basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
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GRADE 12

INFORMATION TECHNOLOGY P2

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MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 13 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	D/C ✓		(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   *GPU hardware specifications*:
                • Speed/type of processor/number of cores ✓
                • Speed/size/type of RAM ✓   (2)

                Also accept:
                Slot type of the GPU

        2.1.3   (a)   ZIF ✓-socket   (1)

                (b)   *Reasons for point-to-point connection*:
                      • CPU need to transfer large amounts of data 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
                • Manages the 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:* ✓
                • Report calculations may be incorrect/inaccurate
                • System crash
                • 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:* ✓✓
- ~~Battery capacity~~
- 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 and arrange the items on a desktop:* ✓
- Easy to locate programs
- Better organisation
- Avoid clutter
- Increase storage space/remove unnecessary files (1)

2.8.2 For the operating system to identify the type of file ✓ to be able to choose the correct program to open file with. ✓ (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   (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*:✓✓
                • Security can be compromised
                • Difficult to manage a large number of computers
                • Does not provide centralised storage/services   (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*:
Changing 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. ✓   (3)

3.7   3.7.1   The company will have information on the website that stays the same over time. ✓   (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 meta data of the content on the internet, ✓ and will relate the users contextual information to present a search result uniquely suited to the user. ✓   (2)

TOTAL SECTION C: 30

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

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:* ✓✓
- When completing forms
- E-toll road passes
- Cell phone logging
- Web searches
- GPS navigation using Google Maps, etc.

NOTE:
DO NOT accept devices in isolation, must be part of the mechanism. (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	(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   Procedure does not return a value whilst a function returns a value. ✓   (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 makes it directly accessible from outside the class ✓ which could have unintended/unforeseen effects. ✓   (2)

5.5   5.5.1   *Any ONE reason to use a sentinel controlled/conditional loop*: ✓
- Number of repetitions are not known in advance
- Preferred when a specific value must be reached
- A pre-set condition determines when loop will stop/terminate   (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 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 with a lot of unnecessary traffic (impacts speed)
- It impacts employee productivity, because 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

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

6.2.2   (a)   The file should be uploaded to cloud storage ✓ and shared with a link.
              OR
              Any valid example of cloud storage e.g. Google drive.   (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 to keep files for sharing. ✓   (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 an infected (torrent) file
                    • Download/installing infected files from a malicious site
                    • Reacting on spoofed chat messages
                    • Opening/Installing a 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 parts of a database ✓ are spread across servers in separate locations. ✓   (2)

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

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

	6.4.3	When data is duplicated, data 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 quickly 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 freely available with access to the source code. ✓		(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	(2)
6.7	6.7.1	Hyper-automation – AI decides on the best strategy ✓ for tasks. RPA - AI used for repetitive, rule-based processes using robotics. ✓		(2)
	6.7.2	*Any TWO concepts to be covered in discussion:* ✓✓ • Less workers available • 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 ✓ bad adding onto the real-world experience using software.		(2)
	6.8.2	Mixed reality super-imposes computer-generated objects that user can interact with. ✓		(1)

TOTAL SECTION F: 40
GRAND TOTAL: 150