GREENBURY SECONDARY SCHOOL
MARCH CONTROL TEST 2016
GRADE 12
INFORMATION TECHNOLOGY

EXAMINER: M PADAYACHEE **DURATION: 1 ½ HRS**
MODERATOR: S NAIDOO **MAX MARK: 60**

DATE: 09-03-2016

Instructions to candidates:

1. Answer all questions.
2. Rule off after each question.
3. Write neatly and legibly.
4. Write clear and concise answers. Use the mark allocation as a guideline when answering.
5. Good Luck!!

QUESTION ONE (MCQ) [10MINS]

Write down the letter of the alternative that best matches the statement in 1.1. to 1.5.

1.1. A *virtual machine* is ...

A a new prototype for a computer.
B a theoretical computer such as the Turing machine.
C software emulating a computer.
D a computer running multiple operating systems.

1.2. The process of storing two sets of instructions on two separate registers in the same CPU allowing the CPU to switch between two processes, is called....

A Multiprocessing
B Multitasking
C Hyperthreading
D Multiprogramming

1.3. The access time on SATA drives is measure by the following formula:

A Seek time + Latency time
B Latency time + Read Time
C Rotational delay time + Seek Time
D Seek time + Read Time

1.4. _____is shared content accessed by groups over several LANs through "cross-enterprise" boundaries by allowing customers access to some content on your network.

A Internet
B Extranet
C WWW
D Intranet

1.5. Which of the following refers to a type of file system?

A NTFS
B SMTP
C TCP/IP
D TLS

[5]

QUESTION TWO [20MINS]

Write down the letter of the term in column B that best matches the statement in column A.

COLUMN A	COLUMN B
2.1. A set of related programs that protects the resources of a private network from users on other networks.	A Fat Client
2.2. A software application that will prevent, detect and remove malwareinfections from computers, servers and networks.	BPull-Based
2.3. The total amount of data that can be transferred from one point to another in a given period oftime.	C Front Side Bus
2.4. A computer with full CPU, memory, backing storage and local software connected to a networkusing a Server-Client setup.	D IAAS
2.5. A high speed bus which connects the CPU and the Northbridge.	E Bandwidth
2.6. ___is where computer resources, such as hardware, software and networks are owned and hosted by a service provider and offered to customers ondemand.	F FTP
2.7. A set of protocols for wireless infrared communications.	G Mbps
2.8. File sharing protocol designed to reduce the bandwidth required to transfer files. Allows multiple peers on a network to upload and download between each other instead of using server resources.	HPush-based
2.9. When a service provider uses public cloud resources to create their private cloud.	IBitTorrent
2.1.0. A_____query is initiated by the user and the user will receive a reply.	J External Bus
	K Anti-Spam
	L Antivirus
	M IrDA
	N Virtual private Cloud
	O Thin Clinet
	P Firewall
(10)	Q VPN

QUESTION THREE [30MINS]

SCENARIO

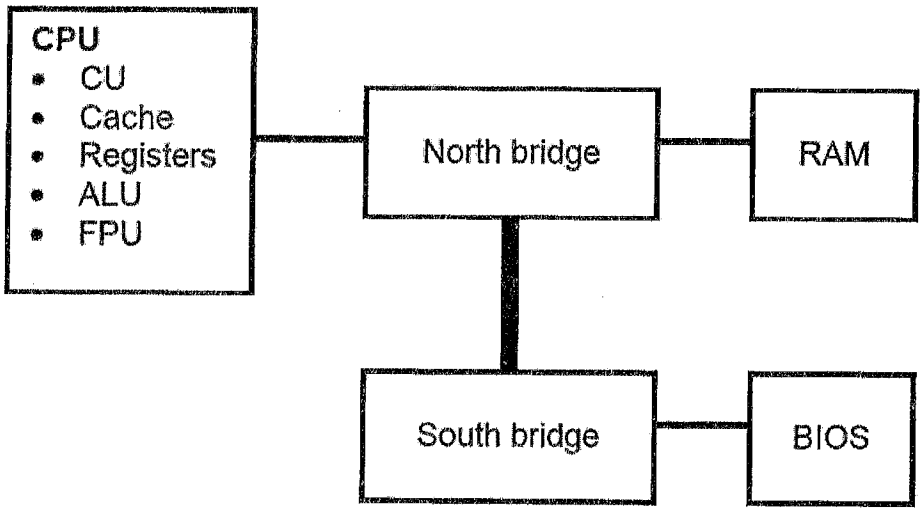
The Science Olympiad Society is a national branch that tests and records results of top science learners in the country. They wish to standardise resulting and recording by the introduction of computers and internet. They are moving from independent testing, resulting and recording at several branches to a centralised system done immediately using technology available.
Each branch that is set up needs to purchase an up to date computer and equipment.
You are part of the technical team appointed to examine and choose a computer that will best serve the needs of the organisation.

3.1. Purchasing a computer can be quite a daunting task. Fortunately modern computers are built using modular design.

3.1.1. Explain what is modular design. (2)

3.1.2. Explain to the team why, when choosing the RAM, they should choose maximum specifications. (2)

3.2. The following diagram, representing some of the components on a motherboard, was given to you to explain more about how a computer operates:



The following questions came up from team members who were not very familiar with computer jargon.

3.2.1. Briefly explain the function of registers. (2)

3.2.2. Explain why instructions loaded in cache memory are processed faster by the CPU than instructions stored in RAM. (2)

3.2.3. What is the physical connection between the CPU and the north bridge called? (2)

3.2.4. To which bridge(north or south) is the AGP connected? (2)

3.3. A large hard drive is required because of the volume of data to be stored.

3.3.1. State two differences between a SATA drive and a SSD. (4)

3.3.2. Disk caching will improve performance in terms of the storage and retrieval of data. Explain what *disk caching* is. (2)

3.3.3. Thrashing may occur when data is captured and processed.
a) Explain what *thrashing* is. (2)
b) What can be done to prevent thrashing from occurring? (1)

[21]

QUESTION FOUR [30 MINS]

Since every branch has to be connected to the main branch, internet connectivity is important. The team also needs to become familiar with networking, storage on Internet and devices required.

4.1. List two factors related to networking that may affect the performance of a computer. (2)

4.2. The team is keen on learning about internet services available. They heard about "*Cloud Computing*" and "*Virtualisation*".

4.2.1. Give a full explanation of the term Cloud Computing. (2)

4.2.2. Discuss the three broad categories of Cloud computing. (3)

4.2.3. Tabulate 2 advantages and 2 disadvantages of cloud computing (4)

4.2.4. Explain the process of Virtualisation. (2)

4.2.5. What is a virtual machine? (1)

4.2.6. State two advantages and two disadvantages of server virtualisation. (4)

4.2.7. Discuss the following virtualisation techniques:

a) Network Virtualisation (2)
b) Desktop Virtualisation (2)
c) Application Virtualisation (2)

[24]

TOTAL : 60

THE END!

Solutions: Marking Memo – IT – GR: 12
Question One

1.1. C
1.2. C
1.3. A
1.4. B
1.5. A

Question Two

2.1. P
2.2. L
2.3. E
2.4. A
2.5. C
2.6. D
2.7. M
2.8. I
2.9. N
2.10. B

Question Three

3.1.1 Modular design – the computer you buy can be put together in pieces with your own specifications in mind. The hardware is not fixed. They are separate modules which are put together and connected via the motherboard.

3.1.2. The ram is important because it is needed by the CPU to process instructions. If you choose less, then processing gets slower. Ram stores the operating system. The more the RAM the faster the computer performs. It is electric memory. Some computers do not allow you to add more RAM later. The RAM may not be recognised by the motherboard.

3.2.1.
A *register* acts as temporary storage✓ to keep data and instructions to be executed by the CPU✓. (2)

3.2.2.
- Cache is higher quality/faster type of memory/cache is static RAM compared to dynamic RAM
- Cache is positioned on the CPU/Cache closer to CPU and thus fetches instructions faster
- Data in RAM needs to be transferred via busses to the CPU before it can be processed/Fetching of instructions from cache is not restricted by slow speed of the motherboard

3.2.3. Front side bus , System bus, Internal bus

3.3.1.

SATA	SSD
- Limited by moving parts - Slow - Has to be defragmented	- Not limited by moving parts- fixed parts - Faster - Doesn't have to be defragmented

3.3.2. *Disk caching* is when part of the RAM✓ is used to store parts of the application that must be saved on the hard drive✓ so that faster access to the software is possible. (2)

3.3.3. a) *Thrashing:*
• Occurs when the operating system spends so much time exchanging pages✓ between the RAM and hard drive (virtual memory)✓ that it seems there is no time to process any other task
OR

• When the amount of virtual memory is too small for the amount of data that needs to be stored, it seems that the hard drive light keeps flashing, while the exchange of pages occur between the RAM and smaller amount of virtual memory

b) *Prevent thrashing* (*Any ONE of* ✓):

• Install more RAM
• Close unused programs/documents to release more RAM
• Allocate more hard drive space for virtual memory

QUESTION 4

4.1. External network speed , Internal network speed, NIC speed, Cabling, Wired or Wireless (2)

4.2.1. Cloud computing is a general term for the providing of hosted services over the internet. These services are broadly divided into three categories: IaaS , PaaS , SaaS. (2)

4.2.2. PaaS - Platform as a Service is part of cloud concept that provides a computing platform for the development of software by users. (1)

IAAS - Infrastructure as a Infrastructure as a service is where computer resources, such as hardware, software and networks are owned and hosted by a service provider and offered to customers ondemand. (1)

SaaS - Software as a service is a software delivery model in cloud computing in which software and associated data are centrally hosted on the cloud by independent software vendors (ISVs) or application service providers (ASPs). E.g. Google Apps. (1)

4.2.3.

Advantages	Disadvantages
- Cost Effeciency - Convenience and continuous availability - Backup and recovery - Cloud is environmentally friendly - Reliance and redundancy - Scalability and performance - Quick deployment and ease of integration - Increased storage capacity - Device diversity and Location Independence - Smaller learning curve	- Security and privacy in cloud - Dependency and vendor lock-in - Technical difficulties and downtime - Limited control and flexibility - Increased vulnerability

4.2.4. Virtualisation is the process of creating logical computing resources from available physical resources. (2)

4.2.5. A virtual machine is a software implementation or emulation of a computer that executes programs like a physical machine. (1)

4.2.6. Advantages:

- Multiple OS environments can co-exist on the same computer in strong isolation from each other.
- The virtual machine can provide an Instruction Set Architecture(ISA) that is somewhat different from that of the real machine.
- Application provision, low maintenance, high availability and disaster recovery.

Disadvantages:

- A virtual machine is less efficient than a real machine when it access the hardware indirectly
- When multiple VM's are concurrently running on the same physical host, each VM exhibit a varying and unstable performance (speed of execution, poor results), which highly depends on the workload imposed on the physical system by other VM's. (4)