NETWORK DESIGN – CHAPTER 1 CHEAT SHEET

1. Overview

Network Design: Planning & designing communication networks. Goal: Connect people, apps, and resources. Process: Identify → Design → Implement → Maintain.

2. Fundamental Design Goals (4)

1. Scalability – Easy to grow (new users, apps, sites).
2. Availability – Reliable 24/7; tolerate failures.
3. Security – Built-in protection, not added later.
4. Manageability – Simple to operate and troubleshoot.

3. Network Design Requirements

A. Business: Always up, reliable, secure, easy to expand & fix.
B. Functional: Defines what the network does (behavior).
C. Application: Focus on user experience & criticality.
D. Technical: High availability, QoS, security, scalability, isolation.

4. Design Methodologies

Systematic Approach (3 Steps):
1. Identify customer requirements
2. Characterize existing network
3. Design topology & solutions.

Traditional: For static networks (slow & costly).
Systematic: Structured & complete.

5. Step 1 – Identify Requirements

Extract from RFP/RFI. Determine: Organizational goals & constraints (budget, staff, policy), Technical goals (performance, security, scalability), Technical constraints (equipment, bandwidth, personnel).

6. Step 2 – Characterize Existing Network

Collect data via audit, customer input, traffic analysis. Document devices, cabling, IPs, routing, redundancy, etc.

7. Step 3 – Design Topology

Top-Down: From business goals → technical (recommended).
Bottom-Up: From devices → applications (quick but risky).
Top-Down Benefits: Big picture, future growth. Disadvantage: Slower.

8. Tools

Modeling: Visualize network.
Strategic analysis: Simulate what-if cases.
Decision tables: Compare options.
Simulation: Verify design before launch.

9. Documentation

Include: Intro | Requirements | Existing Network | Design | Proof of Concept | Implementation Plan | Appendices.

10. Implementation & Monitoring

Plan, test, verify at each stage. Monitor network → redesign if frequent problems.

11. PPDIOO Lifecycle (Cisco)

Prepare: Define goals, strategy, architecture.
Plan: Identify requirements, sites, perform gap analysis.
Design: Detailed design for reliability, security, scalability.
Implement: Deploy & verify devices.
Operate: Day-to-day monitoring & maintenance.
Optimize: Improve & redesign if needed.

12. Benefits of Lifecycle Approach

Lower total cost, align with business goals, easier upgrades, faster implementation, higher efficiency, better agility & service performance.

Quick Recall: Goals – Scalability, Availability, Security, Manageability | 3 Steps – Identify → Characterize → Design | 6 Phases – Prepare → Plan → Design → Implement → Operate → Optimize | Approach – Top-Down (Best for real-world design)