education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

INFORMATION TECHNOLOGY P2

MEMORANDUM

OCTOBER 2008

MARKS: 180

This memorandum consists of 15 pages.

SECTION A: MULTIPLE-CHOICE QUESTIONS

QUESTION 1

1.1 A✓ (C is not to be accepted as it is refers to a file and not the process)

1.2 C✓

1.3 C✓

1.4 B✓

1.5 C✓

1.6 D✓

1.7 B✓ (A is not to be accepted as the AGP does not lead to "continuous … operation")

1.8 A✓

1.9 B✓

1.10 D✓

TOTAL SECTION A: 10

SECTION B: HARDWARE AND SOFTWARE

QUESTION 2: HARDWARE AND SOFTWARE

2.1 2.1.1 (Any THREE points) ✓✓✓
- Data which is predicted to be needed next by the CPU
- It is fetched from RAM, and placed in cache
- Subsequent data is searched for in cache
- It operates at speeds close to that of the CPU
- If the required data is located in cache then the slower access to RAM has been avoided (3)

2.1.2 (Any TWO)✓ ✓
- L1 Cache is usually smaller
- L1 Cache has lower latency time OR L1 is faster
- L1 Cache has a lower hit rate
- L1 Cache is more expensive

If no reference to specific cache memories then also accept, e.g.
- size
- position
- speed (2)

2.2 2.2.1 Multi-threading is where one program has independent sections (threads) running simultaneously OR different instructions are executed at the same time in one program. ✓

Examples: Any ONE ✓
- Word Processor with spell-checker running in the background.
- A large calculation process where independent sections can be completed simultaneously.
- A computer game with more than one thing happening at the same time

Multi-processing is when there are two or more processors running in the same system. ✓

Examples: Any ONE ✓ Dual processors; dual-core processor; hyper-threading; video or math co-processor (4)

2.2.2 (a) Examples: PCI Express or faster graphics cards; SATA or faster hard drives; FireWire; USB 2.0; DDR-RAM; multiple cache levels (e.g. L1, L2, L3 and L4).
Any ONE ✓ (1)
(*If there are other "recent technological hardware innovations" that are correct but not mentioned above – accept*)
(*Do not accept vague examples such as more cache, faster ports*)

(b) Explanation must be appropriate to the example in (a) ✓✓ (2)

2 marks	Correct and detailed explanation on "how performance is improved"
1 mark	Explanation lacks detail but is correct
0 marks	Incorrect or no explanation

Example of use of rubric for PCI Express

Unlike previous PC expansion interfaces, rather than being a bus it is structured around point-to-point serial links called lanes. (*Should be two distinct facts*)	2 marks
Relieves the CPU of some of the tasks that it previously had to perform. (*Only one fact provided*)	1 mark

The explanations below would earn a candidate 2 marks:

SATA – faster transfer rate; serial as opposed to parallel interface

Faster hard drives – faster rotational/spin speeds OR faster transfer rate OR reduced latency; more on-board disk cache

FireWire – supports reliable connection of video equipment; improved data throughput OR faster than USB 1.x (400Mbps versus 12 Mbps)

USB 2.0 – improved data throughput; faster than USB 1.x (480Mbps versus 12 Mbps) or FireWire (480Mbps versus 400 Mbps)

DDR-RAM – faster access to data through change in technology (*rise-and-fall/quad-pumping*); increased bandwidth

Multiple cache levels – faster cache speeds; most of the cache is built into the CPU so as to get speeds closer to the CPU speed

2.2.3 A new instruction is fetched to be processed ✓before current one has been completely processed. ✓ Several instructions can be busy being processed. Faster throughput of processed instructions. (2)

2.3 2.3.1 Redundant Array of Independent/Inexpensive Disks/Drives (1)

2.3.2 Data Mirroring✓ – ongoing backup of data (on another drive) ✓ to allow hot swapping of faulty drives with no downtime
Data Striping (*accept striping*)✓ – data split between drives ✓ allowing improved access/speed and reconstitution of lost data (4)

2.4 2.4.1
(a) Magnetic Tape, DLT drives, external hard drives ✓ (*cannot be internal hard drive or separate partition on same hard drive or flash disk*)
(b) Ignore media type; must be stored offsite/away from computer or in a safe ✓
(c) Server backup software ✓ (*do not accept RAID software; look for specialised/professional server backup software*)
(d) Partial backup once a day or more often, full backup of all files once a week or more often ✓ (*anything that implies regular backups can be accepted*) (4)

2.4.2 (Any TWO) ✓✓
- Data stored in a secure facility offsite
- Regular guaranteed backups
- Backup correctly done (by competent professionals)
- No need to make capital outlay for expensive hardware and software
- Saves your time as others do the backup (2)

2.5 2.5.1 Any TWO Effects ✓✓ Named or described ✓✓
- Computer may become slow: Spyware/AdWare/Cookies/ Popups
- Programs installed from web pages which send information about the user and his computer to a third party.

- System becomes unusable, files/data may be deleted: Virus / Trojan
- Unlawful use of data, e.g. identity theft (hacking, phishing) (4)

2.5.2 a) The hard Disk becomes fragmented ✓ because files are being stored in non-contiguous areas and the read-write heads have to be continually moving back and forth to retrieve and save files. ✓ (2)

b) Run a de-fragmentation program such as Defrag ✓ (1)

2.6 2.6.1 (Any THREE) ✓✓✓
- No cost of purchasing software
- Less hardware because processing is provided on-line
- Continuous backup of files
- Software and stored files available anywhere where there is an Internet connection
- Updating of software (including dictionaries) is managed externally (3)

2.6.2 (Any TWO) ✓✓
- Fully dependent on reliable Internet connection (including bandwidth, cost, connection speed)
- Could lose your data if the company providing the service shuts down
- Reliability of the application
- You have no control over their storage facility and their security
- File sharing can be restrictive (2)

2.7 2.7.1 (Any TWO) ✓✓
- Get drivers from the Internet
- Ask an expert to write the code for a driver
- Obtain driver from hardware vendor/computer store
- Use a generic driver (2)

2.7.2 (a) (ANY TWO) ✓✓
- 3D animation video card
- fast processor
- sound card and speakers
- graphics drivers, e.g. DirectX
- USB ports for connecting gaming peripherals
- lots of RAM (2)

(b) ADSL – high speed broadband connection OR WiMax✓ reliable broadband connection but less expensive✓ (2)

2.7.3 (a) (Any ONE) ✓
IrDA, Bluetooth, WiFi, HSDPA/3G/EDGE/GPRS (1)

(b) (Any TWO)✓✓
- Devices must be in line of sight
- Short distances

- Speed: 115 Kbps – 4 Mbps
- Not secure, data can be intercepted
- Reliability of connection/signal loss (2)

2.7.4 (a) No✓, the OS is embedded ✓ as it resides on a ROM chip (2)

(b) Multi-tasking – Two or more programs that reside in memory at the same time. ✓ E.g. Have the web browser and the email open at the same time wile working with an application such as word processing. ✓ (*accept an explanation of time-slicing which will imply an explanation of multi-tasking*) (2)

(c) (Any TWO advantages)✓✓
- Free/can share with others
- Can add features since the code is available
- Can personalise the features of the software
- Programmers share improvements with others (2)

(Any TWO disadvantages)✓✓
- Lack of integration with other packages since programs are written by different groups of people.
- Not a lot of support to solve problems
- Users are not familiar with the user interface (2)

2.7.5 (a) VoIP✓ (1)

(b) Skype✓ (1)

TOTAL SECTION B: 56

QUESTION 3: e-COMMUNICATION

3.1 3.1.1 A person who attempts to break through the security of a computer network or computer ✓in order to steal information, cause damage to the target or prove the inadequacies of the security. ✓ (2)

3.1.2 It is an attempt to gather information from individuals for example by fooling them into filling forms on-line which seem to be a genuine service of a recognized company. ✓ They then use the information to impersonate or defraud the individual. ✓ (*any reasonable explanation that implies the above*) (2)

3.1.3 This is when someone gains enough information on an individual to electronically impersonate him✓, for example when someone manages to get credit card details and empties an account by paying for services on the Internet. ✓ (*any reasonable explanation that implies the above*) (2)

3.2 3.2.1 Accept any site which requires a transaction between the company and a client and where either party might be fooled into giving out important information to a criminal. ✓ (1)

3.2.2 Proof of identity of the company (genuine/official) ✓ providing the service to the user✓ (2)
[9]

QUESTION 4: SOCIAL AND ETHICAL ISSUES

4.1 Yes, ✓
people can become more knowledgeable about the disease – the consequences and treatments, etc. ✓

OR

No,
people do not always have access to the Internet. (2)

4.2 4.2.1 (Any TWO) ✓✓
- A reputable institution should support the web site (Affiliation)
- The web site should list the author and the appropriate credentials; cross-reference (Establish authority)
- The information should be current/up-to-date (content/coverage)
- Contact the author. (2)

4.2.2 (Any TWO) ✓✓
- Use specific nouns and put the most important terms first in the search text.
- Complex searches (advanced search facilities) using AND and NOT operators (or use a search within a search – Try to be specific)
- Use selected specialist databases to do searches on. (2)

4.2.3 (Any TWO) ✓✓
- Using Internet facilities like Search Engines is much faster than conventional library research
- Access to global information
- Less expensive – do not have to buy books
- Often more up-to-date information is available
- Learners learn how to conduct research
- Physically-handicapped learners have access to research sites
- Faster than a conventional library search (2)

(*OR any other acceptable reason*)

4.3 (Any TWO) ✓✓
- Form of long-distance health care.
- The medical conditions of patients can be diagnosed by listening to audio and viewing video
- Making use of telecommunication to interact with medical staff at remote sites.
- Remote operations (2)

[10]

TOTAL SECTION C: 19

SECTION D: PROGRAMMING AND SOFTWARE DEVELOPMENT

QUESTION 5: ALGORITHMS AND PLANNING

5.1 5.1.1 (a) ID✓ (1)

(b) To uniquely identify a record in the database✓ (*Accept no duplicate entries*) (1)

(c) There are many movies with the same name✓ – and most directors have made more than one movie✓ – so these obvious choices for primary key are invalid because they are not unique. Creating a number that is automatically incremented means that every record will have a single unique no. (Movies do not have other unique identifiers). (2)

5.1.2 (a) Eliminate repeating groups✓ (*also accept eliminate duplicate fields or creation of a unique primary key*) (1)

(b) Eliminate redundant data✓ (*also accept group related data into separate tables or fields cannot be partially dependent on the primary key or no partial dependency*) (1)

(c) ✓✓ 3 or more tables
✓✓ appropriate fields in tables
✓✓ for primary keys
✓✓✓ appropriate linking table(s) (*correct fields, own primary key*) (9)

This is a possible 3-table solution.

Table 1: Movies
MovieID: Autonumber (PK)
Title : Text
Genre : Text
Length : Number
Rating : Number
Year : Number
Price: Currency
Age Restriction:Text
Director:Text

Table 2 : StarsProducers
StarProdID: AutoNumber (PK)
Name: Text
Category: Text (Star / Producer)

Table 3: Link
LinkID: Autonumber (PK)
StarProdID: Number (FK)
MovieID: Number (FK)

Candidates may split, e.g. category in table 2 into a separate table by assuming that a star could also be a producer/director. A possible 4-table solution.

Table 1: Movies

MovieID: Autonumber (PK)
Title : Text
Genre : Text
…
(as above)

Table 2 : StarsProducers
StarProdID: AutoNumber (PK)
Name: Text

Table 3: Link

LinkID: Autonumber (PK)
StarProdID: Number (FK)
MovieID: Number (FK)
CategoryID: Number (FK)

Table 4: Categories

CategoryID: Autonumber (PK)
CategoryName: Text

5.1.3 (a) Data validation ensures that data is meaningful✓ by imposing a set of rules that try to make sure data matches expected criteria✓ – e.g. gender can only be 'M' or 'F' so you can validate it. (*Also accept "to ensure entry of valid data" if accompanied by explanation/example; if valid example given award 2 marks*) (2)

(b) i. > 0 ✓And < 11✓ OR (>= 1 And <= 10) OR (>= 0 And <= 10) OR (> -1 And < 11) (*do not accept rule written in words*) (2)

ii. > 44.99✓ OR >=45 (*do not accept rule written in words*) (1)

5.1.4 (a) Structured Query Language✓ (1)

(b) Select✓ * from movies✓ where✓ director = "Steven Spielberg" ✓ order by title✓ (*-1 mark for incorrect order; in the event that the SQL statement refers to the 2NF table design check for correct WHERE clause according to the candidate's design*) (5)

5.2 Mark the concepts. Candidates can use either pseudocode or any mix of natural language. Deduct 2 marks if programming code has been used.

1. Get password and username ✓✓
2. Check length ✓
3. Initialise Boolean flag ✓
4. Check if a number is part of password
   Loop ✓
   Individual character checking ✓✓
   Change Boolean flag ✓
   } (*only 1 mark if no detail here*)
5. Check username ✓
6. Show message ✓

1 mark for logical flow of algorithm (11)

5.3 5.3.1 toString✓ (1)

5.3.2 Include parameters which include values of the correct types ✓✓
OR accept
Procedure✓ Update (code, title, filename: string; cost : real); ✓
void ✓Update (string code, title, filename: float cost); ✓ (2)

5.3.3 String✓ (1)

5.3.4 **AS THERE IS UNCERTAINTY SURROUNDING THE INCLUSION OF INHERITANCE AND POLYMORPHISM ALL CANDIDATES MUST BE AWARDED THE 2 MARKS FOR THIS QUESTION**

(Any TWO) ✓✓
- The new class has access to the protected and public fields The new class has access to methods of the superclass.

- You do not have to recode methods, you simply use them OR.
- Less programming time involved
- Promotes the goals of modular programming
- Closer to the natural organization of data in the real world (2)

5.3.5 **AS THERE IS UNCERTAINTY SURROUNDING THE INCLUSION OF INHERITANCE AND POLYMORPHISM ALL CANDIDATES MUST BE AWARDED THE 2 MARKS FOR THIS QUESTION**

Polymorphism: The ability of objects to respond differently to the same method call. ✓Example: All the objects will need a getSalesPrice (method) but the % markup might be different for the different media types. Therefore there will be two different getSalesPrice methods, but the method call will be the same. The object calling the method will determine which method will be executed. ✓ (*Any explanation that carries this information*) (2)

TOTAL SECTION D: 45

SECTION E: INTEGRATED SCENARIO

QUESTION 6

6.1 6.1.1 (a) Wireless ✓ (802.11 G) WiFi, WiMax, radio waves (1)

(b) (Any ONE) ✓
Wireless access point
Wireless router
(*Do not accept satellite dish*)
(*If wireless used in 6.1.1(a) accept router/access point*) (1)

6.1.2 (a) The router allows packets to be sent to (and received from) the Internet from any computer connected to the lodge local network. ✓ Also accept: connection between two different architectures; finding best route (1)

(b) Only the computer connected to the Internet would be able to access the Internet✓ – the rest of the network would have no outside connection OR No router, no Internet (1)

(c) The firewall only allows communication through specific ports✓ and checks which software is allowed to communicate ✓ Also accept: Prevents access to the network from zones of no trust; and blocks data from entering or leaving the computer that is not recognized or authorized. (2)

(d) The 3G card provides the actual connection to the Internet✓ by using cellphone technology. (1)

(e) Yes/broadband✓, because it is 3G communication OR if the lodge is in reach of a 3G signal✓
OR
No/not broadband, possibility of no 3G coverage. (2)

(f) (Any TWO) ✓✓
- They would have to sign up with an ISP that provides a connection to the Internet
- Complete the appropriate setup on the server
- Install drivers for hardware
- Load the necessary software (2)

6.2 6.2.1 Images are stored locally on backing storage ✓
On subsequent visits these are loaded more quickly from backing storage ✓ (2)

6.2.2 (a) Suitable: ✓ (Any valid answer) ✓
The content of a history site should not change significantly

over time
If lots of users visit the site then the trend may continue for a while✓ (2)

(b) Caching will NOT be effective ✓
Data changes on a daily basis and cached data will be out of date✓ (2)

6.3 6.3.1 (a) (Any TWO) ✓✓
- A smartphone can run additional programs
- Has an operating system
- Can be used to access websites on the phone (not as a modem)
- Many would have WiFi access
- Many would have touch-screens
- Many might have a GPS (2)

(b) (Any THREE)✓✓✓
- Smaller and more portable
- Have a longer battery life
- Can be used for communication
- Less expensive
- Integrated digital camera (3)

(c) (Any TWO) ✓✓
Symbian, Palm, Windows Mobile/CE, Linux, OS X, Android (2)

6.3.2 (a) Global Positioning Satellite / System✓ (1)

(b) This will populate a database (*collection of data*) ✓ and allow them to see a pattern of where animals are most frequently found. ✓ (2)

6.4 6.4.1 A webcam is a small digital camera/camera connected to the computer ✓ which is optimised for creating images that can easily be distributed via the Internet✓. (2)

6.4.2 (a) Apache Web Server, Internet Information Server (IIS) (1)

(b) DNS means we can type in a name (URL) ✓ (e.g. www.google.com) instead of a series of numbers/IP address ✓ (e.g. 169.79.233.5). (2)

(c) (i) nz refers to New Zealand (*geographical area/country*)✓ – unacceptable because the lodge is in South Africa✓ (2)

(ii) edu refers to education ✓ (*the interest area*) (1)

(iii) www.bataulodge.co.za ✓ (*or .co.za; accept a .za site name*) (1)

6.4.3 (a) The lock icon on the browser✓ and the https:// in the web address✓ (2)

(b) Encryption is scrambling of data✓✓
Decryption is unscrambling the data✓✓
Using a set of rules that can be reversed.✓ (5)

6.4.4 (a) A blog is like an online,✓ public diary. ✓ (*accept electronic journal*) (2)

(b) A blog is personal experience✓ whilst a wiki is an online reference that everyone can edit and contribute to like Wikipedia✓ (2)

(c) Really Simple Syndication (1)

(d) RSS is a technology that 'pushes' information to users✓ – if they subscribe they will always get to see the updates to your blog without having to navigate to your site – the updates will appear automatically in their RSS reader. ✓ (2)

TOTAL SECTION E: 50

GRAND TOTAL: 180