PCI1D 10-Mark Questions - Short Summary Answers

UNIT 1: Computer Hardware Basics (8 Questions)

1. Write a note on computer hardware. Explain its functions (Dec 2019)

Computer hardware consists of physical components that make up a computer system. Key components include:

- **CPU**: Executes instructions and performs calculations
- **Memory**: Stores data temporarily (RAM) and permanently (storage devices)
- **Input/Output devices**: Enable user interaction and data exchange
- **Motherboard**: Connects all components together
- **Power supply**: Provides electrical power to all components Functions include data processing, storage, input/output operations, and system control.

2. Write a detail note on printers and its types (Dec 2020)

Printers are output devices that produce hard copies of digital documents. Types include:

- **Impact printers**: Dot matrix, character printers (use physical impact)
- **Non-impact printers**: Inkjet, laser, thermal (no physical contact)
- **Inkjet**: Uses liquid ink droplets, good for color printing
- **Laser**: Uses toner powder and heat, fast and precise
- **3D printers**: Create three-dimensional objects layer by layer Features: resolution (DPI), speed (PPM), connectivity options, and paper handling capacity.

3. Write a detail note on computer ports, serial, parallel and USB (Dec 2021)

Computer ports are interfaces for connecting external devices:

- **Serial ports**: Transmit data one bit at a time, slower but reliable (RS-232)
- **Parallel ports**: Transmit multiple bits simultaneously, faster for short distances
- **USB ports**: Universal Serial Bus, hot-swappable, supports multiple devices
- **USB versions**: USB 1.1 (12 Mbps), USB 2.0 (480 Mbps), USB 3.0 (5 Gbps)
- **Other ports**: Ethernet, HDMI, VGA, Audio jacks Advantages: standardization, plug-and-play capability, power delivery.

4. Explain System storage devices (Dec 2022)

System storage devices store data permanently:

- **Primary storage**: RAM (volatile), ROM (non-volatile)

- **Secondary storage**: Hard disks, SSDs, optical drives

- **Hard disk types**: SATA, IDE, SCSI

- **File systems**: FAT32, NTFS, exFAT

- **RAID configurations**: RAID 0 (striping), RAID 1 (mirroring), RAID 5 (parity)

- **Optical drives**: CD, DVD, Blu-ray

- **Backup systems**: Tape drives, external storage Performance factors: capacity, speed, reliability, cost per GB.

5. Explain common computer ports (May 2022)

Common computer ports facilitate device connectivity:

- **Power ports**: Supply electrical power to devices

- **Data ports**: USB, Thunderbolt, FireWire for data transfer

- **Display ports**: VGA, HDMI, DisplayPort, DVI for monitors

- **Audio ports**: 3.5mm jacks, optical audio, microphone inputs

- **Network ports**: Ethernet RJ45, Wi-Fi adapters

- **Legacy ports**: PS/2 for keyboards/mice, serial/parallel ports Modern trends: USB-C standardization, wireless connectivity, reduced port count.

6. Explain basics of Motherboard including CMOS and BIOS (May 2023)

Motherboard is the main circuit board connecting all components:

- **Components**: CPU socket, RAM slots, expansion slots, connectors

- **Chipset**: Northbridge (memory controller), Southbridge (I/O controller)

- **BIOS**: Basic Input/Output System, firmware for hardware initialization

- **CMOS**: Complementary Metal-Oxide Semiconductor, stores BIOS settings

- **UEFI**: Modern replacement for BIOS with enhanced features

- **Form factors**: ATX, microATX, Mini-ITX Functions: power distribution, component communication, system boot process.

7. Write a detail note on Display Arrays (All forms) (July 2019)

Display arrays refer to video standards and graphics technologies:

- **VGA**: Video Graphics Array, 640x480 resolution, analog signal

- **SVGA**: Super VGA, improved resolution up to 1024x768

- **AGP**: Accelerated Graphics Port, dedicated graphics card slot

- **Modern standards**: HDMI, DisplayPort, DVI

- **Graphics cards**: Dedicated GPUs for enhanced visual performance

- **Display technologies**: LCD, LED, OLED, curved displays

- **Resolution standards**: HD, Full HD, 4K, 8K Features: color depth, refresh rate, response time, viewing angles.

8. Write a detail note on hard disk and explain its types (May 2021)

Hard disks are primary storage devices for permanent data storage:

- **Mechanical HDDs**: Use spinning platters and read/write heads

- **Solid State Drives (SSDs)**: Use flash memory, faster and more reliable

- **Interfaces**: SATA, IDE/PATA, SCSI, NVMe

- **File systems**: FAT32 (compatibility), NTFS (advanced features), exFAT

- **RAID configurations**: Improve performance and redundancy

- **Specifications**: Capacity, RPM, cache size, data transfer rate

- **Hybrid drives**: Combine HDD and SSD technologies Advantages: large capacity, cost-effective, permanent storage.

UNIT 2: Operating Systems (9 Questions)

9. What is Operating system? Explain with an illustration (Dec 2019)

Operating System (OS) is system software that manages computer hardware and provides services:

- **Definition**: Interface between user and hardware

- **Core functions**: Process management, memory management, file system, I/O control

- **Types**: Single-user, multi-user, real-time, distributed

- **Examples**: Windows, Linux, macOS, Android

- **Architecture**: Kernel, shell, system calls, device drivers

- **Illustration**: User → Application → OS → Hardware Services: program execution, I/O operations, file manipulation, error detection.

10. Explain device drivers (Dec 2020)

Device drivers are software programs that enable OS to communicate with hardware:

- **Purpose**: Translate OS commands into device-specific instructions

- **Types**: Kernel-mode drivers, user-mode drivers

- **Installation**: Automatic detection, manual installation, Windows Update

- **Functions**: Hardware abstraction, error handling, performance optimization

- **Examples**: Graphics drivers, network adapters, printers, storage devices
- **Driver signing**: Digital certificates for security and stability
- **Troubleshooting**: Driver conflicts, compatibility issues, updates Importance: Hardware functionality, system stability, performance optimization.

11. What is Operating System? Explain its types (Dec 2021)

Operating System manages computer resources and provides user interface:

- **Batch OS**: Processes jobs in batches without user interaction
- **Time-sharing OS**: Multiple users share system resources simultaneously
- **Real-time OS**: Responds to inputs within guaranteed time constraints
- **Distributed OS**: Manages resources across multiple networked computers
- **Mobile OS**: Optimized for smartphones and tablets
- **Server OS**: Handles multiple client requests and network services
- **Desktop OS**: Designed for personal computer use
- **Embedded OS**: Specialized for embedded systems and IoT devices Classification: Single/multi-user, single/multi-tasking, single/multi-processing.

12. Elucidate on files and directories (Dec 2022)

Files and directories organize data storage in hierarchical structure:

- **Files**: Named collections of data stored on storage devices
- **File attributes**: Name, size, type, creation date, permissions
- **File types**: Text, binary, executable, data files
- **Directories**: Containers that organize files and subdirectories
- **Directory structure**: Root directory, subdirectories, file paths
- **Path notation**: Absolute paths, relative paths
- **Operations**: Create, read, write, delete, rename, move, copy
- **File systems**: FAT, NTFS, ext4, APFS Security: Access control, file permissions, encryption.

13. Elucidate on system files and boot process (May 2022)

System files are critical OS components required for proper functioning:

- **System files**: Kernel, device drivers, system libraries, configuration files
- **Boot process stages**: Power-on → POST → Boot loader → OS kernel → System services
- **Boot sequence**: BIOS/UEFI → MBR/GPT → Boot loader → OS initialization
- **Boot files**: Boot sector, kernel files, initialization scripts

- **System initialization**: Hardware detection, driver loading, service startup

- **Boot options**: Safe mode, recovery mode, diagnostic tools

- **Troubleshooting**: Boot failures, missing files, corruption issues Importance: System stability, startup process, error recovery.

14. Give an account on Operating System (May 2023)

Operating System is fundamental system software managing computer operations:

- **Evolution**: From batch systems to modern multi-tasking environments

- **Architecture**: Monolithic, microkernel, hybrid approaches

- **Resource management**: CPU scheduling, memory allocation, I/O handling

- **User interface**: Command-line, graphical user interface (GUI)

- **Security features**: User authentication, access control, encryption

- **Networking**: Protocol stacks, network services, remote access

- **Virtualization**: Virtual machines, containers, cloud integration

- **Modern trends**: Cloud computing, mobile platforms, IoT integration Current challenges: Security, performance, compatibility, energy efficiency.

15. Explain the details of system files and boot process (July 2019)

System files and boot process ensure proper OS initialization:

- **Critical system files**: Kernel, HAL, registry, system DLLs

- **Boot process phases**: Hardware initialization, boot loader, kernel loading

- **POST (Power-On Self-Test)**: Hardware component verification

- **Boot loader**: GRUB, Windows Boot Manager, responsible for OS selection

- **Kernel initialization**: Memory management, process creation, driver loading

- **System services**: Background processes, network services, security

- **User logon**: Authentication, profile loading, desktop environment

- **Boot configuration**: Boot.ini, BCD, GRUB configuration Troubleshooting: Boot repair, system recovery, diagnostic tools.

16. Explain the basics of files and directories, also give examples (May 2021)

Files and directories provide organized data storage structure:

- **File concepts**: Data units with names, extensions, metadata

- **File naming**: Conventions, reserved names, case sensitivity

- **Directory hierarchy**: Tree structure, parent-child relationships

- **Examples**:
  - Files: document.txt, program.exe, image.jpg
  - Directories: /home/user, C:\Program Files, Documents folder
- **Operations**: Navigation, search, permissions, sharing
- **File systems**: Different organization methods (FAT32, NTFS, ext4)
- **Metadata**: File size, timestamps, ownership, attributes
- **Path examples**: /usr/bin/ls, C:\Windows\System32\cmd.exe Benefits: Organization, security, efficient access, data management.

17. Explain briefly about the functions of Seven Operating System (July 2019)

Note: This question likely refers to Windows 7 or seven main OS functions

Seven key Operating System functions:

1. **Process Management**: Create, schedule, terminate processes
2. **Memory Management**: Allocate, deallocate, virtual memory
3. **File System Management**: Create, organize, secure files
4. **I/O Management**: Control input/output operations
5. **Network Management**: Handle network communications
6. **Security Management**: User authentication, access control
7. **User Interface**: Provide interaction methods (CLI/GUI)

Each function ensures system stability, security, and user productivity through coordinated resource management and service provision.

UNIT 3: Computer Principles and Back Box Model (7 Questions)

18. Discuss the Back Box Model of the PC (Dec 2020)

Black Box Model treats PC as system with inputs, processes, and outputs:

- **Concept**: Focus on functionality without internal complexity
- **Input components**: Keyboard, mouse, microphone, network, storage
- **Processing unit**: CPU, memory, system bus, controllers
- **Output components**: Monitor, speakers, printer, network, storage
- **Data flow**: Input → Processing → Output transformation
- **System bus**: Address bus, data bus, control bus for communication
- **Abstraction levels**: Hardware, firmware, OS, applications

- **Benefits**: Simplified understanding, modular design, troubleshooting Applications: System design, problem diagnosis, component interaction analysis.

19. Discuss the functioning of boot sequence of PC (Dec 2021)

Boot sequence is systematic process of computer startup:

- **Power-on**: PSU provides power, initial hardware activation
- **POST (Power-On Self-Test)**: Hardware component verification
- **BIOS/UEFI initialization**: Firmware loads, system configuration
- **Boot device detection**: Hard disk, USB, CD/DVD, network boot
- **Master Boot Record (MBR)**: First sector contains boot loader
- **Boot loader execution**: GRUB, Windows Boot Manager loads OS
- **Kernel loading**: OS kernel loaded into memory
- **System initialization**: Device drivers, services, user interface
- **Boot options**: Safe mode, recovery, diagnostic modes Troubleshooting: Boot failures, hardware issues, OS corruption.

20. Elucidate Power on Self-Test and boot Sequence (Dec 2022)

POST and boot sequence ensure reliable system startup:

- **POST process**: Hardware component testing and verification
- **POST checks**: CPU, memory, storage, expansion cards, peripherals
- **Error codes**: Beep codes, LED indicators, display messages
- **Boot sequence phases**: POST → Boot device → Boot loader → OS
- **BIOS/UEFI role**: Firmware interface, hardware initialization
- **Boot priorities**: Device boot order configuration
- **System initialization**: Driver loading, service startup
- **Error handling**: Diagnostic messages, recovery options
- **Performance factors**: Boot time optimization, fast boot options Importance: System reliability, hardware verification, startup troubleshooting.

21. Elucidate dismantling and re-building PCs (May 2022)

PC dismantling and rebuilding requires systematic approach:

- **Preparation**: Anti-static precautions, proper tools, workspace
- **Dismantling sequence**: Power down → External connections → Case → Components
- **Component removal**: CPU, RAM, expansion cards, drives, motherboard

- **Documentation**: Component locations, cable connections, settings
- **Rebuilding process**: Reverse order, careful handling, proper seating
- **Testing phases**: POST, boot sequence, functionality verification
- **Safety measures**: ESD protection, proper grounding, component handling
- **Troubleshooting**: Connection issues, compatibility problems, errors Applications: Upgrades, repairs, maintenance, component replacement.

22. Modern computer are more complex – Do you agree (May 2023)

Modern computers exhibit increased complexity in multiple dimensions:

- **Hardware complexity**: Multi-core processors, advanced chipsets, miniaturization
- **Software complexity**: Complex OS, applications, security layers
- **Integration challenges**: Multiple technologies, standards, protocols
- **Performance demands**: Higher speeds, efficiency, multitasking
- **Connectivity**: Network integration, wireless, cloud services
- **Security requirements**: Encryption, authentication, threat protection
- **User expectations**: Intuitive interfaces, reliability, performance
- **Maintenance challenges**: Specialized knowledge, diagnostic tools **Agreement**: Yes, modern computers are significantly more complex due to technological advancement, integration requirements, and user demands.

23. Discuss Back box Model (July 2019)

Black Box Model provides simplified view of computer system:

- **Modeling approach**: Input-Process-Output abstraction
- **System boundaries**: Clear separation of internal/external components
- **Input mechanisms**: User input, data input, control signals
- **Processing elements**: CPU, memory, system logic, algorithms
- **Output generation**: Display, audio, data output, control responses
- **Interface design**: Standardized connections, protocols, APIs
- **Abstraction benefits**: Simplified analysis, modular design, testing
- **System integration**: Component interaction, data flow management
- **Practical applications**: System design, troubleshooting, optimization Model enables understanding complex systems through simplified representation.

24. Discuss the functioning of power on self-test of PC (May 2021)

Power-On Self-Test (POST) ensures hardware reliability at startup:

- **Initialization phase**: Power supply stabilization, clock generation

- **Component testing**: CPU, memory, storage, expansion cards

- **Test sequence**: Sequential verification of critical components

- **Error detection**: Hardware failures, configuration issues

- **Reporting mechanisms**: Beep codes, LED indicators, screen messages

- **Success criteria**: All components pass verification tests

- **Boot continuation**: Successful POST enables boot process

- **Failure handling**: Error codes, diagnostic information, halt conditions

- **Configuration validation**: Hardware settings, BIOS parameters POST ensures system stability and reliability before OS loading.

UNIT 4: Enterprise and Active Directory Infrastructure (1 Question)

25. Elucidate on Loopback processing of GPO (May 2021)

GPO Loopback processing modifies standard Group Policy application:

- **Standard processing**: User policies applied based on user location

- **Loopback mode**: Computer policies override user policies

- **Replace mode**: Computer policies completely replace user policies

- **Merge mode**: Computer policies merge with user policies

- **Use cases**: Kiosk mode, terminal servers, public computers

- **Configuration**: Computer Configuration → Policies → Administrative Templates

- **Processing order**: Local → Site → Domain → OU → Loopback

- **Benefits**: Consistent user experience, centralized control

- **Scenarios**: Shared computers, restricted environments, special applications Loopback ensures computer-specific policies take precedence over user policies.

UNIT 5: Cloud Computing (1 Question)

26. Discuss in detail the Cloud Computing security architecture (May 2021)

Cloud security architecture provides comprehensive protection framework:

- **Security layers**: Physical, network, host, application, data

- **Identity management**: Authentication, authorization, access control

- **Data protection**: Encryption at rest, in transit, key management

- **Network security**: Firewalls, VPNs, intrusion detection

- **Virtualization security**: Hypervisor protection, VM isolation

- **Compliance frameworks**: SOC, ISO 27001, GDPR, HIPAA

- **Shared responsibility**: Cloud provider vs. customer responsibilities

- **Security controls**: Preventive, detective, corrective measures

- **Monitoring**: Continuous assessment, logging, incident response

- **Risk management**: Threat assessment, vulnerability management Architecture ensures comprehensive security across all cloud service layers.