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EDUCATION

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NATIONAL SENIOR CERTIFICATE

GRADE 12

SEPTEMBER 2025

INFORMATION TECHNOLOGY P2 MARKING GUIDELINE

MARKS: 150

This marking guideline consists of 16 pages.

SECTION A: SHORT QUESTIONS**QUESTION 1**

- | | | | |
|-----|--------|---|-----|
| 1.1 | 1.1.1 | Router ✓ | (1) |
| | 1.1.2 | VRAM/Video Random Access Memory ✓ | (1) |
| | 1.1.3 | Plug-and-Play/PnP/Plug-n-Play ✓ | (1) |
| | 1.1.4 | Switch ✓ | (1) |
| | 1.1.5 | Audit trail ✓ | (1) |
| | 1.1.6 | Spam ✓ | (1) |
| | 1.1.7 | Bandwidth ✓ | (1) |
| | 1.1.8 | Data ✓ | (1) |
| | 1.1.9 | Anti-malware software ✓ | (1) |
| | 1.1.10 | Overflow ✓ | (1) |
| 1.2 | 1.2.1 | D ✓ – (Encapsulation is about restricting direct access to the fields of an object) | (1) |
| | 1.2.2 | B ✓ – (Flowchart) | (1) |
| | 1.2.3 | C ✓ – (13) | (1) |
| | 1.2.4 | D ✓ – (Flashing the ROM) | (1) |
| | 1.2.5 | A ✓ – (Thrashing) | (1) |

TOTAL SECTION A: 15

SECTION B: SYSTEMS TECHNOLOGIES**QUESTION 2****2.1 Any THREE of: ✓✓✓**

- Removes temporary files created by the system and applications
 - Clears the Recycle Bin
 - Removes system cache files
 - Deletes downloaded program files
 - Cleans temporary Internet Files
 - Removes previous Windows installations
 - Deletes outdated drivers that have been replaced with newer versions
 - Provides a list of unused programs which can be uninstalled
- (3)

2.2 Any TWO of: ✓✓

- HDMI supports high-definition resolutions, while VGA is limited to lower resolutions with potential signal degradation.
 - HDMI carries both video and audio signals in one cable, whereas VGA only transmits video, requiring a separate audio connection.
 - HDMI uses a digital signal, which provides a clearer and more stable image compared to VGA's analogue signal, which is prone to noise and signal degradation over long distances.
 - HDMI supports a higher colour depth, improving image
 - HDMI is the standard for modern TVs, gaming consoles, laptops, and projectors, while VGA is becoming obsolete and is rarely found on new devices.
- (2)

- 2.3
- POST refers to a start-up test performed by the BIOS to ensure all essential hardware/components (RAM, Keyboard/HDD/SSD etc.) are present and in working order. ✓
 - Booting refers to the process of locating the operating system on storage and loading it into RAM. ✓
- (2)

2.4 2.4.1 Any TWO of: ✓✓

- Resolve software bugs in the previous versions of the software.
 - Fixes security weaknesses in the software that could be used by people and software with malicious intent to gain unauthorised access to a computer.
 - Improve the functionality of the software with new features.
- (2)

- 2.4.2
- Patch is an update that can be downloaded to fix a specific bug in software.

OR

Patch is a small update to fix a specific bug or security weakness/vulnerabilities in software.

- Service pack refers to a collection of fixes, updates and new features since the release of the original software or previous service pack.

OR

- Service pack is several patches, which are released over a period of time, combined into a single installable package.
- (2)

2.5 Any TWO of: ✓✓

- Reduces file sizes, freeing up disk space.
- Faster file transfers – Smaller files upload/download more quickly.
- Reduces bandwidth usage – Optimised for email attachments and cloud storage.
- Easier file organisation – Combines multiple files into a single archive.
- Enhances security – Can encrypt compressed files for added protection.
- Speeds up backups – Smaller files mean quicker and more efficient backups.
- Compatibility – Standard compression formats (ZIP, RAR, etc.) are widely supported.
- Facilitates sharing – Makes it easier to send large files via email or messaging apps.

(2)

2.6 2.6.1 Cloud storage is a service that allows you to store data and files on remote servers ✓ that can be accessed via the Internet. ✓

(2)

2.6.2 Any TWO of: ✓✓

- Accessibility – Access your files from anywhere with an Internet connection, using any device.
- Cost-effective – Reduces the need for expensive on-premises hardware and maintenance.
- Scalability – Easily increase or decrease storage space based on your needs.
- Data backup and recovery – Protects against data loss with automated backups and recovery options.
- Security – Many cloud providers offer encryption, multi-factor authentication, and compliance with security standards.
- Collaboration – Enables multiple users to access and work on the same files in real time.
- Automatic updates – Cloud providers handle updates and maintenance, ensuring security and performance.

(2)

2.7 2.7.1 Any THREE differences ✓✓✓

| Compilers | Interpreters |
|---|---|
| <ul style="list-style-type: none"> • Translates the entire program into machine code before the program runs. • Provides a list of errors and does not run the program until all errors are corrected. • Once the program successfully runs, an executable file(.exe) is created. • The .exe file can run on any Windows computer regardless of whether it has the programming language installed or not. • Runs faster than interpreters. | <ul style="list-style-type: none"> • Translates the code into machine code line by line as the program is running. • Error messages are provided for each line, one at a time at which point the program will crash. • No executable file is created. • Programming language needs to be installed on the computer to run the program, since no .exe is created. • Runs slower than compilers since each line needs to be interpreted before it can run. |

(3)

2.7.2 Any TWO of: ✓✓

- Java
- Python
- Scratch

(2)

2.7.3 Any ONE of: ✓

- API is an interface between the operating system (which controls the hardware) and the programming language/end-user.
- API acts as a link between a high-level programming language and the hardware, software or service enabling them to communicate and interact effectively.

(1)

2.7.4 Any TWO of: ✓✓

- Fewer lines of code are needed since these languages are installed with libraries of pre-written code and built-in methods.
- It is easier to debug.
- Since the instructions are written in a language closely related to humans, it makes it easier to understand.

(2)

TOTAL SECTION B: 25

SECTION C: COMMUNICATION AND NETWORK TECHNOLOGIES

QUESTION 3

3.1 Any TWO of: ✓✓

| Fibre optic cables | Unshielded Twisted pair cables |
|---|---|
| <ul style="list-style-type: none"> • More expensive • Technical expert needed to install. • Highest bandwidth/Higher data transfer • Lower attenuation/Transmits over many kilometres before the signal need to be boosted/amplified. • Most secure since it is unaffected by EMI and eavesdropping. | <ul style="list-style-type: none"> • Less expensive than fibre optic cables/Cheap. • Easier to install than fibre optic cables. • Lower bandwidth than fibre optic cables/Slower data transfer rate. • Susceptible to attenuation/signal needs to be boosted after every 100 m. • Less secure since it is affected by EMI and eavesdropping. |

(2)

3.2 3.2.1 Any TWO of: ✓✓

- It is easy to add new devices to a WLAN since each device does not need a network point to connect to.
- The setup cost is less than LAN.
- Access to WLAN is more flexible for the users and they are able to connect from anywhere as long as they are within the Wi-Fi range.
- It is easier to connect a device in areas where laying cables is difficult.

(2)

3.2.2 Any TWO of: ✓✓

- Lower speed: Wi-Fi generally offers slower speeds compared to wired connections
- Signal interference: Wi-Fi signals can be interfered with by various factors such as walls, other electronic devices and other nearby Wi-Fi networks, which can degrade the quality and speed of the connection.
- Security risks: Wi-Fi networks are more vulnerable to hacking if not properly secured, especially if they are open or use weak passwords.
- Limited range: As you move further away from the router or access point, the connection strength diminishes, leading to slower speeds or a complete loss of connectivity.
- Network congestion: If many devices are connected to the same Wi-Fi network, bandwidth can be divided among them, leading to reduced performance for each device.
- Reliability: Wi-Fi connections can be less reliable compared to wired connections, with occasional fluctuations in connection stability, especially in areas with poor signal coverage.

(2)

- #### 3.2.3
- Usernames and passwords ✓
 - Two-factor authentication ✓

(2)

3.3 3.3.1 Thin Clients: Any One of: ✓

- Thin clients use the server for all their resources including system and application software.

OR

- Computers that have no hard drives, but depend almost completely on a server to run applications and store data files

Fat Clients: Any One of: ✓

- Fat Clients have their own storage space and RAM to store and run software.

OR

- Computers that run most of their applications from their local hard drives and make little use of network services. (2)

3.3.2 Any TWO of: ✓✓

- It is cheaper to buy thin clients than fat clients, since they have lower hardware specifications.
- They take up less desk space.
- Maintenance is easier as updates are all done on the server.
- They use less power and are therefore a greener solution. (2)

3.3.3 Any TWO of: ✓✓

- E-mail services
- Printing services
- Internet facilities
- Files (2)

3.4 3.4.1 Voice over internet protocol. ✓ (1)**3.4.2 Any ONE of: ✓**

- VoIP is a protocol that allows the transfer of voice data over a network such as the Internet.
- VoIP is a protocol that allows telephone calls to be made over LANs, WANs and the Internet. (1)

3.4.3 Any TWO of: ✓✓

- Both users need stable internet connection.
- Battery life of a mobile device could be depleted quickly while making the call.
- Voice clarity and connection quality can be affected by factors like bandwidth limitations, network congestion, etc.
- VoIP systems are vulnerable to hacking, phishing, and denial-of-service (DoS) attacks. Sensitive data can be intercepted if not properly encrypted, making them more prone to security breaches. (2)

3.5 Any TWO of: ✓✓

- Easy to setup.
- A limited amount of online storage space linked to the email account is available for free.
- E-mails can be accessed from anywhere using an Internet connection and a browser or app on a smartphone. (2)

3.6 3.6.1 Netiquette refers to the use of good manners and showing respect for other users when using the internet / network. ✓ (1)**3.6.2 Any THREE of: ✓✓**

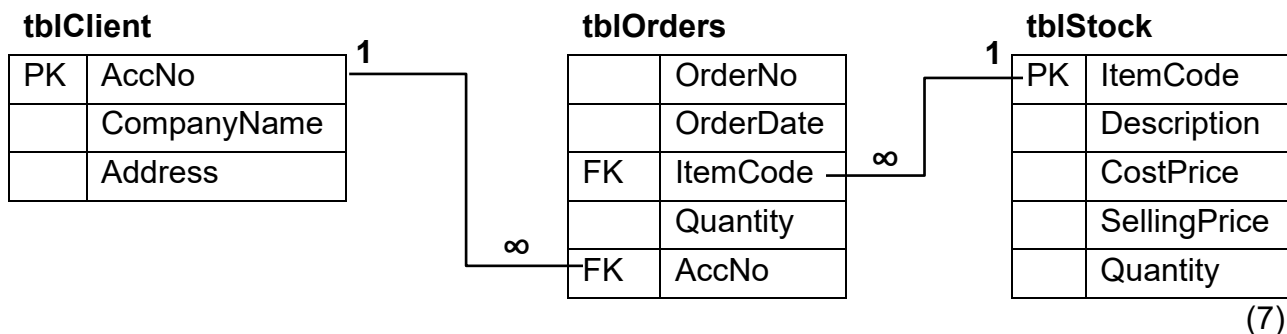
- Avoid TYPING IN ALL CAPS since it comes across as shouting and can be perceived as aggressive.
- Be careful with humour and sarcasm – tone can be misunderstood online, so use emojis or clarification if needed.
- Be respectful by treating others with kindness and avoid offensive language, insults, or harassment.
- Use correct spelling and grammar and do not use SMS language in e-mails.
- Do not share other's personal information online.
- Be respectful of other's data limits by not sending large files.
- Be respectful of the time of the day you send messages besides e-mails.
- If you are sending an e-mail to multiple people at once, place e-mail addresses in Bcc field of your e-mail to prevent sharing their e-mail addresses with others.
- Don't spam – avoid excessive posting, irrelevant links, or repeated messages.
- Follow community guidelines – different platforms have their own rules – make sure to follow them. (3)

TOTAL SECTION C: 24

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

- 4.1 A field ✓ that is a unique identifier ✓ for a specific record or entity. (2)
- 4.2 The Profit field ✓ It can be calculated by subtracting the SellingPrice from the CostPrice ✓ (2)
- 4.3 4.3.1 The steps required in database design ✓ so that anomalies are prevented ✓ (2)
- 4.3.2
- No primary key ✓
 - Multiple values in a field (Address) ✓
 - Repeating columns (Item1, Item2, Item3 or Quantity1, Quantity2, Quantity 3) ✓ (3)
- 4.3.3 An error that occurs when you insert/delete/update data in a table. ✓ (1)
- 4.3.4 **Any TWO of:** ✓✓
- Insert anomaly ✓, you cannot insert a company's details without placing an order ✓
 - Delete anomaly ✓, you could delete a company's information from the table when an order is cancelled ✓
 - Update anomaly ✓, due to redundant data you would need to make changes to several records if details such as the address of a client changes ✓ (4)
- 4.4 **Any ONE of:** ✓
- Range check ✓, ensure that valid values for year, month and day are entered ✓
 - Format check ✓, format e.g. YYYY/MM/DD must be valid ✓
 - Presence check ✓, test if a data has been entered ✓ (2)
- 4.5 4.5.1 A database that contains multiple tables that are linked together ✓ through a relationship using primary and foreign keys ✓ (2)
- 4.5.2 **Any ONE of:** ✓
- To ensure that records linked through a relationship cannot be deleted without first deleting its related records in another table.
 - It ensures that no record in the child table can exist without being related to a record in the parent table. (1)

- 4.6
- Correct table names (tblClient, tblOrders, tblStock) ✓
 - OrderNo must NOT be a primary key ✓
 - Correct primary keys in tblClient and tblStock ✓
 - Correct foreign keys in tblOrders ✓
 - Correct lines linking the PKs and FKs ✓
 - Correct indication of the one-to-many relationships as shown ✓
 - Correct fields in all tables ✓



TOTAL SECTION D: 26

SECTION E: SOLUTION DEVELOPMENT**QUESTION 5**

- 5.1
- Syntax ✓
 - Logical ✓
 - Runtime ✓
- (3)
- 5.2
- 5.2.1 Links the internal file variable, sFile, ✓ to the external file on disk, Staff.txt ✓
- (2)
- 5.2.2 Var sFile : Textfile; ✓
- (1)
- 5.2.3 Number of lines in a file is unknown. ✓
- (1)
- 5.2.4 It will produce an error since Append moves the file pointer to the end, meaning data can only be written, not read. ✓
- (1)
- 5.2.5 The textfile will be empty ✓
- (1)
- 5.3
- 5.3.1 Algorithm refers to a sequence of steps that can be followed to solve a problem ✓
- (1)
- 5.3.2 **Any ONE of:** ✓
- Flowchart
 - Pseudocode
 - IPO
- (1)
- 5.3.3 **Any ONE of:** ✓
- iRandom := RandomRange(45,76)
 - iRandom := Random (31) + 45;
- (1)
- 5.3.4 **Any ONE of:** ✓
- If iRandom mod 2 <> 0
 - If iRandom mod 2 = 1
- (1)
- 5.4
- 5.4.1
- Accessor method is used to retrieve (or access) the value of an instance variable. ✓
 - A mutator method is used to modify the value of an instance variable. ✓
- (2)
- 5.4.2
- Public (+) indicates that an attribute or method is accessible from any class that can access it. ✓
 - Private (-) indicates that an attribute or method is accessible only within the class itself. ✓
- (2)
- 5.4.3 It will be possible to access or modify the attribute from outside the class. ✓
- (1)
- 5.4.4
- DetermineDuration: Real ✓
 - TreatmentRequired (rInfectedSize:Real): String ✓
- (2)

- 5.4.5 GetFarmName ✓ (1)
- 5.4.6 TreatmentRequired (rInfectedSize:Real): String ✓ (1)
- 5.5 5.5.1 2D Array or Parallel arrays ✓ (1)
- 5.5.2 **Any ONE of:** ✓
- StringGrid
 - RichEdit
 - Memo (1)

TOTAL SECTION D: 24

SECTION F: INTEGRATED SCENARIO**QUESTION 6**

- 6.1 6.1.1 • Digital divide is the gap between the people who have access to ICT and people who do not. ✓ (2)
- Digital citizen is a person who has the knowledge and skill to use ICT, including internet and uses the technology responsibly with regards to others and environment. ✓ (2)
- 6.1.2 The digital divide creates barriers that hinder individuals' ability to fully engage in digital citizenship ✓, limiting their access to opportunities, information, and social participation in the increasingly digital world. ✓ (2)
- 6.2 6.2.1 **Any ONE:** ✓ (1)
- Artificial Intelligence is hardware and software programmed to make human decisions according to rule-based algorithms, often collecting data from sensors.
 - Artificial Intelligence refers to simulation of human decision-making processes by a computer system that is programmed to react based on input gained from sensors.
- 6.2.2 **Any TWO:** ✓✓ (2)
- ChatGPT is not always correct and therefore the results always need to be verified.
 - There is also a risk that users may rely too heavily on ChatGPT for information, without fact-checking its responses.
 - The user's personal details may be at risk since ChatGPT stores data from a user's computer such IP address, name, location.
 - ChatGPT is reliant on pre-existing data to generate its responses.
- 6.3 Digital footprint is a trail of data that the user leaves behind while interacting and communicating in the Internet using websites and apps. ✓ (1)
- 6.4 **Any THREE:** ✓✓✓ (3)
- No social interaction with other employees.
 - Employees without integrity might not be working when they should.
 - Support is often difficult via the internet.
 - Work often intrudes/interrupts on an employee's personal time after hours.
- 6.5 6.5.1 Office automation refers to the use of hardware and software to collect, process and store and data and information without human intervention. ✓ (1)

6.5.2 Any TWO: ✓✓

- Email filtering and organisation: Using software like Microsoft Outlook or Gmail, emails can be automatically sorted into folders based on predefined rules
- Tools like Google Drive or SharePoint automate document storage, retrieval, and sharing.
- Some tools automate task assignment, tracking, and deadline notifications, helping teams stay organised and on track without manual intervention.
- Tools like Microsoft Outlook's scheduling assistant automatically find available meeting times and coordinate schedules between team members without the need for back-and-forth communication.
- Some software like QuickBooks automate the creation, submission, approval, and payment of invoices and expenses, reducing the need for manual processing and human errors.
- Or any other suitable example or description (2)

6.5.3 Robots are more accurate than humans. ✓

- Robots can perform tasks faster than humans which improve productivity. ✓
- Robots do not need to be paid salary. ✓ (3)

6.6 6.6.1 Gig economy refer to part-time employees, freelancers and contractors instead of full time employees. ✓ (1)

6.6.2 Any TWO: ✓✓

- The lack of job security and stability of a permanent position.
- No employee benefits like medical aid and pension.
- The lack of physical social interaction with colleagues on a daily basis.
- Long working hours, since there is no income if one does not provide the service. (2)

6.7 6.7.1 Any ONE: ✓

- BitCoin or Ethereum (1)

6.7.2 Any ONE: ✓

- Cryptocurrencies are not controlled by a single central authority like a bank or government, reducing the risk of manipulation or failure by a single entity.
- Transactions are secured using blockchain technology, which is highly resistant to hacking and fraud.
- Lower transaction costs: Because cryptocurrencies eliminate the need for intermediaries like banks, they can significantly reduce transaction fees, especially for cross-border payments.
- Cryptocurrencies are accessible to anyone with an internet connection, enabling financial inclusion for people in regions with limited access to traditional banking services. (1)

6.7.3 **Any ONE:** ✓

- Volatility: The value of a cryptocurrency can fluctuate significantly in a short period, which can result in substantial financial losses for investors or users relying on the currency for transactions.
- Regulatory uncertainty: Many governments are still trying to figure out how to regulate cryptocurrencies.
- Security risks: While blockchain technology is generally secure, cryptocurrencies are still vulnerable to hacking, theft, and scams.
- Scalability issues: As the number of transactions increases, the networks often struggle with processing speed and higher transaction fees, making them less efficient for large-scale or everyday use.
- Environmental impact: Bitcoin, requires substantial computational power and energy consumption.
- Often used for payment in criminal activities, such as ransomware demands because cryptocurrencies are virtually untraceable and do not form part of the formal part of the banking system.
- If the private key/wallet is lost the funds can never be recovered or retrieved. (1)

- 6.8 6.8.1
- Network throttling occurs when the Internet Service Providers/ISP slows down your internet connection ✓ because the ISP has noticed excessive amounts of data.
 - Network shaping is a technique where certain network/internet services (e.g. e-mail, banking services) is given preference while others such as social networking are given less priority. ✓ (2)

- 6.8.2
- Improved network performance: By prioritising critical traffic and limiting non-essential traffic, network shaping ensures that high-priority applications, such as VoIP or video conferencing, receive the necessary bandwidth. ✓
 - Optimised bandwidth utilisation: It ensures that available bandwidth is used more efficiently, which is especially beneficial in environments with limited bandwidth resources. ✓ (2)

- 6.8.3
- SMTP is a protocol used to send e-mail via the internet from the e-mail server. ✓
 - POP3 is a protocol used to download the incoming emails over the Internet from POP3 server. ✓ (2)

- 6.9 6.9.1 Garbage In Garbage Out ✓ (1)

6.9.2 **Any THREE:** ✓✓✓

- Accidental deleting files or formatting a disk.
- Backups not made regularly.
- Entering incorrect data in a program.
- Losing or misplacing portable storage devices.
- Not having a strong password, in that way allowing unauthorised access. (3)

6.9.3 **Any THREE:** ✓ ✓ ✓

- Validate input from the user.
- Set default values for input.
- Choose appropriate input values.
- Import data from another system instead of entering it.
- Use RFID/barcode or QR code scanners to reduce input errors when entering data.

(3)

TOTAL SECTION F: 36
GRAND TOTAL: 150