basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

INFORMATION TECHNOLOGY P2

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MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 14 pages.

SECTION A: SHORT QUESTIONS

QUESTION 1

1.1	1.1.1	C ✓	(1)
	1.1.2	B ✓	(1)
	1.1.3	C ✓	(1)
	1.1.4	A ✓	(1)
	1.1.5	C/D ✓	(1)
1.2	1.2.1	H ✓ (Transaction)	(1)
	1.2.2	K ✓ (Array)	(1)
	1.2.3	J ✓ (Backdoor)	(1)
	1.2.4	I/R ✓ (JavaScript/Python)	(1)
	1.2.5	A ✓ (Copyright)	(1)
	1.2.6	O ✓ (Synchronising)	(1)
	1.2.7	E ✓ (Driver)	(1)
	1.2.8	B ✓ (User Rights)	(1)
	1.2.9	D ✓ (Artificial Intelligence)	(1)
	1.2.10	C ✓ (Scalability)	(1)

TOTAL SECTION A: 15

SECTION B: SYSTEM TECHNOLOGIES

QUESTION 2

2.1 2.1.1 (a) DIMM ✓-slots (1)

(b) Bytes / MB / GB ✓ (1)

2.1.2 *Any TWO GPU hardware specifications*: ✓✓
- Speed/number of cores/type of processor
- Speed/size/type of RAM
- Slot type of the GPU (2)

2.1.3 (a) ZIF ✓-socket (1)

(b) *Reasons for point-to-point connection*:
- CPU need to transfer large amounts of data/higher workload to and from RAM ✓
- Point-to-point connection is dedicated ✓ for single component OR bus is shared amongst many components (2)

2.2 2.2.1 Software that manages/controls ✓ all the activities of a computer system. (1)

2.2.2 *Any TWO functions of an operating system:* ✓✓
- Provides a user interface
- Manages processes and tasks
- Manages memory
- Manages input and output/peripherals/hardware and software
- Manages storage
- Manages security (2)

2.3 2.3.1 Virtual memory ✓ (1)

2.3.2 *How virtual memory works*:
When more applications are opened the system runs out of available RAM. ✓
Processes not actively being used are moved to virtual memory (special storage) ✓ to open up space in RAM for other applications. (2)

2.4 2.4.1 A software bug is an error ✓ in software. (1)

2.4.2 *Any ONE example of how the software bug could be revealed:* ✓
- Incorrect/inaccurate calculated values
- System crash/run-time error
- System malfunction (1)

2.5 *Any ONE way to prevent unauthorised access to software:* ✓
- Use passwords/access control
- Install anti-malware/anti-spyware
- Setup a Firewall
- Physically restricting access (locking up, etc.) (1)

2.6 2.6.1 *Any TWO limitations related to mobile devices compared to PC*: ✓✓
- Small Screen
- Small keyboard
- Limited processing power
- Limited storage
- Limited mobile OS
- Mobile devices are not expandable/upgradeable (2)

2.6.2 Convergence ✓ (1)

2.7 2.7.1 They both convert programs into machine code. ✓ (1)

2.7.2 *Any TWO reasons why a compiler would be a better choice than an interpreter:* ✓✓
- A compiler compiles the whole program at once, whilst the interpreter does it one line at a time.
- A compiler provides a list of errors whilst the interpreter stops at the first error.
- A compiled program does not need the compiler to execute, whist the interpreter is needed to run (creates an executable file). (2)

2.8 2.8.1 *Any ONE reason to clean up/arrange items on a desktop computer:* ✓
- Easy to locate programs
- Better organisation
- Avoid clutter
- Increase storage space/remove unnecessary files (1)

2.8.2 For the operating system to select the correct application ✓ to open the file with. ✓

Also accept:
For the operating system to identify the type of file (1)
to be able to view the file. (1) (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

3.1 3.1.1 (a) UTP/Ethernet cables ✓
Also accept: Fibre (1)

(b) *Any ONE:* ✓
- Radio waves
- Wi-Fi
- Microwaves (1)

3.1.2 *Any TWO advantages of installing a wireless network*: ✓✓
- Mobility
- No cables used
- Cost saving
- Easy to setup/connect (2)

3.1.3 *Any ONE function when no internet access on a network*: ✓
- Transfer files/Communication between computers
- Sharing of files/applications/software resources
- Share hardware/mention a specific hardware device (1)

3.2 3.2.1 *Any TWO reasons why peer-to-peer is less suitable*:✓✓
- Less secure in terms of managing access to resources
- Difficult to manage a large number of computers
- Does not provide centralised storage/services
- More prone to spread of malware (2)

3.2.2 BitTorrent ✓ (1)

3.2.3 *Any ONE role of server*: ✓
- A server provides resources (software, storage, etc.)
- Serves as a log-on controller
- Manages security settings on network (1)

3.2.4 When a switch fails, all the computers connected to the switch will not be able to access the network ✓ (single point of failure). (1)

3.3 3.3.1 (a) HTTP is the protocol that defines how web pages, and their content are transferred across the Web. ✓ (1)

(b) HTTPS provides for secure/encrypted transfer of web content. ✓ (1)

3.3.2 *Encoding of data*:
To change the format of data ✓ for transmission over different mediums. ✓ (2)

3.4 3.4.1 A website is a collection of related webpages. ✓ (1)

3.4.2 (a) To ensure high ranking in search results/increase the amount of traffic on a website ✓ by changing the design of webpages. (1)

(b) Adding specific keywords/phrases ✓ that relates to the way in which search engines does content search. (1)

3.5 CSS separates the formatting of the HTML and gathers all of it in one place, in a .css file. ✓ When you want to make a change in the formatting of your website, you only change the CSS file and all the web pages get updated. ✓

Concepts:
- Formatting is placed in a single .css file/style sheet
- Formatting is applied to all web page (2)

3.6 3.6.1 *Any TWO Hotspot risks:* ✓✓
- Network might not be secured/encrypted
- Exposure to hacking
- Possible risk of malware spread
- Shoulder surfing
- Signal/hotspot spoofing (2)

3.6.2 A VPN creates an encrypted connection ✓ to a private network over a public network/Internet ✓ to gain access with the same security as a direct local connection. ✓

Concepts:
- Communication is encrypted
- Connecting to a private network over a public network/internet
- Same security as a local connection/secure connection (3)

3.7 3.7.1 The company will have information on the website that stays the same over time/no need to be regularly updated. ✓ (1)

3.7.2 *Any TWO advantages for the users of dynamic web pages:* ✓✓
- They can receive relevant/customised versions of webpages
- Webpage will allow interaction with users
- Content is more likely to be up to date
- Users can now also be contributors of content (2)

3.7.3 (a) A set of data that describes and gives additional information on other data. ✓ (1)

(b) A search will take place using the metadata of the relevant content on the internet and will relate it to the user's contextual information ✓ to present a search result uniquely suited to the user. ✓

Concepts:
- The metadata is matched to users' search request/query
- Providing the user with tailored/suitable results (2)

TOTAL SECTION C: 30

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

4.1 4.1.1 *Any ONE example of invisible data captured*: ✓

- Purchasing habits/preferences
- Shopping hour preferences
- Gender/family composition
- Whether the person has pets

OR any other valid example (1)

4.1.2 *Any ONE reason why a company wants to capture invisible data:* ✓

- To predict/plan other products to stock
- Anticipate the needs of the clients
- Target marketing

OR any other valid example (1)

4.1.3 *Any TWO mechanisms of invisible data capturing:* ✓✓

- Forms - completing forms
- E-toll - passing through E-toll gates
- Cell phone logging
- Online activities – Web searches, online purchases, etc.
- GPS navigation - Using Google Maps, etc.
- Security camera footage – Biometrics, etc.
- Background voice capturing by devices
- Access control system – Entering a premises/site
- Smart devices/IoT
- RFID (2)

4.2 4.2.1 *Any TWO ways of ensuring the validity of captured data:* ✓✓

- Format check
- Data type check
- Range check
- Presence check
- Check digit
- Uniqueness check (2)

	4.2.2		A unique value, a primary key, will be allocated to each customer. ✓ OR Any correct example of a unique field related to the customer.	(1)
4.3	4.3.1	(a)	Data redundancy ✓	(1)
		(b)	An update anomaly occurs when a record cannot be changed at a single entry ✓ but has to be changed at multiple entries. ✓	(2)
	4.3.2	(a)	One-to-One ✓	(1)
		(b)	One-to-Many ✓	(1)
4.4	4.4.1		Composite/Compound ✓	(1)
	4.4.2		CollectionNumber ✓ OR any other suitable new field Also accept: Autonumber field	(1)
	4.4.3		Short Text ✓	(1)
	4.4.4		The data contained in the field of a foreign key must already exist as an entry in the table where the field is the primary key. ✓ OR No record in the secondary/many table may refer/link to a record in the primary/one table that does not exist.	(1)
	4.4.5	(a)	True ✓	(1)
		(b)	False ✓	(1)
		(c)	False ✓	(1)
		(d)	False ✓	(1)

TOTAL SECTION D: 20

SECTION D: SOLUTION DEVELOPMENT

QUESTION 5

5.1 5.1.1 *Any ONE reason for the use of modular programming:* ✓
- Avoids repetition of code
- Methods can be called and used easily in more than one class
- Enhances readability
- Easier to debug
- Collaboration between programmers (1)

5.1.2 *Any ONE difference between a procedure and a function:* ✓
- Procedure does not necessarily return a value, whilst a function must return a value.
- A function has a data type associated with the function name, that acts as a variable for the return value, whilst a procedure does not have that.
- A procedure is an independent call, whilst a function must form part of another statement. (1)

5.2. 5.2.1 Valid ✓ (1)

5.2.2 Valid ✓ (1)

5.3 5.3.1 Defensive programming uses code to avoid/handle errors ✓ that will prevent the normal execution of a program. ✓ (2)

5.3.2 (a) *Any ONE possible reason for an overflow error:* ✓
- When a value to be stored in a variable is outside the range of the data type/ or is too large
- Endless loop (1)

(b) *Any ONE of the following to prevent a runtime error:* ✓
- Data validation
- Exception handling techniques
- Any example of defensive programming e.g. testing for division by zero (1)

5.4 5.4.1 Instantiate/Create/Initialise an object ✓ (1)

5.4.2 getCompanyName ✓ (1)

5.4.3 (a) CompanyNum ✓ (1)

(b) The company number uniquely identifies the company ✓ and should not be changed. (1)

ALSO ACCEPT - CompanyName in (a) with correct motivation in (b)

5.4.4 (a) Some of the attributes are declared public/attributes should be private. ✓

OR

Indicating specific examples (+ ContactNumber + NumberOfEmployees) (1)

(b) Declaring an attribute public it is directly accessible from outside the class ✓ which could have unintended/unforeseen effects. ✓ (2)

5.5 5.5.1 Number of repetitions are not known in advance. ✓ (1)

5.5.2
```
iNumber := RandomRange(1,11) ✓;
While (iNumber = 5) ✓ OR (iNumber = 8) ✓ do
    iNumber := RandomRange(1,11) ✓;
```
(4)

TOTAL SECTION D: 20

SECTION F: INTEGRATED SCENARIO

QUESTION 6

6.1 6.1.1 Electronic waste refers to electronic devices or items related to electronics that are obsolete/no longer needed. ✓ (1)

6.1.2 Contains toxic/harmful materials ✓ (1)

6.1.3 *Any TWO ways to reduce electronic waste*: ✓✓
- Keep old devices/replace only if necessary
- Extend the life of your electronics. Buy a case, keep your device clean, and avoid overcharging the battery.
- Donate/sell used electronics
- Recycle electronics and batteries
- Refill toner cartridges (2)

6.1.4 The drive must be formatted/cleared/factory reset (or any way to permanently destroy access to data) ✓ so any personal information cannot be accessed/retrieved by others. (1)

6.2.1 (a) With POP your emails are downloaded to your device ✓ and deleted from the server (unless you change the default settings).

With IMAP, emails 'reside' on the server ✓, and you can easily read and interact with emails from multiple devices. (2)

(b) *Any ONE negative effect of spam*: ✓
- Spam clogs the Internet/generates unnecessary traffic (impacts speed)
- It impacts employee productivity/employees must sift through ‘junk mail’ to find what they really want
- Spam could contain malware that infects devices (1)

(c) *Any TWO possible ways how to identify fake news:* ✓✓
- Consider the source of the news
- Check the references of the author
- Apply common sense (recognise unrealistic news)

Cross-referencing the content with:
- Reputable news sites
- The citations and references given
- Fact-checking websites
- Experts in the field (2)

6.2.2 (a) The file should be uploaded to cloud storage/service ✓ and shared.
OR
Any valid example of cloud storage/service that allows this e.g. Google drive, OneDrive, WeTransfer, TeamViewer, etc. / FTP (1)

(b) *Any ONE risk of sending the attachment via cloud:* ✓
- Limited storage available on free versions of services
- The service might not have good security practices
- The service might not have good backup policies
- The service might 'oversell' their services (1)

(c) An online storage location for the sharing / downloading / streaming of files. ✓ (1)

(d) The cloud/files can be accessed from anywhere and at any time. ✓ (1)

6.3 6.3.1 (a) It is software that appears to be useful/innocent, that is then installed ✓ and then allows an attacker to remotely control the infected computer. (1)

(b) *Any TWO ways in which a computer could be infected with Trojan malware*: ✓✓
- Open an infected attachment in email
- Download/installing a Trojan file
- Download/installing a Trojan file from a malicious site
- Reacting on spoofed chat messages
- Opening/Installing a Trojan file from an infected removable storage device (2)

6.3.2 *Any TWO reasons why websites are often hacked*: ✓✓
- Steal users' personal information (email addresses, passwords, credit card information) for identity theft
- Deface the website or place political messages on the website
- Reroute traffic from the website to a phishing website (2)

6.4 6.4.1 A distributed database is where a database is spread/stored ✓ across servers in separate locations. ✓ (2)

6.4.2 Duplication is when every separate site has a copy of the entire/complete database. ✓

Partitioning is when each site manages/stores only its own data that it works with. ✓ (2)

6.4.3 When data is duplicated, each site works with its own copy of the data and data sets will start to differ over time. ✓

Synchronisation will ensure that changes are replicated ✓ over all data sets to prevent problems. (2)

6.5 6.5.1 Decision Support System / DSS ✓ (1)

6.5.2 Human expertise is coded into software ✓ to create a rule-based system that can make decisions based on the input obtained ✓ from a system such as mentioned in Question 6.5.1. (2)

6.6 6.6.1 Software that is available with access to the source code, ✓ which can be modified and adapted by a user. (1)

6.6.2 *Any ONE type of file that the disk clean-up program will remove*: ✓
- Temporary/redundant files
- Cached webpages (1)

6.6.3 (a) The gap between those who have access to computers and the internet, and those who do not. ✓ (1)

(b) *Any TWO factors that contribute to the digital divide*: ✓✓
- Lack of financial resources to acquire technology
- Difference in educational levels
- The age gaps
- Disabilities
- Lack of supporting infrastructure
- Fear of ICT (2)

6.7 6.7.1 RPA - Used for repetitive, rule-based processes using robotics. ✓

Hyper-automation – AI decides on the best strategy ✓ for tasks. (2)

6.7.2 *Any TWO concepts to be covered in discussion:* ✓✓
- Robots can replace workers
- Robots can improve worker productivity
- Robots can do task that requires strength and good health
- Robots can take over dangerous tasks (2)

6.8 6.8.1 Virtual reality replaces reality ✓ with software.
Augmented reality enhances reality ✓ by adding onto the real-world experience using software.

Also accept examples of each. (2)

6.8.2 Mixed reality super-imposes computer-generated objects that users can interact with. ✓ (1)

TOTAL SECTION F: 40
GRAND TOTAL: 150