1. Compare LRC and CRC (Any two points each) - Table Format

LRC (Longitudinal Redundancy Check)	CRC (Cyclic Redundancy Check)
Uses parity bits to check errors in a block of data	Uses polynomial division to generate a remainder (CRC code)
Simpler to implement with basic logic	More complex, requires polynomial arithmetic
Less accurate in detecting burst or multiple-bit errors	Highly accurate, especially for burst and patterned errors
Commonly used in small systems and older protocols	Widely used in networks (e.g., Ethernet), storage, and modern systems

2. Describe the terms with suitable example:

i) Subnetting

ii) Supernetting

i) Subnetting:

Definition: Subnetting divides a large network into smaller sub-networks (subnets). It helps with routing efficiency and IP management.

Example:

Given Network: 192.168.1.0/24

Divided into 4 subnets with /26 mask:

- 192.168.1.0/26
- 192.168.1.64/26

- 192.168.1.128/26

- 192.168.1.192/26

ii) Supernetting:

Definition: Supernetting combines multiple smaller networks into a larger one, often called CIDR (Classless Inter-Domain Routing).

Example:

Combining: 192.168.1.0/24, 192.168.2.0/24, 192.168.3.0/24, 192.168.4.0/24

Result: 192.168.0.0/22

3. What is error? Enlist different types of error?

Definition: An error in communication is an unintended change in data during transmission.

Types of Errors:

1. Single-bit Error - Only one bit is incorrect (e.g., 10110010 10110000)

2. Burst Error - Multiple bits in a sequence are corrupted

3. Random Error - Occurs at random positions

4. Systematic Error - Consistent errors due to system faults

4. Draw and explain TCP/IP reference model

TCP/IP has 4 layers:

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| Application Layer |

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| Transport Layer |

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| Internet Layer |

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| Network Access Layer |

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Layer Functions:

- Application: User-level protocols like HTTP, FTP

- Transport: Reliable/unreliable delivery (TCP/UDP)

- Internet: Routing and logical addressing (IP)

- Network Access: Hardware addressing and transmission (Ethernet/Wi-Fi)

5. Explain the process of DHCP server configuration

Steps:

1. Install DHCP Server software (e.g., via Server Manager or apt install)

2. Configure Scope (IP address range)

3. Set options like subnet mask, gateway, DNS

4. Set lease duration (e.g., 24 hours)

5. Start DHCP service

6. Verify client IP assignment

Linux DHCP config example (/etc/dhcp/dhcpd.conf):

```
subnet 192.168.1.0 netmask 255.255.255.0 {
  range 192.168.1.100 192.168.1.200;
```

```
  option routers 192.168.1.1;
  option domain-name-servers 8.8.8.8;
}
```

6. State the functions of any two layers of OSI Model

Transport Layer (Layer 4):

- Reliable data transfer
- Uses TCP/UDP
- Segmentation, error recovery

Data Link Layer (Layer 2):

- Node-to-node transfer
- MAC addressing, error detection, framing