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INFORMATION TECHNOLOGY THEORY EXAMINATION

GRADE 11

November 2009

MARKS: 150

EXAMINER: Mrs D Kench and Who Knows
MODERATOR: Mrs D Kench

TIME: 2½hrs

Please read the following instructions carefully:

NOTE THIS PAPER HAS AN ANSWER SHEET

1. Number your answers **exactly** as the questions are numbered in the question paper.
 2. Answer ALL the questions.
 3. Rule off after each question.
 4. Number your questions clearly.
 5. It is in your own interests to write clearly and legibly.
 6. Read each question carefully and answer all parts of each question, but give only what is being asked for.
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Question	LO	Possible	Actual
1	1,2	20	
2	1	40	
3	1	27	
4	2	12	
5	1,2,3	28	
6	4	23	
TOTAL		150	

Scenario :

As part of the grade 11 leadership programme, the members of your IT class have decided to set up an outreach committee with a difference. You've decided to reach out to other learners at the school as well as the staff who are having issues

QUESTION 1**Terminology****[20 Marks]**

Give a brief description of each of the following terms :

- 1.1 RFID
- 1.2 IrDA
- 1.3 VoIP
- 1.4 Blogs
- 1.5 Podcasts
- 1.6 IM
- 1.7 Digital certificate
- 1.8 Unbounded media
- 1.9 Bandwidth
- 1.10 Intranet

(20)

QUESTION 2**Hardware and System Software****[40 Marks]**

- 2.1 There are several different types of memory or storage areas in a modern computer system i.e. RAM, cache, registers and virtual memory.
 - 2.1.1. Arrange each of these areas of memory in order of speed of access i.e. from the fastest to the slowest. (4)
 - 2.1.2. Make a conjecture i.e. draw a conclusion about the ease of upgradeability of these components in comparison to the speed of the components. **Answer this question on the answer sheet in the table provided.** (8)
- 2.2. It is possible to be busy with more than one activity at the same time on your computer such as downloading a program from the Internet while typing a document in Word?
 - 2.2.1 What processing technique is being applied by the operating system in this instance? (1)
 - 2.2.2. Briefly explain how the above technique works. (2)
- 2.3 Many users confuse the terms multiprocessing, multithreading and hyper threading. Write explanations for all three terms. (6)
- 2.4 What is an Interrupt? (2)
- 2.5 Explain how buffers and spoolers would be used to print a document. Include definitions for the terms buffer and spooler. (8)

- 2.6 An important task of the operating system is storage management.
- 2.6.1 The file system keeps track of the attributes of a file. Give TWO examples of attributes of files that could be stored. (2)
- 2.6.2 The server at school uses Windows NT. Which file system is it more likely to use? Motivate your answer. (2)
- 2.6.3 Explain how the file allocation table (FAT) keeps track of the files on a hard drive. Use the words, cluster, sector and chaining in your answer. (5)

QUESTION 3**Networking****[27 Marks]**

A network needs to be set up for the accounts department. There are three offices and one server. A printer will be needed at the main office. The computers in all THREE offices will need access to the printer and the Internet for banking purposes.

- 3.1 The Internet and e-mail make use of packet switching to transmit data. Explain how packet switching works. (4)
- 3.2. Network security is important to ensure that data is not damaged or stolen. Suggest THREE ways in which the network administrator can limit the access to data. (3)
- 3.3. A new computer, loaded with Bluetooth technology has been put into a new office, adjacent to the main office.
- 3.3.1. What is the advantage to having Bluetooth technology on computers and printers in different venues? (1)
- 3.3.2. Give another example of a practical use of Bluetooth technology. (1)
- 3.4. Explain the difference between a client and a server in a network in terms of resources. (2)
- 3.5. The computers can be connected in a variety of ways, but you have been given the choice of using UTP cables or WiFi technology.
- 3.5.1 Describe and compare these two strategies with reference to
- □ communication media
 - cost
 - security
- (6)
- 3.5.2 The network uses the Ethernet architecture.
- 3.5.2.1 What topology is likely to be used? (1)
- 3.5.2.2 Ethernet uses CSMA/CD as a media access method. Explain how this access method works. (3)
- 3.6 Although a high speed Internet line is not essential, it would be nice to have one. Give TWO advantages of changing a dial-up connection to an ADSL connection. (2)
- 3.7 The bursar has heard of a VPN, but has no idea as to what this means.
- 3.7.1 Explain what a VPN is. (2)
- 3.7.2 Explain the advantage of setting up a VPN. (2)

QUESTION 4**[12]**

4.1. A recent study shows the number of hours that a student spends per day on the following:

- Sleeping - 7 hours;
- watching TV for 1.5 hours;
- goes online for 3.5 hours;
- spends 2 hours on the cellphone;
- listens to music for 2.5 hours;
- spends 3 hours in class;
- spends 3 hours studying;
- spends 2 hours eating; and
- spends 2 hours working;
- **Total: 26.5 hours.**

Educators have to jump on to the learning curve and make sure that they are using the teaching tools that hit home.

- 4.1.1. Name TWO devices or technologies that students use every day for recreational use and give an example of how each can be used for educational purposes. (4)
- 4.1.2. Do you think that online content (similar to our moodle) and courses will replace the need for traditional schools? Motivate your answer. (4)

4.2 One of the latest developments in wireless communication is WiMax. There are rumours going around that places like schools and various charity organisations will be able to gain free access to this system.

- 4.2.1. What is WiMax? (2)
- 4.2.2. Why will WiMax be a suitable way to provide e-communication to people in South Africa? (2)

QUESTION 5**Social and Ethical Issues****[28]**

5.1. The school management is considering buying textbooks online. Kalahari.net is a well-known e-trader.

- 5.1.1. Explain what an e-trader is. (1)
- 5.1.2. State TWO disadvantages of e-commerce for the school. (2)
- 5.1.3. State ONE way in which the school can overcome each of the disadvantages that you mentioned above. (2)

5.2. The local government school has lost much teaching time because of a teachers' strike. The headmaster wants to find out about e-Learning.

- 5.2.1. Discuss TWO advantages of e-learning. (2)
- 5.2.2. Discuss TWO disadvantage of e-learning. (2)
- 5.2.3. Advise the headmaster if it is worth spending money on e-learning to prevent learners losing out on teaching time in the future. (2)

Next world war 'in cyberspace'

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Hui Min Neo

Geneva - The next world war could take place in cyberspace, the UN telecommunications agency chief warned on Tuesday as experts called for action to stamp out cyber attacks. "The next world war could happen in cyberspace and that would be a catastrophe. We have to make sure that all countries understand that in that war, there is no such thing as a superpower," Hamadoun Toure said.

"Loss of vital networks would quickly cripple any nation, and none is immune to cyberattack," added the secretary-general of the International Telecommunications Union during the ITU's Telecom World 2009 fair in Geneva. Toure said countries have become "critically dependent" on technology for commerce, finance, health care, emergency services and food distribution.

"The best way to win a war is to avoid it in the first place," he stressed. As the internet becomes more linked with daily lives, cyberattacks and crimes have also increased in frequency, experts said. Such attacks include the use of "phishing" tools to get hold of passwords to commit fraud, or attempts by hackers to bring down secure networks. Individual countries have started to respond by bolstering their defences.

Cyber sheriffs

US Secretary for Homeland Security Janet Napolitano said on Thursday that she has received the green light to hire up to 1 000 cybersecurity experts to ramp up the United States' defences against cyber threats. South Korea has also announced plans to train 3 000 "cyber sheriffs" by next year to protect businesses after a spate of attacks on state and private websites. Warning of the magnitude of cybercrimes and attacks, Carlos Solari, Alcatel-Lucent's vice-president on central quality, security and reliability, told a forum here that breaches in e-commerce are now already running to "hundreds of billions".

But one of the most prominent victims in recent years has been the small Baltic state of Estonia, which has staked some of its post Cold War development on new technology. In 2007 a spate of cyber attacks forced the closure of government websites and disrupted leading businesses. Estonian Minister for Economic Affairs and Communications Juhan Parts said in Geneva that "adequate international cooperation" was essential. "Because if something happens on cyberspace... it's a border crossing issue. We have to have horizontal cooperation globally," he added.

'Start educating our professionals'

To this end, several countries have joined forces in the International Multilateral Partnership against Cyber Threats (IMPACT), set up this year to "proactively track and defend against cyberthreats". Some 37 ITU member states have signed up, while another 15 nations are holding advanced discussions, said the ITU. Experts say that a major problem is that the current software and web infrastructure has the same weaknesses as those produced two decades ago.

"The real problem is that we're putting on the market software that is as vulnerable as it was 20 years ago," said Cristine Hoepers, general manager at Brazilian National Computer Emergency Response Team. "If you see the vulnerabilities that are being exploited today, they are still the same," she underlined. She suggested that professionals needed to be trained to "design something more resilient". "Universities are not teaching students to think about that. We need to change the workforce, we need to go to the universities..., we need to start educating our professionals," she said.

Pointing out the infrastructure weakness, Carlos Moreira, who founded and runs the Swiss information security firm Wisekey, said legislation is needed to bring cybersecurity up to international standards.

- 5.3.1 Describe in your own words what is a "cyberattack". (2)
- 5.3.2 How could a war take place in cyberspace? (2)
- 5.3.3 The article mentions "phishing". Explain what phishing is and how it can be used to gain access to passwords. (3)
- 5.3.4 If you were to apply for the job of a cyber sheriff, what three skills would you list on your CV? (3)

- 5.3.5 Explain what "Because if something happens on cyberspace... It's a border crossing issue." means? (2)
- 5.3.6 List three ways you can protect your computer at home from a cyberattack. (3)
- 5.3.7 Describe two NEW laws you would introduce to protect computer users from a cyber attack. (2)

QUESTION 6

Algorithms and Java

[23]

- 6.1. Object Oriented Programming involves designing a solution where objects are used to model an item in the problem. Such as a Student class to represent the fields and methods relating to a student.
- 6.1.1 Define the terms class, object and instantiate. (3)
- 6.1.2 Why do we use objects and create classes when the solution can be coded in a single program? Give two well explained arguments. (4)
- 6.1.3. A beginner programmer wants to sort a list of students. For each student their name and telephone number is stored. The programmer has created two arrays: one to store the names and one to store the telephone numbers.
- 6.1.3.1 Explain why this is a bad solution. (2)
- 6.1.3.2 Explain a better way of storing the student's details so that a sort can work effectively. Write the Java statement to declare the array. (4)

- 6.2. Study the 2 algorithms below and answer the questions which follow :

A

```
Begin main
  Fac = 1
  Loop N from 1 to 7
    Fac = Fac * N
    Write N, ' ', Fac
  Endloop
End main
```

B

```
Begin main
  N = 1
  Fac = N
  while Fac <= 1000
    N = N + 1
    Fac = Fac * N
    Write N, ' ', Fac
  Endwhile
End main
```

- 6.2.1 Fill in the trace tables labelled A and B **on the answer sheet** to determine the results yielded by both programs. (8)
- 6.2.2 If the 2 programs do not yield the same results, alter B so that the same results are yielded. Rewrite the full algorithm. (2)

NAME _____ CLASS: 11 _____

2.1.2

Component	Easy to upgrade	Increase in speed
RAM		
Cache		
Register		
Virtual memory		

(8)

6.2

A			
FAC	N	$N \leq 7?$	OUTPUT

B			
N	FAC	$FAC \leq 1000?$	OUTPUT

(8)