

# DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

Subject : **COMPUTER NETWORKS (CN)**

Class & Sem: III B. Tech I Sem Academic Year:2024-2025

# Question Bank

**UNIT-1**

# Topic name: Computer networks definition, Characteristics

1. What do you mean by computer networks? Classify computer networks and explain them In brief**.**

# [7M] [Reg Feb2022] Knowledge CO1

1. What are the characteristics of computer networks? [7M][Oct/Nov-2017]Analysis CO1
2. What are the objectives of computer networks? What are the network components? Explain [7M] [December -2023]Analysis CO1

**Topic name: Network Types**

1. Explain various categories of network, Explain different Network Types.

# [7M] [Reg Feb2022] Knowledge CO1

1. Explain in detail about LAN & WAN. What are the advantages and disadvantages?

[**7M**][Supply Feb-2022] **Knowledge CO1**

1. Classify networks by scale and explain each with figures.

# [7M] [Reg Feb2022] UnderstandCO1

1. Summarize the classification of Network types.

[**7M**][Reg Dec/Jan-2022]**UnderstandCO1**

# Topic name: Network Topologies

1. Summarize network topologies. [**7M**] [**June/July-2022**] **Analysis CO1**
2. Explain different Network topologies of the network, List any 3 network topologies. [7M] [ June/July-2022]Analysis CO1
3. Assume 6 devices are arranged in a mesh topology. How many cables areneeded? How many ports are needed for each device? Discuss with suitablediagram [7M] [December -2023]Analysis CO1
4. Explain the Mesh and Tree topologies of the network. Compare their performance. [7M] [December -2023]Analysis CO1

**Topic name: The OSI Reference Model, TCP/IP Reference Model**

1. What is the significance of layered Architecture Explain the OSI Layered Architecture with neat sketch? (OR) Explain the functionality of each layer in OSI reference model

# [7M] [Reg Feb2022] Understand CO1

1. Explain the responsibilities of physical, Data link, network, Transport, presentation and session layer in OSI model. [**7M**] [ **Reg Feb2022] Understand CO1**
2. Explain in detail about TCP/IP reference model. (OR) Explain the layers of TCP/IP reference model. [**7M**] **[Reg Feb2022] [Dec/Jan-2022-23] Understand CO1**
3. Explain design issues for the layers in computer network. .

# [7M] [ June/July-2022]Analysis CO1

1. Explain the different layers in OSI model. [7M] **[Reg Dec-Jan -2022-23 setUnderstand CO1**
2. Explain the difference between OSI model and TCP/IP model. (OR) Compare and Contrast OSI model and TCP/IP reference model.

(OR)

Discuss the similarities and differences between OSI and TCP/IP reference models.

# [7M] [ Dec/Jan -2022-23] Analyze CO1

**Topic name: Internet History**

1. What is internet, explain the Architecture of Internet with neat sketch, discuss its history. [7M][

# June/July-2022] Understand CO1

16 Briefly explain ARPANET design, Limitations.

# [7M] [ Dec/Jan -2022-23] Understand CO1

1. What is Internet? Discuss its history

[7M] [ **June/July-2022**] **Understand CO1**

1. Classify internet, intranet and extranet with applications.

# [7M][Dec/Jan-2022-23]Understand CO1

**Topic name: Guided Media.**

1. Describe the Transmission media. What are the types of Transmission media? [7M][ **June/July-2022**] **Analyze CO1**
2. Describe any two Guided transmission media options.

# [7M] [ Dec/Jan -2022-23] Analyze CO1

1. Explain Un-Guided transmission media option.

# [7M] [Dec/Jan-2022-23] Understand CO1

1. Discuss Coaxial cable and Fiber optical cable of guided media.

# [7M] [Dec/Jan-2022-23] Understand CO1

1. Explain the difference between guided and unguided media with diagrams, compare their performance. [7M] **[Dec/Jan-2022-23] Understand CO1**
2. Explain about fibre optic cable? What are the types of fibre optic cable?

# [7M][Dec/Jan-2022-23] Understand CO1

1. Distinguish between wired and wireless LANs.

# [7M] [ Dec/Jan -2022-23] Analyze CO1

**Topic name: Unguided media.**

1. Differentiate Radio waves and Microwaves in details. [7M] [ Dec/Jan -2022-23] Analyze CO1
2. Explain about various transmission media in physical layer with a neat sketch.

# [7M][Dec/Jan -2022-23] Understand CO1

1. Explain Wireless Radio waves and microwaves of unguided media[7M] [Dec/Jan -2022-23] Understand CO1
2. Describe the relative advantages and disadvantages of the following media:

i) Satellite links ii) Optical fiber transmission

# UNIT-II

**Topic name: Data link layer: Design issues**

1. Explain the significance of data link layer, explain the design issues of data link layer. [7M] **[Dec/Jan-2022-23] Understand CO3**
2. What is need of framing, various methods for implementing framing in data link layer [7M]**[Dec/Jan-2022-23]Analyze CO3**
3. Explain about the data link layer frame and frame fields.

# [7M] [Apr/May-2019] Understand CO3 Framing: fixed size framing, variable size framing

1. Explain character, Bit stuffing for framing. [7M][Dec/Jan-2022-23]Analyze CO3
2. Compare and contrast fixed size framing and variable size framing [7M] [December -2023]Analysis CO3

**Topic name: error control, error detection and correction codes, CRC, Checksum: idea, one’s complement internet checksum**

1. Explain the following error detection techniques with example
   1. LRC ii) CRC iii) Checksum [7M] **[Dec/Jan-2022-23] Understand CO3**
2. What is meant by error in data link layer? Discuss about error detection and correction methods in data link layer, [7M] **[Dec/Jan-2022-23]Analyze CO3**
3. Explain the CRC error detection technique using generation polynomial x4+x3+1 data is 11100011. [7M] **[Dec/Jan-2022-23] Understand CO3**
4. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is x3+1. Show the actual bit string transmitted. Suppose the third bit from the left is inverted during transmission. Show that this error is detected at the receiver end. [7M] **[Dec/Jan-2022-23] Evaluate CO3**
5. A sender sends series of frames to the same destination using 5-bit sequence number. If the sequence number starts with 0, what is the sequence number after sending 100 frames?

# [7M] [Jun/Jul-2022] Evaluate CO3

1. A bit stream 10011101 is transmitted using CRC method .The generator polynomial is X 3+1. Show that the actual bit transmitted. Suppose that third bit from left is inverted during the transmission. Show that this error is detected at the receiver’s end.

# [7M] [Apr/May-2019] Evaluate CO3

**Topic name: Flow Control**

1. Explain flow control mechanism in data link layer.

# [7M][ Reg Feb 2022 Set-1] Understand CO3

1. Discuss data link layer protocols for noiseless channels and noisy channels in detail. [**7M**] **[Dec/Jan-2022-23] Understand CO3**
2. Explain the difference between flow control and error control.

# [7M][ June/July 2022 Set-1] Understand CO3

1. Infer the need of buffers on both sender and receiver ends.

# [7M][ July 2023 Set-1] Understand CO3 Topic name: Elementary Data Link Layer protocols,Sliding window protocol,multi link, PPP

1. Explain in detail about Point-to-Point Protocol.

# [7M] [Dec/Jan-2022-23] Understand CO3

1. Explain the elementary datalink layer protocols.

i) Simplex protocol ii) simplex stop and wait iii) simplex protocol for noisy channel [7M] [**Apr/May-2019] Understand CO3**

1. Explain the Sliding window flow control mechanisms. Explain the drawbacks of Stop and wait? How they overcome by Sliding window protocol.

# [7M][Dec/Jan-2022-23]Understand CO3

1. Describe about the Selective –Repeat protocol.

# [7M] [Jun/Jul-2022] Understand CO3

1. Explain the working of unrestricted simplex protocol, what are the restrictions placed on other protocols?
2. Derive the sending and receiver window sizes for Go Back N and Selective-Repeat protocols.

# [7M][ June/July 2022] Understand CO3

1. Discuss about working Principle of a One-Bit Sliding Window Protocol with example. [7M] [**Jun/Jul-2022] Understand CO3**
2. Explain in detail about the sliding window protocol using Go-Back-NA.

# [7M][ June/July-2022] Understand CO3

1. With an example, explain Go Back N protocol.

# [7M][ June/July-2022] Understand CO3

1. Compare sliding window protocols. **[7M][June/July 2022] Evaluate CO3 Topic name: HDLC**
2. Draw the frame format of HDLC and explain its configuration and transfer modes.

# [7M][Reg Dec/Jan 2022-2023 Set-3] Understand CO3

**UNIT-III (part 1)**

# Topic name: Media Access Control: Random Access: ALOHA

1. Explain ALOHA and types of ALOHA in detail.

# [7M][Supply feb-2022] Understand CO3 (OR)

Explain the various ALOHA protocols in details.

1. Explain about Pure Aloha and Slotted Aloha.

# [7M][Dec/Jan2022-23] Understand CO3

1. What is ALOHA? Discuss different versions of ALOHA protocol and compare them

# [7M]Supply July -2023 Analyze CO3

1. A pure ALOHA network transmits 200 bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together ) produces 1000 frames per second ii) A slotted ALOHA network transmits 200 bit frames on a shared channel of 200 kbps. What is the throughput if the system (all stations together ) produces 1000 frames per second

# [7M]Supply July -2023 Analyze CO3

1. Write and explain about various multiple access protocols.

# [7M][Dec/Jan -2022-23] Evaluate CO3 Topic name: Carrier sense multiple access (CSMA)

1. Briefly explain the concept of Carrier Sense Multiple Access protocol in detail.
2. What is a collision? What is the need of MAC protocols?

# Topic name: CSMA with Collision Detection, CSMA with Collision Avoidance

1. Explain CSMA/CD mechanism.

# [7M][Reg feb-2022] Understand CO3

1. Explain CSMA/CD and CSMA/CA protocols.

# [7M][supply July-2023] Understand CO3

1. What is CSMA? Explain about CSMA/CD.

# [7M][Supply June/July-2022] ] Understand CO3 (OR)

What is the purpose of CSMA with Collision Detection?

1. What is the purpose of CSMA with Collision Prevention? Explain it.

# Topic name: Controlled Access: Reservation

1. Explain what Reservation Protocol is with an example.

# Topic name: Polling

1. Explain what is polling method with an example.

# Topic name: Token Passing

1. Explain Token Ring technology.

# [7M][Supply June/July-2022] ] Understand CO3 UNIT-III (Part-2)

**Topic name: Channelization: FDMA, TDMA, And CDMA**

1. Distinguish between frequency division multiplexing and time division multiplexing. Draw the neat schematics of these schemes.

# [7M][supply feb-2022] Understand CO3

1. Illustrate Frequency Division Multiplexing and Time Division Multiplexing.

# [7M][Reg feb-2022] Understand CO3

1. Give the comparison between various multiplexing techniques.

# [7M][supply July-2023] Understand CO3

1. Briefly discuss the different Channelization techniques.

# [7M][ Dec/Jan -2022-23] Understand CO3

1. Write in detail on Time–Division Multiplexing and Frequency Division Multiplexing.

# [7M][Supply June/July-2022] ] Understand CO3

1. Explain the Code Division Multiple Access.

# [7M][Supply June/July-2022] ] Understand CO3

**Topic name: Wired LANs:**

1. Discuss in brief the MAC frame structure for IEEE802.3

# [7M][Reg feb-2022] Understand CO3

1. Explain IEEE 802.11 wireless LAN.
2. Explain Bluetooth technology.

# [7M][Reg feb-2022] Understand CO3

**[7M][Dec/Jan -2022-23] Understand CO3**

1. Explain how to choose appropriate hardware and software, including protocols and algorithms, to establish LAN in your campus. **[7M][Supply**

# June/July-2022] Understand CO3

1. Discuss briefly about the MAC layers in 802.11standard.

# [7M][Dec/Jan -2022-23] Understand CO3

1. What is Ethernet? Discuss four generations of Ethernet evolutions briefly

# [14M] Supply July -2023 Analyze CO3

**Topic name:** standard Ethernet.

1. Explain standard Ethernet. **[7M][supply feb-2022] Understand CO3**

# [7M][supplyJuly-2023]Understand CO3

1. Write about Standard Ethernet, Fast Ethernet and Gigabit Ethernet.

# [7M][Dec/Jan -2022-23] Understand CO3

**UNIT-IV**

# Topic name: The Network Layer: Design Issues

1. Explain the services and design issues of Network layer.

# [7M] [Dec/Jan -2022-23] Understand CO2

1. What are the responsibilities of Network layer?

# [7M] [Nov-2019] Understand CO2

**Topic name: Circuit Switching, Packet Switching**

1. Explain in brief Store and Forward Packet Switching.

# [7M] [Dec/Jan -2022-23] Understand CO2

1. Compare circuit switching and message switching.

# [7M] [Nov-2019] Understand CO2

1. With a neat sketch, explain the following in detail Circuit Switching Technique and Packet Switching Technique. **[7M] [Nov-2019] Apply CO2**

# Topic name: Virtual circuit, Datagram sockets

1. Discuss in detail Virtual circuit vs Datagram sockets.

# [7M] [Dec/Jan-2022-23] Understand CO2 Topic name: Adaptive and Non-adaptive (OR) static routing and dynamic routing

1. Differences between static routing and dynamic routing with examples (Adaptive and non-Adaptive

routing). [7M] [**Dec/Jan -2022-23] Analyze CO2**

1. Compare Adaptive and Non-adaptive routing algorithms.

# [7M] [Nov-2019] Apply CO2

**Topic name: Connection less & Connection Oriented**

1. Compare connection oriented and connection less services provided by the network layer.

# [7M][Supply July-2023] Analyze CO2

1. How is the Connection-Oriented Services implemented? Explain

# [7M][Supply July-2023] Analyze CO2

**Topic name: Routing Algorithms**

1. What is Routing Algorithm? Briefly discuss Adaptive Routing Algorithms and Non – Adaptive Routing Algorithms. **[7M] [Nov-2019] Apply CO2**
2. Compare Distance Vector Routing and Link State Routing.

# [7M][Supply July – 2023] Analyze CO2

1. With an example explain the Dijkstra’s (Shortest path) routing algorithms used in computer networks **[7M] [Dec/Jan -2022-23] Understand CO2**
2. Explain the Hierarchical Routing algorithm and discuss its advantages and limitations.

# [7M] [Nov-2019] Apply CO2

1. Explain distance vector routing algorithm (DVMRP), Describe the problem and solutions associated with distance vector routing. **[7M] [Dec/Jan-2022-23] Understand CO2**
2. Explain Link state routing algorithm. [7M] **[Nov-2019] Understand CO2**

# (OR)

Illustrate Link State Routing. **[7M][Supply July – 2023] Analyze CO2**

1. Explain flooding with examples.

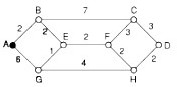
# [7M] [Dec/Jan-2022-23] Understand CO2

1. Briefly explain Hierarchical, Broadcast, multicast routing techniques.

# [7M] [Dec/Jan-2022-23] Understand CO2

1. Discuss the shortest path routing algorithm with an example

# [7M][Supply July – 2023] Ana lyze CO2



1. Distinguish between transparent fragmentation and non-transparent fragmentation.

# [7M][Supply July – 2023] Analyze CO2 Topic name: Congestion Control

1. Differentiate the open loop congestion control and closed loop congestion control in detail.

# [7M] [Dec/Jan-2022-23] Analyze CO2

1. What are the reasons for congestion in network layer?

# [7M] [Dec/Jan-2022-23]Understand CO2

1. What are the problems with congestion control?

# [7M] [Dec/Jan-2022-23] Understand CO2

1. Explain the general principles and prevention policies of congestion control.

# [7M] [Nov-2019] Understand CO2

1. What is the role of different layers in controlling the congestion? Describe congestion control in datagram subnets.

# [7M] [Nov-2019] Understand CO2

1. Explain the leaky bucket and token bucket algorithm.

# [7M] [Dec/Jan-2022-23] Understand CO2

**Topic name: Internet Working**

1. Explain the need and the process of Network Address Translation.

# [7M][Supply July – 2023] Analyze CO2

1. A university has 264 LANs in it. Each LAN contains 50 hosts. Suppose the university has one class B address. Design an appropriate subnet addressing scheme.

# [7M][Supply July – 2023] Analyze CO2

1. How Networks differ, how networks can be connected**.**

# [7M] [Nov-2019] Analyze CO2

1. What is internet working? Explain about tunnelling.

# [7M] [Dec/Jan-2022-23]Understand CO2

1. Discuss different internet control protocols.

# [7M] [Dec/Jan-2022-23]Understand CO2

1. Classify Internet, Intranet and Extranet with applications.

# [7M] [Nov-2019] Understand CO2

1. Explain Internet control protocols- ICMP, ARP, DHCP.

# [7M] [Nov-2019] Understand CO2

**Topic name: IPV4, IPV6**

1. What are the motivation factors for IPV6? Explain about the IPV6 address structure.

# [7M] [Nov-2019] Understand CO2

1. Explain the IPV4 header format with neat sketch.

# [7M] [Dec/Jan-2022-23] Understand CO2

1. Draw and explain IPV6 header.

# [7M] [Supply-June/July-2022] Analysis CO2

1. Explain the IPV6 header format with neat sketch.

# [7M] [Dec/Jan-2022-23] Understand CO2

1. Explain the transition from IPV4 to IPV6.

# [7M] [Nov-2019] Understand CO2

1. What is the major problem of IPV4 protocol? What are the solutions?

# [7M][Supply-Jun/July-2022] Analysis CO2

1. Explain the format of IPv4, IPv6 header, describe the significance of each field and the major problems of IPv4 protocol, and discuss the various classes of IPV4 addressing.

# [7M] [Nov-2019] Understand CO2 Topic name: Classless & Classful addressing, subnetting

1. Explain about Class full addressing and CIDR.

# [7M][Supply July – 2023] Analyze CO2

42. A router has received new IP addresses: 57.6.96.0/21, 57.6.104.0/21, 57.6.112.0/21 and 57.6.120.0/21. If all of them use the same outgoing line, can they be aggregated?

# [7M] [Supply-June/July-2022] Analysis CO2

1. Illustrate subnetting in networks.

# [7M] [Supply-June/July-2022] Analysis CO2

1. Explain about class full addressing and CIDR.

# [7M] [Dec/Jan-2022-23] Understand CO2

1. Perform CIDR aggregation on the following IP addresses: 128.56.24.0/24, 128.56.25.0/24, 128.56.27.0/24 (OR) 128.56.26.0/24

# [7M][Supply July – 2023] Analyze CO2

**UNIT-V**

# Topic name: Transport layer

1. What are the two types of transport services that the Internet provides to its applications? What are the characteristics of each of these services?

# [7M][Supply July – 2023] Analyze CO5

1. Explain the Services of Transport layer, what are the responsibilities of Transport layer? [**7M**]**[Nov-2019] Understand CO5**
2. What are the different transport layer protocols, Explain flow control in transport layer in detail?

# [7M] [Oct/Nov -20] Understand CO5

1. Briefly explain flow control, error control and congestion control in transport layer.

# [7M] [Dec/Jan-2022-23] Understand CO5

1. Explain the services, responsibilities, functions of transport layer.

# [7M] [Oct/Nov -20] Understand CO5

1. What is a socket? Explain each part of it.

# [7M][Supply July – 2023] Analyze CO5

**Topic name: TCP (Transmission Control Protocol)**

1. Explain the TCP header format and Pseudo header structure with neat sketch.

# [7M] [Nov-2019] Understand CO5

1. Draw and explain TCP header. **[7M][Supply July – 2023] Analyze CO5**
2. Explain TCP services and 3-protocol Scenarios for connection establishment in TCP.

# [7M] [Nov-2019] Understand CO5

1. What is congestion? Discuss TCP congestion control.

# [7M] [Dec/Jan-2022-23] Understand CO5

**(OR)**

Explain congestion control in TCP. **[7M][Supply July – 2023] Analyze CO5**

1. What is Connection management? Discuss in detail about the connection establishment and release in TCP. **[7M**] **[Dec/Jan-2022-23] Understand CO5**
2. How a Connection is established in a Transport Protocol. Explain three protocol scenarios for establishing a connection. Explain in detail three way handshaking for connection establishment in TCP. [**7M] [Nov-2019] Apply CO5**
3. Draw and explain each field in the TCP Segment header.

# [7M] [Nov-2019] Understand CO5

**Topic name: UDP (User Datagram Protocol)**

1. How does UDP differ from TCP? List the applications of UDP.

# [7M] [Nov-2019] Understand CO5

1. Write the structure of TCP pseudo header and explain how it is used in checksum calculation.

# [7M] [Nov-2019] Understand CO5

1. Explain the UDP header with protocols used in UDP.

# [7M] [Nov-2019] Understand CO5

1. Discuss real time transport protocol with applications and services.

# [7M] [Dec/Jan-2022-23] Understand CO5

1. Give the format of the UDP segment and TCP segment? Explain when UDP is preferred to TCP

# [7M][Supply July-2023] Analyze CO5

1. What is UDP? Explain the different components of UDP header.

# [7M] [Dec/Jan-2022-23] Understand CO5

**Topic name: Application layer Protocols**

1. Write a short note on the following
   1. SNMP 2. Multimedia 3.DNS 4. FTP

5. SMTP 6. HTTP

# [7M] [Dec/Jan-2022-23] Remember CO5

1. Explain the purpose of FTP and BOOTP protocols.

# [7M][Supply July – 2023] Analyze CO5

1. Compare SMTP and IMAP protocols.

# Topic name: DNS

**[7M][Supply July – 2023] Analyze CO5**

1. Explain the purpose, working of DNS and significance of DNS.

# [7M] [Nov-2019] Understand CO5

1. Explain briefly DNS messages and resource records.

# [7M] [Dec/Jan-2022-23] Understand CO5

1. How DNS service maps domain names to IP addresses, what resource records are associated with DNS? Explain. [7M] **[Nov-2019] Understand CO5**
2. What is DNS? What resource records are associated with it? Explain.

# [7M] [Jun/Jul-2022] Understand CO5

1. Compare iterative and recursive name resolutions. .

# [7M] [Supply-June/July-2022] Analysis CO2

1. Explain addresses used in different layers of network protocol stack.

. [7M] [Supply-June/July-2022] Analysis CO2

# Topic name: E-mail systems, HTTP, WWW

1. What are the five basic functions supported in e-mail systems? Explain.

# [7M] [Jun/Jul-2022] Remember CO5

1. What is electronic E-mail? Describe in brief about the two architectures of E- Mail.

# [7M] [Nov-2019] Remember CO5

1. Explain how domain name is converted to IP address.

# [7M][Supply July-2023] Analyze CO5

1. Explain architecture and services provided by electronic mail. .

# [7M] [Supply-June/July-2022] Analysis CO5

1. What is World Wide Web, Explain about electronic mail architecture in detail?

# [7M] [Dec/Jan-2022-23] Understand CO5

1. Describe briefly about the HTTP operational model.

# [7M] [Jun/Jul-2022] Understand CO5

1. Explain briefly about the Architecture of WWW, Write the short notes on E-Mail architecture.

# [7M] [Nov-2019] Understand CO5

1. Write about HTTP and SNMP. [**7M] [Nov-2019] Apply CO5**
2. What is HTTP? Describe in brief about HTTP request methods.

# [7M] [Jun/Jul-2022] Understand CO5

1. Explain the following protocols: i) ARP ii) DHCP.

# [7M] [Nov-2019] Understand CO5

1. What is electronic mail? Describe in brief about different agents involved in sending and receiving e-mail.

# [7M] [Nov-2019] Apply CO5