



**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**SEPTEMBER 2023**

**INFORMATION TECHNOLOGY P2  
MARKING GUIDELINE**

**MARKS: 150**

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This marking guideline consists of 12 pages.

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**SECTION A: SHORT QUESTIONS****QUESTION 1**

- |     |        |   |     |
|-----|--------|---|-----|
| 1.1 | 1.1.1  | Composite keys ✓                              | (1) |
|     | 1.1.2  | Data redundancy/Data duplication ✓            | (1) |
|     | 1.1.3  | Utilities/Utility programs ✓                  | (1) |
|     | 1.1.4  | Digital gap/Digital Divide ✓                  | (1) |
|     | 1.1.5  | Bus ✓   | (1) |
|     | 1.1.6  | Data cap ✓                                    | (1) |
|     | 1.1.7  | Telecommuting/Remote working/Online working ✓ | (1) |
|     | 1.1.8  | Convergence ✓                                 | (1) |
|     | 1.1.9  | Artificial Intelligence/AI ✓                  | (1) |
|     | 1.1.10 | Router ✓                                      | (1) |
| 1.2 | 1.2.1  | A ✓ – (Encapsulation)                         | (1) |
|     | 1.2.2  | B ✓ – (Attributes)                            | (1) |
|     | 1.2.3  | C ✓ – (Machine code)                          | (1) |
|     | 1.2.4  | D ✓ – (AJAX)                                  | (1) |
|     | 1.2.5  | C ✓ – (Rich Text Format)                      | (1) |

**TOTAL SECTION A: 15**

**SECTION B: SYSTEMS TECHNOLOGIES**

**QUESTION 2**

2.1 2.1.1 Video card/Graphics card ✓ (1)

2.1.2 **Any ONE:** ✓  

- Generates images/output displayed by the monitor.
- Generates images both graphics and text displayed by the monitor.

(1)

2.1.3 **Any ONE:** ✓  

- Accelerated Graphics Port (AGP)
- PCI expansion slot
- PCI Express expansion slot

(1)

2.1.4 

- Graphics Processing Unit/GPU ✓
- Video RAM/VRAM/Memory module ✓

(2)

2.1.5 

- Fan ✓
- Heat sink ✓

(2)

2.1.6 

- Video Graphics Adapter (VGA) port ✓
- Digital Video Interface (DVI) port ✓
- HDMI port ✓

(3)

2.2 

- *Disk fragmentation* is when files saved/written on a disk are broken up into several pieces and stored all over the disk. ✓
- *Disk defragmentation* is a process of using/running a special software that re-arranges the files on the disk so that they are stored in sequence. ✓

(2)

2.3 Plug-and-Play/PnP ✓ (1)

2.4 **Any THREE differences:** ✓✓✓

SSD	HDD
<ul style="list-style-type: none"> <li>• Electronic (SSD has no moving parts)</li> <li>• Fast</li> <li>• Generate less heat and uses less power</li> <li>• Huge storage capacity.</li> <li>• Very expensive per gigabyte</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanical (HDD has moving parts used to write and read data)</li> <li>• Slow</li> <li>• Generate more heat because of moving parts and use more power</li> <li>• Huge storage capacity</li> <li>• Cheap (The cost per GB is much less than the cost per GB of SSD)</li> </ul>

(3)

- 2.5 **Any THREE:** ✓✓✓
- Accidentally deleting files
  - Reformatting a disk
  - Not ensuring that regular backups are made
  - Entering incorrect data in a program
  - Losing or misplacing portable storage devices
  - Allowing unauthorised users to get access to data by not following basic security principles such as having secure password and changing it on regular basis. (3)
- 2.6 2.6.1
- Copy and paste ✓
  - Backup and restore ✓
  - Online backup ✓ (3)
- 2.6.2
- Full backup ✓
  - Differential backup ✓
  - Incremental backup ✓ (3)
- 2.7
- Easy to repair a computing device by replacing a broken or faulty component (maintenance). ✓
  - Easy to upgrade the computing device by adding new parts or replacing existing ones with more powerful versions. ✓ (2)
- 2.8 **Any TWO:** ✓✓
- Clean-up the computer using any disk clean-up tool
  - Uninstall unused software
  - Empty the recycle bin
  - Compress data not frequently used. (2)

**TOTAL SECTION B: 29**

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

- 3.1 3.1.1 Node(s) ✓ (1)
- 3.1.2 (a) Network topology refers to the layout/arrangement of the physical connection of computers in a network. ✓ (1)
- (b) Base station ✓ (1)
- (c) **Any TWO:** ✓✓ (2)
- Fast, efficient communication
  - Sharing of hardware resources
  - Centralisation of data
  - Transfer of files
  - Leisure
  - Increased control and security
  - Flexible access
- 3.1.3 • Fat clients ✓ are computers that run most of their applications from their local hard drives and make little use of network services. ✓  
• Thin clients ✓ are computers that have no hard drives but depend almost completely on a server to run applications and store data files. ✓ (4)
- 3.1.4 (a) Switch ✓ (1)
- (b) **Any TWO:** ✓✓ (2)
- Connects computers in a network to a central location.
  - It directs the traffic between devices connected to the network.
  - Receives signals/data from many directions and then forwards signals/data to one or more destinations.
  - It can also be used to connect two networks to each other.
  - A switch serves as a controller, enabling networked devices to talk to each other.
- 3.1.5 (a) Firewall ✓ (1)
- (b) **Any TWO roles:** ✓✓ (2)
- Firewall restricts the computer's communication to the most common settings.
  - Firewall allows you to check and change settings for individual applications and control access to specific ports.
  - Blocks any unrequested information from passing through the firewall.
  - Firewall stops malicious users on the internet from sending viruses to your computer.
  - Whenever you run a new program that uses the internet on your computer, your firewall will ask you whether to allow this program to send and receive data.

## 3.1.6 WiFi/Wireless connection. ✓

- Connects wireless enabled devices to a network or to another device wirelessly to send and receive data. ✓

(2)

3.2 **Any TWO:** ✓✓

- An app's interface is easier to navigate.
- It as a dedicated purpose and does not result in distraction and loss of focus.
- With an app you do not have to remember URLs or manage menus of bookmarks to get where you want to go.
- All the interface data is already installed on your device as part of the app and does not need to be downloaded.
- Apps speed up the responsiveness of the app and reduces the amount of data that the app has to download.
- Apps can set to fetch data on their own in the background, even when you are not using them.
- App also notify you automatically of significant/important changes or events.
- Apps can work with a syncing service, which means that the data on your device is continually synchronised with online storage in the cloud and can easily be accessed on your other devices, including your computer.
- Apps can use the additional sensors in your mobile device (e.g. GPS, compass, accelerometers, etc.) which means that they can offer a more integrated experience than a web page can.

(2)

## 3.3 Protocol ✓

(1)

## 3.4 3.4.1 URL shortener is a tool/a service which converts a long URL to a shorter version. ✓

(1)

3.4.2 **Any TWO advantages:** ✓✓

- It is suitable for messaging communication apps (Twitter) which may limit users to the number of characters they can type in their message.
- It is much easier to remember or type without errors.
- Allows you to track the links that you created.

(2)

**TOTAL SECTION C: 23**

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

- 4.1
- *Physical integrity* ✓ is the process of overcoming practical issues such as power failures, mechanical failures, natural disasters and dealing with the physical storage and retrieval of data. ✓
  - *Logical integrity* ✓ deals with the correctness of data or with data making sense in a particular context. ✓ (4)
- 4.2
- 4.2.1 True ✓ (1)
- 4.2.2 True ✓ (1)
- 4.2.3 False ✓ (1)
- 4.2.4 True ✓ (1)
- 4.3 **Any TWO:** ✓✓
- Accurate
  - Correctness
  - Current
  - Complete
  - Relevant
  - Consistent (2)
- 4.4
- 4.4.1 *Data security* involves protecting data from loss/theft. ✓ (1)
- 4.4.2 **Any THREE:** ✓✓✓
- Passwords
  - Encryption codes
  - Fingerprint readers
  - Face recognition systems
  - Hand geometry systems
  - Voice recognition systems
  - Iris recognition systems
  - Biometric security
  - Signature verification systems (3)
- 4.5
- 4.5.1
- tblGates – GateID ✓
  - tblVisitors – VehicleNo ✓ (2)
- 4.5.2
- Accommodation ✓
  - Overseas ✓
  - Out ✓ (3)
- 4.5.3
- (a) tblVisitors ✓ (1)
- (b) Entrance ✓ (1)
- 4.5.4 **Any ONE:** ✓
- 1 : M
  - 1 : ∞ (1)
- 4.5.5 Date/Time ✓ (1)

**TOTAL SECTION D: 23**

**SECTION E: SOLUTION DEVELOPMENT****QUESTION 5**

- 5.1 InputBox ✓ (1)
- 5.2 5.2.1 False ✓ (1)
- 5.2.2 True ✓ (1)
- 5.2.3 False ✓ (1)
- 5.2.4 True ✓ (1)
- 5.2.5 True ✓ (1)
- 5.3
- *WriteLn* is a function that writes a line of text at the current position of the file pointer/cursor and moves the file pointer/cursor to the next line. ✓
  - *Write* is a function that writes a line of text at the current position of the file pointer/cursor but does not move the file pointer/cursor to the next line. ✓ (2)
- 5.4
- Constant ✓
  - Via programming code (OnCreate / OnActivate) ✓
  - Textfiles ✓
  - Via components ✓ (4)
- 5.5
- *Constructor* is a method that is used to create an object and initialise the properties of an object. ✓
  - *Destructor* is a method that is used to remove the object from the computer memory. ✓ (2)
- 5.6 5.6.1 Method stub is a skeleton or framework code structure of your method which is displayed/written underneath/below implementation and is used to code in. ✓ (1)
- 5.6.2 Ctrl + Shift + C ✓ (1)
- 5.6.3
- T ✓
  - Type ✓ (2)
- 5.7 A toString method is used to convert the properties of a class into a formatted string output. ✓ (1)
- 5.8 Method signature ✓ (1)
- 5.9 Overload/Overloading ✓ (1)

**TOTAL SECTION E: 21**



**SECTION F: INTEGRATED SCENARIO****QUESTION 6**

- 6.1 6.1.1 **Any ONE:** ✓
- *Internet of Things (IoT)* refers to billions of devices around the world that are connected to the Internet through sensors or Wi-Fi.
  - *Internet of Things (IoT)* refers to the trend whereby all sorts of objects and devices are being connected to one another via the internet.
- (1)
- 6.1.2 **Any TWO:** ✓✓
- Increasing processing power of embedded platforms
  - Development of smaller OSs and protocol
  - Development of wireless communication
  - Data prices (cheaper)
  - Development of the GPS systems
  - AI (Artificial Intelligence)
- (2)
- 6.1.3 **Any THREE:** ✓✓✓
- Waste management
  - Daily commute/commuting
  - Smart cities
  - Agriculture
  - Businesses
  - Smart water sensors
- (3)
- 6.2 6.2.1 Drone ✓
- (1)
- 6.2.2 **Any ONE:** ✓
- A drone is an unmanned aircraft.
  - A drone is a flying robot that can be remotely controlled combine with advanced technologies including GPS, sensors, artificial intelligence and video cameras.
- (1)
- 6.2.3 **Any THREE:** ✓✓✓
- Drones are inexpensive compared to manned aircraft, quick to deploy, can work rapidly and can collect accurate data.
  - Drones can fly to areas that are difficult/impossible to access in other ways.
  - Drones can be used to do a rapid inspection of construction sites, power lines or large-scale industrial equipment.
  - They are used to aerial mapping of topography.
  - They are used to preparation in building a road or digging a mine.
- (3)

6.2.4 **Any THREE:** ✓✓✓

- Agriculture
- Disaster management
- Photography
- Filming
- Journalism
- Scientific
- Nature conservation and game ranging
- Military
- Security
- Commercial use
- Insurance companies or Geographic mapping. (3)

6.3 6.3.1 **Any THREE benefits:** ✓✓✓

- Scalability
- Ubiquity (Anywhere/Anytime)
- Enables collaboration
- Outsources maintenance and upgrades of hardware
- Outsources software installation and upgrades
- Minimal setup required
- Minimal initial cost
- Software is updated automatically on the cloud computers
- New features are regularly added
- Can be used from any computer with Internet connection
- Easier to collaborate or share information with other users. (3)

## 6.3.2 • Cloud based apps ✓

- Downloadable, locally installed apps ✓
- Integrated products ✓ (3)

6.3.3 **Any ONE:** ✓

- Virtual reality is an artificial environment that is created with software.
- Virtual reality is a computer generated simulation of a three-dimensional image or environment. (1)

6.3.4 **Any TWO:** ✓✓

- Gaming
- Military
- Education
- Healthcare
- Entertainment
- Fashion
- Heritage
- Business
- Engineering
- Sport
- Media
- Scientific visualisation
- Telecommunications. (2)

- 6.4 6.4.1 **Any ONE:** ✓
- Augmented reality covers/deals with computer generated image onto a user's view of the real world.
  - Augmented reality takes the physical world and adds objects such as graphics within the real world.
  - Augmented reality turns the environment around you into a digital interface by placing virtual objects in the real world, in real time. (1)
- 6.4.2 **Any TWO:** ✓✓
- Product view
  - Enhance content
  - Training
  - Productivity
  - Engage audience (2)
- 6.4.3 **Any TWO:** ✓✓
- Battery life
  - Bluetooth connectivity
  - Field or view in 3D view
  - On board storage capacity
  - On board OS/web browser
  - Inputs/Outputs (buttons, eye tracking, accelerometer)
  - Microphone
  - Sound capacity
  - Display capacity
  - Visual tracking. (2)
- 6.5 6.5.1 **Any ONE:** ✓
- Wearable devices are devices that you wear on your body instead of carrying them around in a pocket or bag.
  - Wearable devices are mobile devices worn as accessories or part of clothing that generate data from various environments and communicate with other computing devices such as PCs or networks. (1)
- 6.5.2 **Any TWO:** ✓✓
- Smart watches
  - Fitness trackers
  - Smart glasses
  - Smart clothing
  - Gaming industry (Gloves, headsets)
  - Implanted wearable devices. (2)
- 6.6
- *E-learning* is the creation of a learning environment where individuals use their computers to take part in teaching and learning to further their education. ✓
  - *M-learning* is a form of education and training delivered and conducted via Internet using mobile devices such as tablets and smartphones. ✓ (2)

- 6.7 6.7.1 **Any ONE:** ✓
- *Big data* is very large (structured and unstructured) data sets that are analysed using computers to reveal trends and associations.
  - *Big data* is a collection of data from traditional digital sources inside and outside the organisation. (1)
- 6.7.2 **Any TWO:** ✓✓
- Mobile road maps
  - Medical records
  - Online shopping
  - Store loyalty cards
  - Music (2)
- 6.8 **Any ONE:** ✓
- Near Field Communication is a standard that allows devices such as smartphones to connect wirelessly by bringing them into close proximity.
  - NFC is a technology built upon radio frequency identification or RFID which allows a gadget to send information/data via radio waves to another gadget or to another RFID enabled tag and to trigger a certain action.
  - NFC makes tap-and-go services possible and is often used in smartphones and smartwatches.
  - NFC is a wireless technology that allows a device to collect and interpret data from another closely located NFC device or tag. (1)
- 6.9 **Any ONE:** ✓
- *Network shaping* is the lowering of available bandwidth by ISP once you have exceeded your monthly limit.

**OR**

*Network shaping* is a technique where certain services (e-mail) are given preferences while others (such as social networking services) are given less priority so that performance is maintained for more critical services.

**Any ONE:** ✓

- *Network throttling* occurs when ISP intentionally slows down your internet speed.

**OR**

- *Throttling/policing* occurs when your ISP slows down your internet connection and it occurs when your ISP notices that your downloads have used excessive amounts of data. (2)

**TOTAL SECTION F: 39**  
**GRAND TOTAL: 150**