

# Govt. of Karnataka, Department of Technical Education

Diploma in Information Science & Engineering

Third Semester

Subject: COMPUTER NETWORKS

Contact Hrs/Week: 4

Contact Hrs/Sem: 64

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2.2		The OSI Model
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	3.1.2	Analog and Digital Signals
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	3.2.2	Phase
	3.2.3	Wavelength
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	10.2.2	Physical Layer
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	12.1.1	Address Space
	12.1.2	Notations
	12.1.3	Class Full Addressing
	12.1.4	Class less Addressing
	12.1.5	Network Address Translation
12.2		IPv6 Addresses
	12.2.1	Structure
	12.2.2	Address Space
<b>13</b>		<b>Network Layer : Internet Protocol</b>
13.1		Internetworking
	13.1.1	Need for Network Layer
	13.1.2	Internet as a Datagram Network
	13.1.3	Internet as a Connectionless Network
13.2		IPv4
	13.2.1	Datagram
	13.2.2	Fragmentation
	13.2.3	Checksum
	13.2.4	Options
13.3		IPv6
	13.3.1	Advantages
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14.2		Forwarding
	14.2.1	Forwarding Technique

	14.2.2	Forwarding Process
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<b>15</b>		<b>Process to Process Delivery : UDP, TCP</b>
15.1		Process to Process Delivery
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	15.1.2	Multiplexing and De-Multiplexing
	15.1.3	Connectionless Versus Connection Oriented Service
	15.1.4	Reliable Versus Un-Reliable
	15.1.5	Three Protocols
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	15.2.1	Well Known Ports for UDP
	15.2.2	User Datagram
	15.2.3	Checksum
	15.2.4	UDP Operation
	15.2.5	Use of UDP
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	15.3.1	TCP Services
	15.3.2	TCP Features
	15.3.3	Segment
	15.3.4	TCP Connection
	15.3.5	Flow Control
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	16.1.1	Traffic Descriptor
	16.1.2	Traffic Profiles
16.2		Congestion
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16.3		Congestion Control
	16.3.1	Open-Loop Congestion Control
	16.3.2	Closed-Loop Congestion Control
<b>17</b>		<b>Domain Name System</b>
17.1		Name Space
	17.1.1	Flat Name Space
	17.1.2	Hierarchical Name Space
17.2		Domain Name Space
	17.2.1	Label
	17.2.2	Domain Name
	17.2.3	Domain
17.3		Distribution of Name Space
	17.3.1	Hierarchy of Name Servers
	17.3.2	Zone
	17.3.3	Route Server
	17.3.4	Primary and Secondary Servers
17.4		DNS in the Internet
	17.4.1	Generic Domains
	17.4.2	Country Domains
	17.4.3	Inverse Domain
<b>18</b>		<b>Remote Logging, Electronic Mail and File Transfer</b>

18.1		Remote Logging
	18.1.1	Telnet
18.2		Electronic Mail
	18.2.1	Architecture
	18.2.2	User Agent
	18.2.3	SMTP
	18.2.4	POP and IMAP
	18.2.5	Web-based Mail
18.3		File Transfer
	18.3.1	FTP
	18.3.2	Anonymous FTP

**General Objectives:**

- 1 Know the concepts of Data Communication, networking, protocols, standards and networking models
- 2 Understand the concepts of data and signals
- 3 Learn the concepts of Bandwidth Utilization
- 4 Know the various transmission Medias
- 5 Understand the concepts of switching
- 6 Understand various Error detection and correction methods
- 7 Know about data flow and error control
- 8 Know about data link control
- 9 Understand multiple access
- 10 Learn the concepts of wired LANs and Ethernet
- 11 Compare various connecting devices
- 12 Know the concepts of network layer, logical addressing, IP, Forwarding and routing
- 13 Understand Transport layer UDP, TCP and congestion control
- 14 Know about domain name system, remote logging, E-mail and file transfer

**SPECIFIC INSTRUCTIONAL OBJECTIVES:**

Learn Data communication Classify Components Appraise Data representation Know about Data flow Know about Networks Appraise Distributed Processing Know about Network Criteria Physical Structures
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Compare Network Models

Discuss Categories of Networks

Know about Interconnections of Networks : Internetwork

Know about Internet

Understand Protocols and Standards

Know about Layered Tasks, Sender, Receiver and Carrier

Learn about The OSI Model, Layered Architecture, Peer to Peer Processes

Discuss Layers in the OSI Model

Discuss TCP/IP Protocol suite and its layers

Discuss Addressing

Learn about Analog and Digital signals

Discuss Periodic Analog Signals, Digital Signals ,Performance

Classify Multiplexing

Learn about various Transmission Medias

Discuss Circuit Switched Networks, datagram n/ws and virtual circuit

Classify Types of Errors

Learn about Redundancy

Compare Detection and Correction

Compare Forward Error Correction and Retransmission

Know about Block Coding, Error detection , correction and hamming distance

Learn about Cyclic Codes , CRC, Polynomials, checksum , 1's complement

Discuss Framing , Flow and Error Control

Discuss Random Access ,Aloha ,CSMA,CSMA/CD, CSMA/CA, Controlled Access, Preservation ,Polling , Token Passing

Learn about IEEE Standards ,Data Link Layer ,Physical Layer ,

Standard Ethernet ,MAC Sub layer ,Physical Layer, Fast Ethernet ,MAC Sub layer ,Physical Layer ,Gigabit Ethernet MAC Sub layer ,Physical Layer ,Ten-Gigabit Ethernet

Discuss Connecting Devices like ,Hubs ,Repeaters , Active Hubs ,

Bridges ,Two-Layer Switches ,Routers , Three-Layer switches ,

Gateways ,Backbone Networks , Connecting Remote LANs ,Virtual

LANs ,Configuration Communication between Switches ,IEEE Standards and Advantages

Discuss about IPv4 Addresses , Address Space , Notations ,Class

Full Addressing ,Class less Addressing ,Network Address Translation ,



IPv6 Addresses ,Structure , Address Space

Learn about Internetworking ,Need for Network Layer , Internet as a Datagram Network ,Internet as a Connectionless Network IPv4 , Datagram, Fragmentation, Checksum,Options,IPv6, Advantages and Packet Format

Discuss Delivery ,Direct versus In-Direct Delivery ,Forwarding , Forwarding Technique ,Forwarding Process, Routing Table.

Discuss Process to Process Delivery ,Client/Server Paradigm ,Multiplexing and De-Multiplexing, Connectionless Versus Connection Oriented Service Reliable Versus Un-Reliable ,Three Protocols , UDP, Well Known Ports for UDP, User Datagram ,Checksum UDP Operation , Use of UDP ,TCP ,TCP Services ,TCP Features ,Segment ,TCP Connection ,Flow Control Error Control , Congestion Control Data Traffic , Traffic Descriptor , Traffic Profiles , Congestion , Network Performance ,Congestion Control Open-Loop Congestion Control, Closed-Loop Congestion Control .

Discuss Name Space , Flat Name Space ,Hierarchical Name Space Domain Name Space,Label ,Domain Name , Domain Distribution of Name Space ,Hierarchy of Name Servers Zone ,Route Server ,Primary and Secondary Servers DNS in the Internet ,Generic Domains , Country Domains Inverse Domain.

Discuss Remote Logging, Telnet , Electronic Mail ,Architecture , User Agent SMTP ,POP and IMAP , Web-based Mail ,File Transfer , FTP

Text Books: 1. Data **Communications and Networking** - Behrouz A Forouzan, Tata McGraw-Hill, 4<sup>th</sup> edition, ISBN: 9780070634145  
2. 2. Computer Network -By Niranjana A, **sapna Publications**

References:

1. Computer networks ---- Tannanbaum, PHI
2. Data and computer communication --- William Stallings
3. Computer Networks – C R Sarma, JAICO Publication
4. Computer Networks --- Olifer Wiley publications
5. Computer Networks --- Brijendra Singh

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**Diploma in Information Science & Engineering**

**Third Semester**

Subject: COMPUTER NETWORKS

Max. Marks: 100

Max. Time: 3 Hours

Model Question Paper

Note: 1. Section –I is compulsory.

2. Answer any TWO questions from each remaining Sections. Marks

Section – I

1. a) Fill in the blanks with appropriate word/s 5x1=5
- i. The process of combining more than one type of data signal is called.....
  - ii. CSMA stands for .....
  - iii. IP address is of ..... Bits
  - iv. Error detection is the responsibility of .....layer
  - v. .... is a connection oriented reliable protocol.
- b) Write a note on network physical structures. 5

Section – II

2. a) Explain ISO OSI Reference model. 8
- b) Distinguish between base band and broad band transmission. 5
- c) Define multiplexing. 2
3. a) Explain frequency division multiplexing process. 5
- b) Explain any two unguided media. 5
- c) Explain the concept of optical fiber communication. 5
4. a) Define switching. Explain circuit switched network. 10
- b) Explain Forward error correction verses retransmission. 5

Section – III

5. a) What is meant by cyclic codes ? Illustrate CRC with an example. 10
- b) Define framing. Explain the two classes of framing. 5
6. a) Explain CSMA and CSMA / CD. 10

- b) Write a note on 802.3 MAC frame format. 5
7. a) What is the significance of Ten-Gigabit Ethernet ?. 5  
b) What is the difference between a bus backbone and a star backbone? 5  
c) Explain the role of VLANs. 5

#### Section – IV

8. a) What is meant by network address translation ? 3  
b) Distinguish between IPv4 and IPv6 addressing. 5  
c) Explain the role of network layer in an inter network. 7
9. a) Explain hierarchical routing with an example . 10  
b) Write a note on socket addressing. 5
10. a) Explain the features of TCP. 5  
b) Explain the concept of open loop congestion control. 5  
c) List the services provided by application layer and explain any one. 5