.2.6 Because all operations on a computer have to be carried out in RAM, this is regarded as a very important component affecting the performance of a computer system. Various designs of RAM have been developed over the years to improve its speed.

(a) DDR Quad Pumping memory has been developed. Explain with the aid of a diagram how it works and give the transfer rate should the bus speed be 266 MHz. (3)

(b) One of the problems of improving bus performance is heat. Name ONE area where research is being carried out to overcome this problem. (1)

2.2.7 List TWO types of external busses which appear on good quality motherboards and give an example of a device which would be connected to each of these. (4)

2.2.8 Modern processors and operating systems are great for improving the productivity of users of computers. Processor design has improved in many ways.

(a) Name and describe TWO of these improvements (excluding pipelining) which contribute to CPU performance. (4)

(b) Explain how pipelining works to improve CPU performance. Refer to the machine cycle in your answer. (2)

TOTAL SECTION B: 55

SECTION C: APPLICATIONS AND IMPLICATIONS

QUESTION 3 e-Communications

Your father keeps your little group busy with training and being sent out on call-outs. You use the Internet in your spare time to do some research and you bring ideas and questions back to the group.

Your father says the recession is taking its toll and the staff needs to improve sales by doing more advertising. You suggest sending advertising via email to all the customers on your database as well as friends whose addresses you know.

3.1 State why this is a wrong approach to take. (1)

3.2 What is this kind of email called? (1)

3.3 Discuss ONE way in which the Internet has changed the way in which one does business. (2)

3.4 You suggest to your father that your team set up a web site for the retail side of his computer business. Give TWO advantages for the customer as well as TWO advantages for the business of this approach. (4)

3.5 The e-commerce approach does come with inherent risks. Discuss TWO things a bank can do to improve the security of their site. (2)

3.6 With regards to security threats on the Internet, describe what a virus is and how one combats this threat. (3)

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QUESTION 4 SOCIAL AND ETHICAL ISSUES

4.1 A client who asks for a quote for a machine suggests that you load her copies of Microsoft Windows and Microsoft Office which are on copied disks to cut costs. Would you accept this suggestion? Substantiate your answer. (2)

4.2 Explain how spyware violates your privacy as an Internet user. (2)

4.3 During some research it became clear to you that information between web sites can differ substantially. Give TWO hints on how you can ensure that the information on a website is trustworthy. (2)

4.4 Internet technology is being used extensively in the medical field. Doctors are now making use of telemedicine. Explain what telemedicine is. (2)

4.5 A client phones in and says she needs to receive news updates on the Internet. You suggest she subscribes to RSS feeds.

4.5.1 Describe the function of an RSS feed. (2)

4.5.2 Give an advantage of using an RSS feed. (1)

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TOTAL SECTION C: 25

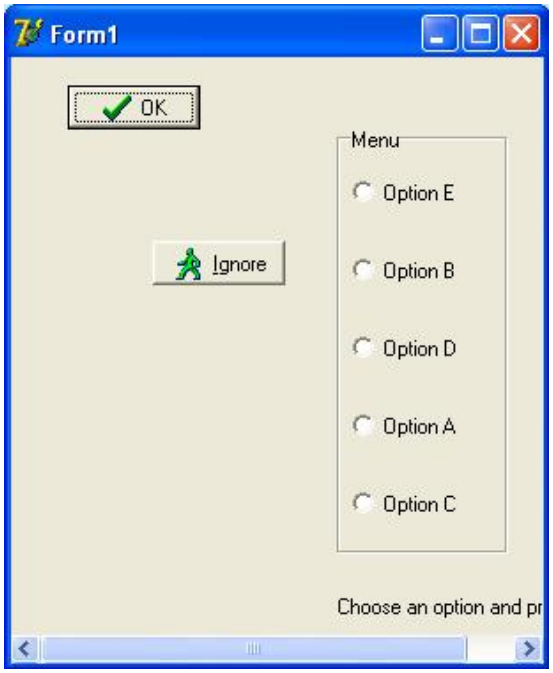
SECTION D: PROGRAMMING AND SOFTWARE DEVELOPMENT

QUESTION 5 ALGORITHMS AND PLANNING

Part of your training with your father's business is to get some experience in software development. You are given various projects to work on as a team with your fellow students.

Your father meets with your group and asks you to come up with a computerised system to help him manage his help desk. Machines are being brought into the workshop with no proper booking or tracking system and as a result some machines have had the wrong work done to them.

5.1 The following interface has been created by one of your friends. The program is supposed to help with booking in of equipment for repairs.

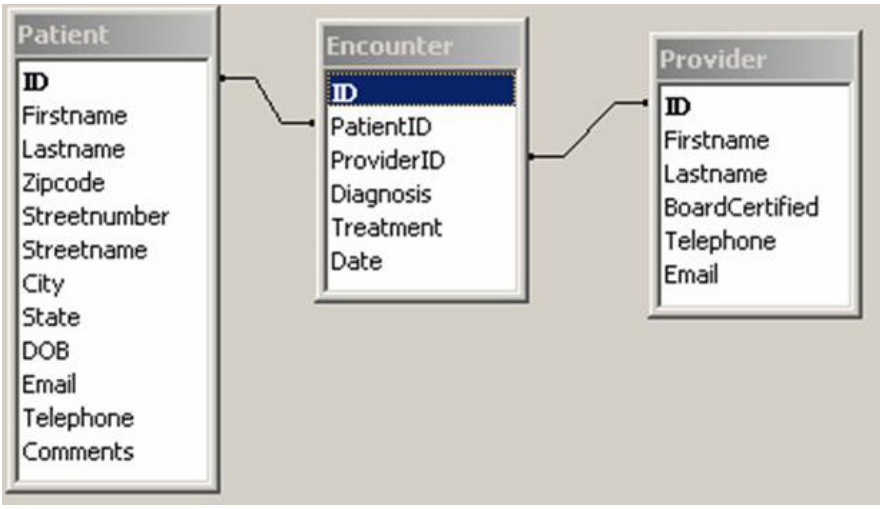


5.1.1 Comment critically on the above interface by giving TWO examples of bad GUI design. (2)

5.1.2 Comment critically on the user friendliness of the above interface. (2)

5.2 The doctor comes back to your father's business and asks for help in designing a system for his practice. He wants to record patient details, visits by patients and who in the practise saw the patient. You suggest using a database and come up with the following linked tables containing appropriate fields.

Study the figure below and answer the questions that follow.



5.2.1 Motivate your suggestion by listing THREE advantages of a database approach. (3)

5.2.2 Study the three tables above. Which field in each table could be an appropriate primary key? (3)

5.2.3 The above database has been normalised. State the main aim of normalising a database. (1)

5.2.4 The doctor needs to generate reports from his database. He gives you the following queries he wants incorporated in the system. Write the SQL code to generate these reports.

(a) Display all patients' details in alphabetical order of surname. (3)

(b) Display the lastname, firstname, Streetnumber, Streetname and City of all patients who reside in a city which is typed into an edit called edtCity. Sort the results by city. (4)

(c) Display the lastname, firstname and treatment that a patient has undergone sorted in order of newest treatment first. (4)

5.3 Your father's business expands to include an ISP. To manage this, your father needs a program to generate passwords for his clients. The specifications are:

- Type in the clients surname
- Type in the clients year of birth, yyyy
- Get the current time in the format hhmm from the system
- Create a password using the following rule
    - Password <- character(1) and a random character of the surname + the remainder after dividing {1} by {2} where {1} is the larger of the year of birth and the time and {2} is the smaller of these two numbers

Write an algorithm to generate this password. Use pseudo code, not programming code. (7)

Your groups programming techniques have come along nicely. Your father decides to test them out and he gives your group a task. It is the following:

- Design a card game using OOP principles for the cards.
- The class must have the following fields:
    - Picture, value, suite.
    - The class should contain a private method to shuffle the cards.

5.4.1 What does OOP stand for? (1)

5.4.2 Write down the definition of the class. (6)

TOTAL SECTION D: 36

SECTION E: INTEGRATED SCENARIO

QUESTION 6

You have been called on by the doctor to implement phase 2 of the upgrade which is to upgrade the hardware and network the machines at his practice. He also requires Internet for all the machines.

6.1 The first thing you need to decide on is the cabling topology for the network.

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

6.1.2 Name ONE cabled network topology. (1)

6.2 Next you need to decide on the role of the computers in the network. In other words, should you design a client/server or peer-to-peer network.

6.2.1 Describe the main characteristic of Clients, Servers and Peers. (3)

6.2.2 Compare client/server and peer-to-peer networks in terms of performance and security. (4)

6.2.3 Which model would be the better one for the doctor's practice? Substantiate your answer. (2)

6.2.4 You use a switch to connect all the machines together in the LAN. You could have used a hub because they are cheaper. What is the main difference between a switch and a hub? (2)

6.3 The doctor decides that once his practice is on the web, he would like to implement direct payments through the Internet. To keep the transactions secure ,they need to use SSL.

6.3.1 Name ONE thing to look at to make sure you are visiting a web site that uses SSL for security. (1)

6.3.2 SSL uses encryption to ensure data is not "sniffed" on the line and confidential information stolen. Briefly explain the concept of encryption and decryption. (2)

6.4 The new network is set up and all machines are communicating with one another and the Internet. The doctor is excited and is doing some research on the Internet. He calls me over to show me something he has found on the net.

I am shown a web page where it is stated that the life expectancy after being diagnosed with lung cancer is only two months. The doctor finds this hard to believe. Argue the validity of this statement. (3)

6.5 With the network connected to the Internet, security measures need to be put in place to protect data and the network.

6.5.1 Give THREE ways of protecting your data. (3)

6.5.2 Describe ONE way of protecting the network against intrusions. (1)

6.5.3 The device described in QUESTION 6.5.2 uses the concept of a port to block intrusions into a network. Explain, making reference to protocols, what a port is and how this device uses it to block access. (2)

6.6 One of the staff at the doctor's practice registers the practice on Facebook with all the doctor's details, e.g. names, address, ID number, email, etc. You suggest this is foolish because it opens the doctor up to identity theft.

6.6.1 Describe TWO ways an identity thief can use this information. (2)

6.6.2 Staff started getting spam mail. One staff member thinks she has won a UK lottery. The email states that to claim the prize she needs to follow a link where confidential information is requested. You explain this is Social Engineering.

(a) Explain what social engineering is. (2)

(b) Give TWO ways of combating it. (2)

6.7 In terms of finishing off the work at the doctors practice, you install anti-virus software on all machines and set them to update once a day.

6.7.1 Why does the virus database need to be updated so often? (1)

6.7.2 Give a definition of a computer virus. (3)

6.7.3 Give THREE symptoms of a machine which is infected by a virus. (3)

6.8 One of the old machines which have been upgraded runs slowly. You suggest defragmenting the hard drive.

6.8.1 Explain what defragmenting a drive does. (1)

6.8.2 Describe how files become fragmented in the first place. (3)

6.8.3 You battle to delete a file until you realise it is read only. Name TWO other file attributes associated with files. (2)

TOTAL SECTION E: 44

GRAND TOTAL: 180