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SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

INFORMATION TECHNOLOGY P2

2022

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 13 pages.

SECTION A: SHORT QUESTIONS**QUESTION 1**

- | | | | | |
|-----|-------|---|---------------|-----|
| 1.1 | 1.1.1 | B - Bluetooth ✓ | | (1) |
| | 1.1.2 | D - cookie ✓ | | (1) |
| | 1.1.3 | A - Expert system ✓ | | (1) |
| | 1.1.4 | C - extremely high volumes of traffic that request data from the website. ✓ | | (1) |
| | 1.1.5 | D - ytoje ✓✓ | | (2) |
| 1.2 | 1.2.1 | K ✓ | Cyberbullying | (1) |
| | 1.2.2 | F ✓ | iOS | (1) |
| | 1.2.3 | E ✓ | RSI | (1) |
| | 1.2.4 | A ✓ | Algorithm | (1) |
| | 1.2.5 | H ✓ | Spam | (1) |
| | 1.2.6 | D ✓ | Hyperlink | (1) |
| | 1.2.7 | R ✓ | Machine Cycle | (1) |
| | 1.2.8 | C ✓ | Machine code | (1) |
| | 1.2.9 | L ✓ | GIGO | (1) |

TOTAL SECTION A: 15

SECTION B: SYSTEMS TECHNOLOGIES**QUESTION 2**

- 2.1.1 a) DIMM slot ✓ (1)
- b) *Any TWO functions of a motherboard:* ✓✓
• Houses components (also accept specific components)
• Connects components / communication
• Provides power/distributes power to components (2)
- c) Increased use of virtual memory will result in data being accessed at a slower/lower rate ✓
Instructions and data are fetched at a slower rate from storage than from RAM ✓
- OR
- Decreased use of virtual memory/more instructions and data can be stored in RAM
Instructions and data are fetched faster from RAM than from storage (2)
- 2.1.2 A core is a single/separate processor on a CPU chip ✓ (1)
- 2.1.3 *Any ONE type of storage device used to increase storage space:* ✓
• SD card / memory card (1)
- 2.1.4 *Why would device C would be the most suitable device to scan QR codes:*
Mobility/portability ✓
Access to camera/ front and rear facing camera/built in camera ✓ (2)
- 2.1.5 Central Processing Unit (CPU) ✓ (1)
- 2.1.6 *Any ONE motivation for having a dedicated graphics card:* ✓
• Needed for graphics intensive applications (Video editing / CAD)
• Improve overall performance
• Reduce the processing load on the CPU
• Crypto mining (1)
- 2.2.1 *Any ONE for what is modular design:* ✓
• Computer is built up from separate modules/ parts
• An indication that the computer consists of individual components (1)
- 2.2.2 *Any ONE reason for using modular design:* ✓
• Components can be combined according to your needs
• Easy to upgrade/replace
• Easy to repair (1)

- 2.3.1 Any TWO properties of CPU cache memory: ✓✓
• High speed memory/static memory
• Memory on the CPU
• Stores frequently used instructions/stores instructions likely to be used next (2)
- 2.3.2 Any TWO other types of caching that is used on a computer system:
Web caching ✓
Disk caching ✓ (2)
- 2.4.1 A Trojan is malware disguised as useful software ✓
A user is tricked into installing ✓ the Trojan with the assumption that they are installing useful/legitimate software

CONCEPTS:
• Malware disguised as useful/legitimate software
• Activated by action from the user (installing/downloading) (2)
- 2.4.2 A firewall monitors/controls/filters traffic ✓ (incoming & outgoing) on a network/internet and prevents unauthorised communication/access ✓ (2)
- 2.5 Difference between software update and patch:

An update fixes code/adds new features/enhances security to software ✓
A patch removes software bugs/replacing incorrect code/removes vulnerabilities in code ✓ (2)
- 2.6 Any TWO ways to free up storage space: ✓✓
• Use a disk clean-up tool/example of disk clean-up
• Remove duplicate files
• Uninstall/remove unused software/applications
• Empty the recycle bin
• Compress data not frequently used
• Archive files/data
• Move data/files to cloud storage/external device (2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES**QUESTION 3**

- 3.1 3.1.1 *Any ONE type of cable used in wired LAN: ✓*
 • UTP/Ethernet cable (CAT 5/6/7)
 • Fibre (1)
- 3.1.2 *Any ONE type of media used to transmit in WiMAX: ✓*
 • Radio waves
 • Electromagnetic waves (1)
- 3.1.3 Wi-Fi ✓ (1)
- 3.2 3.2.1 VPN (Virtual Private Network) ✓ (1)
- 3.2.2(a) *IP address:*
 A unique address/code that identifies a device ✓ on a network. (1)
- 3.2.2(b) *Purpose of a DNS:*
 To obtain the correct IP-address for a specific URL/linking URL's to IP-addresses ✓ (1)
- 3.2.3 The NIC encodes/decodes data ✓ that is transmitted across a network ✓
- OR
- Provides a network hardware port for the computer to allow for data transmission over a network (2)
- 3.2.4 Intranet is a network similar to the Internet/browser based network ✓ of which the access is limited to a specific organisation ✓ (2)
- 3.3 3.3.1 *Any ONE characteristic of streaming: ✓*
 • The immediate and real-time delivery of media content to a receiving device
 • The file is not saved to the storage devices media, but only played on the device
 • Live viewing/ Video on demand (1)
- 3.3.2 *Any ONE way to prevent unauthorised viewing: ✓*
 • Use on a closed channel/do not connect to a larger network
 • Use a login/password to control access the content (1)

- 3.4 3.4.1 You will find “HTTPS” in the URL ✓ (1)
- 3.4.2 (a) Changing the format of data ✓ using a mathematical formula/key to prevent unauthorised access ✓
- OR
- Any TWO properties of encryption (SSL):*
- The public key is used to encrypt the data.
 - The data can only be decrypted using the specific private key.
 - The private and public unique matching keys are provided by complex mathematical algorithms.
 - The private key never travels on network and therefore cannot be intercepted. (2)
- 3.4.2 (b) The CA verifies that the business or organisation is valid. ✓ (1)
- 3.5 *Difference between functions of a router and modem:*
- A modem converts the format of a signal for a specific communication medium. ✓
- A router determines the best/correct route ✓ for the transmission of a message/communication between two points on a network. ✓ (3)
- 3.6 3.6.1 Semantic Search ✓ (1)
- 3.6.2 *Purpose of using SEO:*
- To ensure that a search engine ✓ will place the company’s site higher up in the order of search results. ✓ (2)
- 3.7 3.7.1 FTP (File Transfer Protocol) ✓ (1)
- 3.7.2 *Any ONE type of file sharing service: ✓*
- Cloud storage
 - BitTorrent
 - Git/Git hub
- Also accept examples of Cloud Storage like Google Drive, One Drive etc. (1)
- 3.7.3 *Any ONE benefit of using online file storage services: ✓*
- accessible from many devices/places
 - collaboration/sharing
 - Saving on local storage space
 - Servers take responsibility for creating a backup of the files (1)

TOTAL SECTION C: 25

SECTION D: DATA AND INFORMATION MANAGEMENT**QUESTION 4**

- 4.1 It is the primary key. ✓ (1)
- 4.2 *Primary key:*
Must be unique ✓
Cannot be empty/have a null value/required field ✓ (2)
- 4.3 IDNumber ✓ (1)
- 4.4 *Suitable data type for the VehicleRegNumber and motivation:*
Short Text (any text data type) ✓
A vehicle registration number contains numbers and letters ✓ (2)
- 4.5 *Why should name and surname be split into two fields:*
There is more than one piece of information in the field ✓
OR
Any indication that it might be necessary to separately work with the name and surname values (1)
- 4.6 4.6.1 Data redundancy refers to the unnecessary repetition of data ✓ (1)
- 4.6.2 Normalisation ✓ (1)
- 4.7 4.7.1 *Example of useful information extracted from the data:*

Establishing the frequency of offences/most common offence/least common offence ✓

Accept any relevant or correct answer of information gained from the table (1)
- 4.7.2 *How can step 3 & 4 in the data progression diagram be applied:*

A logical solution ✓ linked to the information obtained ✓
Example - Increase policing at stop signs

Also accept other correct examples based on the information from QUESTION 4.7.1 (2)
- 4.7.3 Fuzzy logic deals with reasoning that works with probabilities. ✓

Drivers not stopping at stops are reckless drivers/there are many reckless drivers in the community ✓

Also accept any other correct example (2)

- 4.8 4.8.1 *SQL injection:*
A hacking technique where SQL statements are entered ✓ into data input fields ✓ instead of data. (2)
- 4.8.2 *Audit trail:*
A record or 'trail' that is made to keep track of who ✓ made changes to a database and when ✓ those changes were made. (2)
- 4.9 4.9.1 (a) Logical integrity ✓ (1)
- 4.9.1 (b) Physical integrity - ensuring that data is protected against damage from power surges, natural disasters, theft, etc. ✓ (1)
- 4.9.2 *Any TWO ways to ensure the date is entered in the correct format. ✓✓*
- Provide a list/component to select from/date picker/calendar
 - Specify format in input component/ghost text
 - Format/Data type check/applying a validation rule
 - Input mask (2)
- 4.10 *How is transaction processing used to maintain data integrity:*
- In transaction processing, transactions that are dependent on one another to work are grouped together. ✓
 - The transaction will only be completed if all the individual transactions are successful. ✓
 - If any one of the parts/instructions are unsuccessful, everything will be rolled back. ✓ (3)

TOTAL SECTION D: 25

SECTION E: SOLUTION DEVELOPMENT

5.1 5.1.1 2 ✓ (1)

5.1.2 0-9 ✓ A-F ✓ (2)

5.2 5.2.1 Any ONE reason for using an array vs variable: ✓
 • When working with a large number of values/variables
 • An array can store multiple values
 • A variable can store only one value (1)

5.2.2 Any ONE reason why names and ages cannot be stored in array provided: ✓
 • An array can only store values of one specific data type
 • Names and ages are represented by two different data types
 • The provided array can only store integer values (1)

5.2.3 Loop k index 10 ✓ down to 7 ✓
 arrNum[k] ✓ ← arrNum[k-1] ✓ OR Loop k index 9 down to 6
 arrNum[6] ← 92 ✓ arrNum[k+1] ← arrNum[k]
 arrNum[6] ← 92 (5)

5.3 5.3.1 (a) FALSE ✓ (1)

(b) TRUE ✓ (1)

(c) FALSE ✓ (1)

5.3.2 An accessor returns the value of an attribute ✓ of an object and a mutator changes the value of an attribute ✓ of an object. (2)

5.4

Number	Factor	Loop	Number mod Loop = 0	Factor = 1	Output
4					
	0				
		2			
			True/Yes		
	1				
		3			
			False/No		
		4			
			True/Yes		
	2				
				False/No	
					4 is NOT a prime number
	✓	✓	✓	✓	✓

Notes:

- Values may be placed in the same line as long as progression of algorithm is clear.
- Mark with fault by penalising for the faulty value in that column only. (5)

TOTAL SECTION E: 20

SECTION F: INTEGRATED SCENARIO**QUESTION 6**

6.1 6.1.1 *Crowd funding:*
The practice of funding a project or venture by raising money from a large number of people ✓ who each contribute a small amount, typically via the internet/social networks. (1)

- 6.1.2 (a) *Any TWO reasons of using technology to automate the assembly of new vehicles: ✓✓*
- Safer work environment
 - Fewer people employed/cost saving
 - Greater precision/consistency of repetitive tasks
 - Greater efficiency
 - Improved productivity

Also ACCEPT other valid answers. (2)

- (b) *How could a learning algorithm be used to improve the manufacturing and sale of new vehicles:*

A learning algorithm observes the current processes/trends that are followed ✓, for example, colour preference of vehicles, also extras that are popular, creates a set of rules based on the observation ✓ and creates an optimal process that can be implemented. ✓

CONCEPTS:

- Studying/observing current processes/trends
- Creating a set of rules
- Creating an optimal process (3)

6.2 6.2.1 Radio Frequency Identification ✓ (1)

- 6.2.2 *Any TWO ways how passive tags work: ✓✓*
- Energy from reader's radio signal at tollgate powers the tag
 - Tag sends a signal that the reader uses to identify the specific tag
 - Amount is automatically deducted from tag holder's account (2)

6.2.3 (a) GPS ✓ (1)

- (b) *Any ONE reason why active tags will be needed for satellite tracking: ✓*
- The signal needs to be transmitted over longer distances
 - Stronger signal needed to communicate with satellite
 - Signal needs to be transmitted continuously (1)

- 6.3 6.3.1 *Uncapped:*
Unlimited amount of data that can be used in a month ✓
OR
No limit on amount of data used. (1)
- 6.3.2 *Any ONE reason for installing fibre rather than mobile LTE: ✓*
 - Fixed location internet has a lower cost per GB than mobile LTE
 - Fibre might have faster connection speeds depending on the speed of the package
 - Using a lot of data
 Also ACCEPT other valid answers. (1)
- 6.3.3 Router/ONT ✓ (1)
- 6.3.4 *Will the 70GB Night Surfer Data hold a benefit for the company:*
Yes, backup/update procedures can be done overnight ✓✓
OR any other applicable motivation
- OR**
- No. Outside office hours
OR any other applicable motivation (2)
- 6.4 6.4.1 (a) *Rootkit:*
Software designed to obtain administrator rights to a computer for unauthorised access. ✓ (1)
- (b) *Any ONE risk to data due to rootkit: ✓*
 - Opens the computer for hacking/illegally accessing data files
 - Creating backdoors for other malware
 - Used as a bot for launching attacks on other computers and networks.
 Also ACCEPT other valid answers. (1)
- 6.4.2 *Social engineering:*
An attempt to manipulate or con someone ✓ into installing malware or giving out sensitive personal information. ✓ (2)
- 6.4.3 *Any ONE way that anti-virus software identifies malware: ✓*
 - The anti-virus software scans the files to identify known threats using virus signatures/definitions
 - Looks for pieces of code that is unique to specific viruses. (1)

- 6.5 6.5.1 *Any TWO ways that AI can be used when working with big data: ✓✓*
- Find possible connections among datasets
 - Recognize knowledge using natural language processing
 - Can be used to automate and accelerate data preparation tasks
 - Can learn common human error patterns
 - Detect and resolve potential flaws in information
 - Can learn by watching how the user interacts with an analytics program
 - Can identify data types
 - It can alert users to anomalies or unexpected patterns in data
 - Identify potential threats from system logs or social networking data
- Also ACCEPT other valid answers. (2)
- 6.5.2 With the duplication model, each separate site has a complete copy of the entire database stored. ✓
With the partitioning model, each site stores and manages only the part of the database it works with. ✓ (2)
- 6.5.3 (a) *Purging:*
Deleting/removing records ✓ permanently from a database. (1)
- (b) *Any ONE reason why records will need to be purged: ✓*
- To limit the size of the database file.
 - Remove obsolete/redundant/outdated records
 - Improve the performance of the database (1)
- 6.6 6.6.1 Virtualisation is the use of software ✓ to create an entity that only exist for as long as the software is being run. ✓ (2)
- 6.6.2 *Any ONE benefit of virtualisation: ✓*
- Saving on hardware
 - Can run software written for other platforms
 - Convenience of not having to keep multiple devices (1)
- 6.6.3 *Is it compulsory for the company to pay for the additional proprietary operating system:*
- Yes, ✓ the user must pay for the operating system to avoid committing piracy ✓ (2)
- 6.6.4 *TWO ways in which virtualisation is applied to make scalability of services possible:*
- Combining the resources of many machines into one powerful service ✓
Sharing the resources of one powerful machine between many users ✓ (2)

6.7.1 *Any ONE reason to frequently change a password: ✓*

- For security reasons
- Prevent access to your account due to password leaks

Also ACCEPT other valid reasons.

(1)

6.7.2 *Any TWO reasons why mfunzi is not a strong password: ✓✓*

- Password too short/must be more than 8 digits
- Only lowercase characters/must contain an uppercase and lowercase letter, number and special character
- Can easily be guessed/do not use personal information

(2)

6.7.3 (a) *How can Quantum computing can be used in the statistical process of preventing the spread of a virus:*

It is used to easily query, monitor, analyse and act on data ✓, regardless of the source.

(1)

(b) *Any TWO problems of cloud computing which are solved using Edge computing: ✓✓*

- Bypasses the latency caused by cloud computing.
- Acts as mini data centres which cloud computing lacks.
- Used to process time-sensitive data in remote locations with limited or no connectivity to a centralised location.

(2)

TOTAL SECTION F: 40
GRAND TOTAL: 150