Computer Science Class 12 — Chapter 1

Complete Question Bank (Easy English Only) • Clearly Separated Textbook vs Additional Sections

PART 1: OFFICIAL TEXTBOOK EXERCISE (MCQs, Short & Long)

A. TEXTBOOK MULTIPLE CHOICE QUESTIONS

1. A computer network is:

(a) A single computer (b) A group of connected computers and devices (c) A software (d) A hard disk

✔ **Answer: (b) A group of connected computers and devices**

2. The device used to connect a computer to a network is:

(a) Monitor (b) Keyboard (c) Network Interface Card (NIC) (d) Printer

✔ **Answer: (c) Network Interface Card (NIC)**

3. A network that covers a small geographical area, such as a school or office, is:

(a) WAN (b) MAN (c) LAN (d) Internet

✔ **Answer: (c) LAN**

4. The topology that uses a central hub or switch is:

(a) Bus Topology (b) Ring Topology (c) Star Topology (d) Mesh Topology

✔ **Answer: (c) Star Topology**

5. The OSI model contains:

(a) Five layers (b) Six layers (c) Seven layers (d) Eight layers

✔ **Answer: (c) Seven (7) layers**

6. The protocol mainly used to view web pages is:

(a) FTP (b) DNS (c) TCP (d) HTTP

✔ **Answer: (d) HTTP**

7. The main function of a router is to:

(a) Store data (b) Connect devices within a network (c) Connect different networks (d) Display web pages

✔ **Answer: (c) Connect different networks**

8. DNS is used to:

(a) Transfer files (b) Protect data (c) Convert domain names into IP addresses (d) Connect hardware devices

✔ **Answer: (c) Convert domain names into IP addresses**

9. The device that converts digital signals for Internet transmission is:

(a) Switch (b) Hub (c) Modem (d) NIC

✔ **Answer: (c) Modem**

10. The topology that provides the highest reliability is:

(a) Bus topology (b) Ring topology (c) Star topology (d) Mesh topology

✔ **Answer: (d) Mesh topology**

B. TEXTBOOK SHORT QUESTIONS

Q1: What is a computer network?

Answer: A computer network is a group of connected computers and devices that share files, data, and resources with each other.

Q2: Write two uses of computer networks.

Answer: 1. Browsing the internet and sending messages.
2. Online banking and using ATM machines.

Q3: What is network architecture?

Answer: Network architecture is the overall design of a network. It shows how devices are arranged and how data moves between them.

Q4: Name any two components of a computer network.

Answer: 1. Router | 2. Network Interface Card (NIC).

Q5: What is the OSI model?

Answer: The OSI model is a 7-layer system that explains how data travels from one computer to another over a network.

Q6: Write the name of any two network topologies.

Answer: 1. Star Topology | 2. Bus Topology.

Q7: What is a Local Area Network (LAN)?

Answer: A LAN is a fast network in a small area, such as a single home, school computer lab, or office building.

Q8: What is the function of a router?

Answer: A router connects different networks together (like home to internet) and sends data packets to the correct destination.

Q9: What is a network protocol?

Answer: A network protocol is a set of rules that computers follow to communicate and send data smoothly.

Q10: What is the purpose of DNS?

Answer: DNS (Domain Name System) converts website names (like `google.com`) into IP address numbers so computers can open them.

C. TEXTBOOK LONG QUESTIONS

Long Q1: What is the OSI Model? Explain its Layers and their Functions.

The OSI model has 7 layers. Data goes from Layer 7 down to Layer 1 on the sending computer:

Layer Name	Simple Meaning & Main Job
7. Application Layer	The layer you see and use (Apps like Chrome, WhatsApp, HTTP, Email).
6. Presentation Layer	Formats, compresses, and encrypts (locks) data so it is safe and readable.
5. Session Layer	Starts, maintains, and closes the connection between two apps.
4. Transport Layer	Breaks data into small pieces (segments) and makes sure all pieces arrive without error (TCP).
3. Network Layer	Adds IP addresses and chooses the best path for data packets to travel (Routers).
2. Data Link Layer	Uses MAC addresses to send frames between nearby devices without mistakes (Switches).
1. Physical Layer	Sends raw electrical signals or light through actual cables and Wi-Fi waves.

Long Q2: Define Network Topology. Explain Bus, Star, Ring, and Mesh with Advantages & Disadvantages.

Topology	How It Works	Good Points (Pros)	Bad Points (Cons)
Bus	All computers connect to one single main wire.	• Cheap and easy to setup • Uses very little cable	• If main wire breaks, whole network stops • Hard to find faults
Star	All computers connect to one central switch/ hub.	• If 1 computer fails, others still work • Easy to add new devices	• If central switch fails, all computers stop • Needs more wire
Ring	Computers connect in a complete circle.	• Data moves in order • No data collisions	• If 1 computer breaks, the whole circle stops
Mesh	Every computer connects directly to multiple computers.	• Best reliability (backup paths) • Very secure	• Very expensive • Hard to install and lots of wires

Long Q3: Explain Types of Computer Networks (LAN, WAN, and the Internet).

- **LAN (Local Area Network):** A small network inside a single room, home, or office building. It is very fast and cheap to set up.
- **WAN (Wide Area Network):** A large network that connects different cities or countries using satellite links, telephone lines, and routers.
- **The Internet:** The world's largest public network connecting millions of LANs and WANs globally so everyone can share information.

Long Q4: What are Network Protocols? Explain TCP/IP, HTTP, FTP, and DNS.

- **TCP/IP:** The core language of the internet. TCP breaks files into packets and ensures delivery. IP addresses packets to find destinations.
- **HTTP & HTTPS:** HTTP opens web pages in browsers. HTTPS does the same job but with encryption to keep passwords and cards secure.
- **FTP (File Transfer Protocol):** Designed especially for uploading and downloading big files to and from servers.
- **DNS (Domain Name System):** Acts like a phone book that turns names like `google.com` into numbers like `142.250.190.14`.

PART 2: ADDITIONAL EXAM-ORIENTED QUESTIONS (Full Marks Preparation)

A. ADDITIONAL MULTIPLE CHOICE QUESTIONS

1. IPv4 address size is:

(a) 16 bits (b) 32 bits (c) 64 bits (d) 128 bits

✔ **Answer: (b) 32 bits**

2. IPv6 address size is:

(a) 32 bits (b) 64 bits (c) 128 bits (d) 256 bits

✔ **Answer: (c) 128 bits**

3. The unique permanent hardware address on a NIC is called:

(a) IP address (b) MAC address (c) Port number (d) Gateway

✔ **Answer: (b) MAC address**

4. Which command checks if a website or device is connected?

(a) ipconfig (b) ping (c) exit (d) help

✔ **Answer: (b) ping**

5. Which protocol is the safe and encrypted version of HTTP?

(a) FTP (b) SMTP (c) HTTPS (d) DNS

✔ **Answer: (c) HTTPS**

6. Which OSI layer works with IP addresses and finds the best path?

(a) Physical (b) Data Link (c) Network Layer (d) Transport

✔ **Answer: (c) Network Layer**

7. Network delay (Latency) is measured in:

(a) Mbps (b) Milliseconds (ms) (c) Bytes (d) Kilograms

✔ **Answer: (b) Milliseconds (ms)**

8. A wall of protection that stops bad traffic and hackers is:

(a) Router (b) Firewall (c) Cable (d) Switch

✔ **Answer: (c) Firewall**

9. Hiding private home IP addresses behind one public IP is called:

(a) Subnetting (b) NAT (c) Ping (d) Routing

✔ **Answer: (b) NAT (Network Address Translation)**

10. What is the latest and most secure Wi-Fi password protection?

(a) WEP (b) WPA (c) WPA2 (d) WPA3

✔ **Answer: (d) WPA3**

B. ADDITIONAL SHORT QUESTIONS

Topic 1.3: DSL & ISP

Q1: What are DSL and ISP?

Answer:

- **DSL:** Provides internet using telephone lines while allowing you to use the phone at the same time.
- **ISP:** The internet company (like PTCL/StormFiber) that gives you internet access.

Topic 1.4: Switch vs Access Point

Q2: What is the difference between a Switch and a Wireless Access Point (WAP)?

Answer:

- **Switch:** Connects devices using network cables.
- **WAP:** Connects devices wirelessly using Wi-Fi radio signals.

Topic 1.4: Modem

Q3: What does a Modem do?

Answer: A modem converts computer digital signals into cable signals, and changes incoming signals back into digital data.

Topic 1.5: Tree Topology

Q4: What is Tree Topology?

Answer: Tree topology is a mix of Bus and Star topologies. It connects multiple Star networks to one main backbone cable like tree branches.

Topic 1.7: HTTP vs HTTPS

Q5: Why is HTTPS better than HTTP?

Answer: HTTPS is secure because it encrypts (locks) your data so hackers cannot steal your passwords or banking details. HTTP does not encrypt data.

Topic 1.8: IPv4 vs IPv6

Q6: What is the simple difference between IPv4 and IPv6?

Answer:

- **IPv4:** 32 bits long, uses 4 numbers separated by dots (e.g. `192.168.1.1`).
- **IPv6:** 128 bits long, uses letters and numbers separated by colons (e.g. `2001:0db8::1`). It will never run out of addresses.

Topic 1.8: Subnetting & NAT

Q7: What is Subnetting and NAT?

Answer:

- **Subnetting:** Breaking a large network into smaller sub-networks to increase speed and security.
- **NAT:** Allows many home devices to share one public IP address on the internet.

Topic 1.10: Default Gateway & Guest Network

Q8: What is a Default Gateway and a Guest Network?

Answer:

- **Default Gateway:** The main router address that sends your local data outside to the internet.
- **Guest Network:** A separate Wi-Fi network for visitors so they cannot access your private home devices.

Topic 1.11: Ping & IPCONFIG

Q9: What are ping and ipconfig commands?

Answer:

- **ping:** Tests if a computer or website is responding and measures connection speed.
- **ipconfig:** Shows your computer's IP address and router gateway on Windows.

Topic 1.12: Bandwidth vs Latency

Q10: What is Bandwidth and Latency?

Answer:

- **Bandwidth:** The total amount of data the internet connection can carry (measured in **Mbps**).
- **Latency:** The time delay (ping) taken for data to travel (measured in **milliseconds - ms**).

Topic 1.13: Load Balancing

Q11: What is Network Load Balancing?

Answer: Distributing heavy website traffic across multiple servers so no single server crashes and speed stays fast.

Topic 1.14: Firewall

Q12: What is a Firewall?

Answer: A security tool that checks all incoming and outgoing internet traffic and blocks viruses, dangerous files, and unauthorized users.

Topic 1.15: Types of Backups

Q13: Name the three types of Data Backups.

Answer: 1. **Full Backup:** Copies all files at once.
2. **Incremental Backup:** Copies only files that changed since the last backup (fastest).
3. **Differential Backup:** Copies files changed since the last full backup.

Topic 1.16: Usability vs Security

Q14: What is the trade-off between Usability and Security?

Answer: If security is too high (very long passwords, OTPs), the system is hard to use. If security is too low, hackers can easily enter. A good system balances both.

C. ADDITIONAL LONG QUESTIONS

Additional Long Q1: Describe Main Networking Devices (NIC, Switch, Router, Modem, WAP) and their Functions.

- **NIC (Network Interface Card):** The hardware inside a computer that connects it to the network. It has a unique physical MAC address.

- **Switch:** Connects multiple computers in a local room or building and sends data directly to the correct computer using MAC addresses.
- **Router:** Connects different networks together (such as your home network to the internet) using IP addresses.
- **Modem:** Converts signals between your internet cable/line and your home network devices.
- **Wireless Access Point (WAP):** Broadcasts Wi-Fi radio signals so phones and laptops can connect without wires.

Additional Long Q2: Explain IP Addressing, Difference Between IPv4 and IPv6, Default Gateway, and Subnetting.

- **IP Addressing Concept:** Every device on a network needs a unique IP address to send and receive data correctly.
- **IPv4 vs IPv6:**
  - **IPv4:** 32 bits long, written as 4 numbers with dots (e.g., `192.168.1.1`). Total: ~4.29 billion addresses.
  - **IPv6:** 128 bits long, written as 8 groups of hexadecimal digits with colons (e.g., `2001:0db8::1`). It will never run out of addresses.
- **Default Gateway:** The router IP address on a local network that forwards traffic to external websites and the internet.
- **Subnetting:** Dividing a large physical network into smaller sub-networks to improve speed and management.