NATIONAL
SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2022

INFORMATION TECHNOLOGY P2
MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 14 pages.

SECTION A: SHORT QUESTIONS

QUESTION 1

1.1	1.1.1	Record/Tuple ✓	(1)
	1.1.2	Normalisation ✓	(1)
	1.1.3	Zero Insertion Force /ZIF/CPU slot ✓	(1)
	1.1.4	Hacker ✓	(1)
	1.1.5	Utilities/Utility software ✓	(1)
	1.1.6	Node ✓	(1)
	1.1.7	Internet of Things/IoT ✓	(1)
	1.1.8	RAM ✓	(1)
	1.1.9	Memes ✓	(1)
	1.1.10	Intranet ✓	(1)
1.2	1.2.1	B ✓ – (object) ✓	(1)
	1.2.2	C ✓ – (Method signature)	(1)
	1.2.3	B ✓ – (seek time)	(1)
	1.2.4	D ✓ – (Power users)	(1)
	1.2.5	C ✓ – (attenuation)	(1)

TOTAL SECTION A: **15**

SECTION B: SYSTEMS TECHNOLOGIES

QUESTION 2

2.1   2.1.1   **Any ONE:** ✓
- Motherboard
- Main board
- Circuit board   (1)

2.1.2   **Any TWO:** ✓✓
- Provides physical structure for other hardware.
- Connects the hardware.
- Provides power to the hardware.
- Sends signals between the hardware.   (2)

2.1.3   **Any ONE:** ✓
- A motherboard bus connects one part of the motherboard to communicate with other parts of the motherboard.
- It also serves as an interface between the CPU and various external devices.   (1)

2.1.4   • Checks that all important hardware (RAM, hard drive, keyboard) is present, and working. ✓
- Provides users with a menu or set of options to configure the computer at the lowest level or change the settings stored in the CMOS. ✓
- Locates and loads the operating system. ✓
- Controls the hardware at a low level. ✓   (4)

2.1.5   (a)   SATA ✓   (1)

(b)   Dual Inline Memory Module/DIMM ✓   (1)

2.1.6   CMOS is a type of memory that stores BIOS settings that can be updated or changed. ✓   (1)

2.2   **Any TWO:** ✓✓
- Electronic (RAM has no moving parts)
- Fast (RAM is fast because it is electronic)
- Volatile (It loses its contents if the power supply is interrupted or removed.)
- Comparatively expensive (RAM is more expensive per gigabyte than storage.)
- Limited (By the number of slots on the motherboard. By the amount of memory which the operating system can address or make use of.)   (2)

2.3   Power On Self-Test (POST) refers to a startup test performed by the BIOS to ensure that all essential hardware (RAM, keyboard, storage) is present and in working order. ✓   (1)

2.4   Plug-and-Play ✓   (1)

2.5   System clock coordinates activities on a motherboard. ✓   (1)

2.6
- Volatile memory/Temporal storage/Primary Memory ✓
  Example: RAM ✓
- Non-volatile memory/Secondary memory/Permanent storage ✓

  Example: **Any ONE:** ✓
  - Hard Disk Drive/HDD
  - Solid State Drive/SSD
  - Optical disc
  - Memory card
  - Sim card
  - Flash drive/Memory stick
  - Cassettes   (4)

2.7   **Any TWO*:*** ✓✓
- RAM
- CPU
- Video card   (2)

2.8
- Compilers refer to software that translates programming instructions written in high level language into a standalone executable file (with an *exe.* extension) that can run independently of the programming language.

<div align="center">

OR

</div>

- Compilers takes an entire program and translates it into a machine language. ✓
  Interpreters refer to software that translates programming instructions into a machine code one line at a time. ✓   (2)

<div align="right">

TOTAL SECTION B: **24**

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SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

3.1   3.1.1   *Information overload* refers to excess/too much of information available to a person aiming to complete a task or make a decision. ✓

               Digital divide refers to a gap between those who benefit from the digital age and those who do not. ✓   (2)

      3.1.2   Search Engine Optimisation ✓   (1)

      3.1.3   • URL starts with HTTPS ✓
                 • Closed lock/pad lock, ✓somewhere on the page or next to URL   (2)

3.2   3.2.1   Secure Sockets Layer (SSL) is an encryption protocol which encrypts data over the internet. ✓   (1)

      3.2.2   SSL issued by websites for communicating sensitive information. ✓   (1)

      3.2.3   **Any TWO:** ✓✓
                 • The domain name or subject the certificate is valid for
                 • The certificate authority that created/issued the certificate
                 • The dates the certificate is valid for
                 • Owner's public key
                 • Owner's name
                 • Expiration date of the public key
                 • Serial number of the digital certificate
                 • Digital signature of the issuer   (2)

3.3   3.3.1   Virtual Private Network/VPN is a network implemented via a public network such as the internet. ✓   (1)

      3.3.2   **Any TWO:** ✓✓
                 • It allows the user to log onto a network from a remote location with same benefits of privacy and security as a LAN.
                 • It is useful when a person needs to log onto an organisation's network and access files stored on the file server when they are at home or travelling.
                 • It allows you to work as if your computer is connected to all resources on the network and all the files you have access to on that network.
                 • You can route all your communications through the remote network.   (2)

3.4   3.4.1   **Any ONE:** ✓
- Network communication channel is a transmission media on which data, instructions or information (signals) travel from the sending device/source to the receiving device/destination.
- Network communication channel is a path or a way which carries signals from the sending device/source to the receiving device/destination.   (1)

       3.4.2
- Wired/Cabled communication channel ✓
  Example: **Any ONE:** ✓
  o   Twisted Pair cables (Unshielded Twisted Pair cables/UTP)
  o   Fibre optic cables
- Wireless communication channel ✓
  Example: **Any ONE:** ✓
  o   Satellites
  o   Microwave stations   (4)

       3.4.3
- Network Interface Card/NIC gets data from the rest of the computer system and encode the data so that it can be sent over a specific medium. ✓
- NIC receives data over the medium and decodes it so that it can be understood by the rest of the computer system. ✓   (2)

       3.4.4
- *Switch* is a hardware device used to connect computing devices in a central location to a network so that communication can occur. ✓

- *Router* is hardware device that makes communication between networks possible over the internet by directing data to its correct destination. ✓   (2)

3.5   Bandwidth refers to the total amount of data that can be transferred from one point to another point in a given period of time. ✓   (1)

3.6   3.6.1   **Any TWO:** ✓✓
- Sharing hardware
- Sharing software
- Sharing data and information   (2)

       3.6.2
- Intranet is an organisation's private network and is an internet-like environment consisting of web pages relating to the organisation's business. ✓

- Extranet is an organisation's intranet (or part thereof) which is available to other users outside the organisation. ✓   (2)

3.7   **Any THREE:** ✓ ✓ ✓
- DRM (Digital Rights Management)
- ATM
- Internet browsers
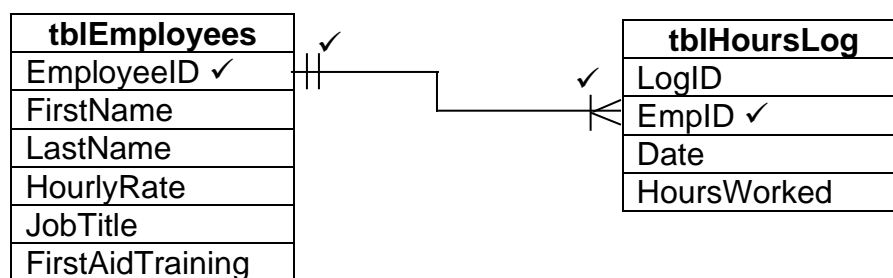- Skype calls
- Online storage services   (3)

TOTAL SECTION C: 29

SECTION D: DATA AND INFORMATION MANAGEMENT

QUESTION 4

4.1   4.1.1   *Data* is a collection of unprocessed items/facts. ✓
                Information refers to processed data that is organised accurately, is
                timely, meaningful and useful. ✓   (2)

        4.1.2   **Any ONE:** ✓
- *Database* is a collection of data organised in a manner that allows access, retrieval and use of data.
- *Database* is a collection of data or facts regarding a specific topic.   (1)

4.2   4.2.1   **Any ONE:** ✓
- *Data validation* is a technique used to reduce the number of errors that can be made during the input or data entry by ensuring that data meets a set of specified requirements/rules.
- *Data validation* refers to the process of comparing data entered to a system with a set of rules to determine its correctness or accuracy.   (1)

        4.2.2   **Any TWO:** ✓✓
- Format check
- Data type check
- Range check
- Check digit   (2)

4.3   4.3.1   Anomaly ✓   (1)

        4.3.2   *Data redundancy* refers to unnecessary repetition/duplication of data in a database. ✓
                Data integrity refers to the overall completeness, accuracy and consistency of data. ✓   (2)

4.4   4.4.1   *tblEmployees* – EmployeeID ✓
                t*blHoursLog* – LogID ✓   (2)

        4.4.2   tblHoursLog ✓ and EmpID ✓   (2)

        4.4.3   Yes/No ✓   (1)

4.4.4

tblEmployees ✓		**tblHoursLog**
EmployeeID ✓	✓ ✓	LogID
FirstName		EmpID ✓
LastName		Date
HourlyRate		HoursWorked
JobTitle		
FirstAidTraining		

(4)

4.4.5   Entity ✓   (1)

4.4.6   Composite/Combined/Concatenated key ✓   (1)

4.5   **Any TWO:** ✓✓
- Plan and design the database
- Add and remove fields from existing database
- Design the technical requirements of the database
- Plan how the information will flow in the database   (2)

4.6   *Logging* is the process of recording any changes made by users to a database. ✓   (1)

TOTAL SECTION D: 23

SECTION E: SOLUTION DEVELOPMENT

QUESTION 5

5.1 *Physical file* name refers to the external file name found on a storage device and contains the actual data. ✓

Logical file is a variable (in RAM) that points to the physical file on your storage medium. ✓ (2)

5.2 txt ✓ (1)

5.3 5.3.1 **Any ONE:** ✓
- Opens the file *tPayrollReport* for writing and sets the file pointer to the end of the file so that text can be written to the end of the text file.
- It only allows you to add data to the end of the file *tPayrollReport.* (1)

5.3.2 Writes to the logical file *tPayrollReport* the current date next to the label *Report Date,* 15 spaces have been reserved for the current date and the date is right aligned. ✓ (1)

5.3.3 Create a new file tPayrollReport with write only access (writing) and sets the file pointer at the beginning of the file and if the file already exists, the contents of the file is lost. ✓ (1)

5.3.4 Opens an existing file (*tPayrollReport)* for read only access and sets the file pointer at the beginning of the file so that text can be read from the beginning of the text file. ✓ (1)

5.4 Algorithm ✓ (1)

5.5 5.5.1 Type ✓ (1)

5.5.2 Real ✓ (1)

5.5.3 Constructor ✓ (1)

5.5.4 (a) **Any ONE:** ✓
- CalcMonthlySalary
- toOutputString (1)

(b) **Any ONE:** ✓
- GiveRaise(rRaisePerc : Real);
- YearEnd; (1)

(c) GetYearly : Real; ✓ (1)

5.6 Encapsulation ✓ (1)

5.7 Logical error ✓ (1)

5.8   Boolean ✓   (1)

5.8   5.9.1   Elements ✓   (1)

        5.9.2   const ✓
                  arrStudentMarks : array[1..6] of Integer ✓ = (60,70,40,80,90,59) ✓;   (3)

        5.9.3   arrStudentMarks[2]; ✓   (1)

        5.9.4   Temporal ✓   (1)

        5.9.5   Text files ✓   (1)

                                                          TOTAL SECTION D: 24

SECTION F: INTEGRATED SCENARIO

QUESTION 6

6.1   6.1.1   Script kiddie is a term used for people who obtain virus templates or pre-created scripts which they modify and release. ✓
              Any One: ✓
- Cracker breaks into computer systems for a variety of reasons, from stealing data to testing their skills to making political statements.
- The word cracker can also be used to refer to people who write software cracks (tools that allow software to be pirated and used illegally).   (2)

       6.1.2   Malware is a software specifically designed to install itself without the user's knowledge to negatively affect or harm a computer system. ✓   (1)

       6.1.3   **Any THREE:** ✓✓✓
- Installing and updating anti-virus software
- Using a firewall
- Keeping all your software up-to-date
- Being aware of current trends in computer crime
- Applying common sense
- Following a good password policy   (3)

       6.1.4   **Any TWO:** ✓✓
- Use different passwords for different accounts
- Make your passwords long
- Avoid words that can be found in a dictionary
- Change your password regularly
- Avoid personal information about yourself or your family that can easily be researched   (2)

6.2   6.2.1   **Any TWO:** ✓✓
- Fingerprint reader
- Hand geometry systems
- Face recognition systems
- Signature verification
- Iris recognition systems
- Retina scanners   (2)

       6.2.2   **Any TWO:** ✓✓
- Hand geometry readers transmit germs
- In case of sore throat, voice recognition systems might reject you
- People are not comfortable to use iris scanners
- Electricity problems may cause the devices not to function
- If you cut your finger, a fingerprint reader might reject you as a legitimate user   (2)

6.3   6.3.1   Protocol is a set of rules for encoding and decoding data for transmission across a network. ✓   (1)

        6.3.2   Simple Mail Transfer Protocol (SMTP) is the most common protocol used for sending e-mail via the Internet. ✓
                  Post Office Protocol 3 (POP3) is the protocol used for downloading e-mail via the internet from POP3 servers. ✓   (2)

        6.3.3   File Transfer Protocol/FTP ✓   (1)

        6.3.4   Blind Carbon Copy ✓   (1)

6.4   6.4.1   E-commerce refers to a business transaction that occurs over an electronic network such as the internet. ✓   (1)

        6.4.2   **Any TWO:** ✓✓
                  • Buy goods/products
                  • Bookings
                  • Entertainment
                  • Online trading
                  • Banking
                  • Online learning
                  • Crowd funding
                  • Pay bills
                  • Tracking services
                  • Media services   (2)

        6.4.3   Shopping cart is an electronic trolley that allows the customer to collect purchases. ✓   (1)

        6.4.4   **Any TWO:** ✓✓
                  • Pay-pal/Google checkout
                  • Bank cards (Debit/Credit cards)
                  • Direct deposit
                  • Bitcoin
                  • Points   (2)

6.5   6.5.1   **Any TWO:** ✓✓
                  • Back and neck pain
                  • Hand or arm pain
                  • Eye strain
                  • Obesity
                  • Computer stress
                  • Repetitive Strain Injury (RSI)
                  • Carpal Tunnel Syndrome (CTS)   (2)

        6.5.2   Digital divide is a gap between people that have access to computers and technology and people that do not. ✓   (1)

6.5.3   **Any TWO:** ✓✓
- Keep messages brief/short.
- Use proper grammar, spelling and punctuation.
- Be careful when using sarcasm and humour as it might be misinterpreted.
- Be polite. Avoid offensive language.
- Read the message before you send it.
- Use meaningful subject lines.
- Avoid sending spam.
- Do not use capital letters which is equivalent to SHOUTING!
- Use abbreviation and acronyms for phrases.
- Do not participate in flame wars **OR** Avoid sending or posting flames which are abusive or insulting messages.   (2)

6.5.4   **Any ONE:** ✓
- Green computing refers to initiatives to design, use and dispose of technology in an environmentally or eco-friendly way.
- Green computing involves reducing electricity and environmental waste while using computers **OR** Green computing reduces environmental impact of the daily use of computers.   (1)

6.5.5   Ergonomics ✓   (1)

6.6   6.6.1   **Any TWO:** ✓✓
- An app's interface is easier to navigate.
- An app has a dedicated purpose and does not result in distraction and loss of focus.
- You do not have to remember URLs or manage menus of bookmarks to get where you want to go.
- Apps can be set to fetch data on their own in the background even when you are not using them and also notify you automatically of changes or events.
- All the interface data is already installed on your device as part of the app and does not need to be downloaded.
- Apps can work with syncing service.
- Apps can use additional sensors in your mobile device.   (2)

6.6.2   **Any TWO:** ✓✓
- Browsing and browser discovery of sites is decreasing.
- Search engines are struggling to make money off the mobile web because fewer mobile users use the web and search engines.
- Many users can suffer with app overload where they have pages and pages of apps installed on their device and end up forgetting which app to use.   (2)

6.7   Rich Internet Application is a web application that is designed to deliver the functions and features of a traditional desktop application. ✓   (1)

TOTAL SECTION F: **35**
GRAND TOTAL: **150**