Chapter # 4
Chapter 4 – Troubleshooting Memories and Storage Devices

✅ **Part I: Short Questions**

Q1. Describe RAM and ROM.

- **RAM (Random Access Memory):**
  - Temporary, volatile memory.
  - Stores data and instructions while the computer is running.
  - Example: DDR4, DDR5.

- **ROM (Read Only Memory):**
  - Permanent, non-volatile memory.
  - Stores BIOS/firmware.

Q2. Enumerate different types of memories.

1. RAM (DRAM, SRAM, SDRAM, DDR).
2. ROM (PROM, EPROM, EEPROM).
3. Cache memory.
4. Flash memory.
5. Virtual memory.

Q3. Describe parity error in memory.

- Occurs when memory detects a **bit error** (0 changed to 1 or vice versa).
- **Parity bit** is used for error-checking.
- If mismatch occurs → system shows "Memory Parity Error."

Q4. Replace memory chip.

- Power off the computer.
- Open case → locate RAM slot.
- Remove faulty RAM.
- Insert new RAM stick properly into slot.

Q5. Identify parts of floppy and hard disk drives.

- **Floppy Disk Drive:** Read/write head, spindle motor, stepper motor.
- **Hard Disk Drive (HDD):** Platters, spindle, actuator arm, read/write head, PCB board.

Q6. Install and setup floppy and hard disk drives.

- Connect **power cable + data cable (IDE/SATA)**.
- Mount drive in case.

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- Configure jumpers (for IDE drives: Master/Slave).

- Setup BIOS to detect drive.

Q7. Describe peripherals configuration.

- Process of setting up devices like printers, scanners, drives.

- Requires proper **drivers, connection, and OS configuration**.

Q8. Explain configuring techniques.

1. **Manual configuration:** Setting IRQ, DMA, I/O addresses manually.

2. **Auto-configuration:** Using Plug and Play (PnP).

3. **BIOS setup:** Enabling/disabling devices.

✅ **Part II: Long Questions**

Q1. Describe each type of memory.

- **RAM:** Volatile, stores temporary data.

- **ROM:** Non-volatile, stores BIOS.

- **Cache:** Very fast memory near CPU.

- **Flash memory:** Used in SSDs, USB drives.

- **Virtual memory:** Uses part of HDD as RAM.

Q2. Describe troubleshooting routines of memory.

1. Run **POST/BIOS test**.

2. Use memory diagnostic software (MemTest86).

3. Check for parity/ECC errors.

4. Reseat RAM modules.

5. Replace faulty modules.

Q3. Describe the operational principles of floppy and hard disk drives.

- **Floppy Disk Drive (FDD):**

  o Magnetic storage.

  o Data read/write using read/write head on magnetic disk.

- **Hard Disk Drive (HDD):**

  o Multiple platters coated with magnetic material.

  o Read/write head moves across spinning platters to store/retrieve data.

Q4. Describe the IDE and SCSI setup of drives.

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- **IDE (Integrated Drive Electronics):**
    - Uses 40/80 pin ribbon cable.
    - Supports up to 2 devices per channel (Master/Slave).

- **SCSI (Small Computer System Interface):**
    - High-speed interface.
    - Supports multiple devices (up to 7 or 15).
    - Used in servers.

Q5. Describe operational principles of tape, compact, Bernoulli and Zip drives.

- **Tape drives:** Use magnetic tape, sequential access (used for backup).
- **Compact drives (CD/DVD):** Optical media, uses laser to read/write.
- **Bernoulli drives:** Removable magnetic cartridge, early portable storage.
- **Zip drives:** Portable disk storage (100MB – 750MB).

Q6. Install and setup tape, compact, Bernoulli and Zip drives.

1. Connect to PC (IDE/SCSI/USB).
2. Install drivers.
3. Configure through BIOS or OS.
4. Test with read/write operations.

Q7. Describe auto-configuration and Plug and Play devices.

- **Auto-configuration:** Devices configured automatically by BIOS/OS.
- **Plug and Play (PnP):** Device automatically detected and installed when connected.
- Example: USB flash drive.

Q8. Describe CONFIG.SYS file and its significance.

- **CONFIG.SYS:** A system configuration file used in DOS.
- Defines memory management, device drivers, and system settings.
- Example:
- DEVICE=C:\HIMEM.SYS
- FILES=30
- BUFFERS=20
- Importance: Essential for running older DOS applications.

🎇 **Extra Important Questions**

Q1. Difference between RAM and Cache memory?

- RAM: General purpose, slower than cache.

- Cache: Very fast, located near CPU, stores frequently used instructions.

Q2. What are the signs of a failing hard drive?

- Clicking sounds, corrupted files, slow boot, frequent crashes.

Q3. What is ECC memory?

- **Error-Correcting Code memory** detects and corrects single-bit errors.

Q4. Why is defragmentation important for HDDs?

- Rearranges fragmented data → improves speed and performance.

Q5. What is the difference between HDD and SSD?

- HDD: Magnetic, slower, mechanical.

- SSD: Flash-based, faster, no moving parts.