MUTHAYAMMAL ENGINEERING COLLEGE
(An Autonomous Institution)

(Approved by AICTE, New Delhi, Accredited by NAAC & Affiliated to Anna University)
Rasipuram - 637 408, Namakkal Dist., Tamil Nadu

MUST KNOW CONCEPTS

MKC

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2021-22

Course Code & Course Name : 19CYC05 & Computer Networks

Year/Sem **: II/III**

S.No	Term	Notation (Symbol)	Concept/Definition/Meaning/Units/Equation/ Expression	Units
Unit I: Data Communication				
1.	Computer Network		A Computer Network is a set of computers connected together for the purpose of sharing resources.	
2.	Link		A link of a network is one of the connections between the nodes of the network	
3.	Node		Any system or device connected to a network is also called a node	
4.	Data Communication		Data communication is the exchange of data (in the form of 1s and 0s) between two devices via some form of transmission medium (such as a wire cable)	
5.	Router		A node that is connected to two or more networks is commonly called as router or Gateway. It generally forward message from one network to another	
6.	Protocols		A network protocol is a set of rules followed by the network.	
7.	LAN		A local area network (LAN) is a computer network within a small geographical area such as a home, school, computer laboratory, office building or group of buildings.	
8.	MAN		A metropolitan area network, or MAN, consists of a computer network across an entire city, college campus or small region. A MAN is larger than a LAN, which is typically limited to a single building or site.	
9.	WAN		A wide area network (WAN) is a network that exists over a large-scale geographical area. A WAN connects different smaller networks, including local area networks (LANs) and metro area networks (MANs).	
10.	Network Topology		Network topology refers to the physical or logical layout of a network. It defines the way different nodes are placed and interconnected with each other.	
11.	Mesh Topology		Mesh topology is a type of networking where all nodes cooperate to distribute data amongst each other.	
12.	Ring Topology		A ring topology is a network configuration in which device connections create a circular data path.	

13.	Bus Topology		A bus topology is a network setup where each computer and network device is connected to a single cable or backbone	
14.	Simplex		Simplex is a communication channel that sends information in one direction only.	
15.	Half duplex		In half duplex mode, data can be transmitted in both directions on a signal carrier but not at the same time.	
16.	Full duplex		A full duplex communication channel is able to transmit data in both directions on a signal carrier at the same time.	
17.	OSI Model		OSI (Open Systems Interconnection) is a reference model for how applications communicate over a network.	
18.	Physical Layer		Physical layer is the lowest layer of the OSI reference model. It is responsible for sending bits from one computer to another.	
19.	Data Link Layer		Data link layer performs the most reliable node to node delivery of data.	
20.	Network Layer		The main aim of this layer is to deliver packets from source to destination across multiple links (networks).	
21.	Transport Layer		The transport layer is the layer in the open system interconnection (OSI) model responsible for end-to-end communication over a network.	
22.	Session Layer		The main aim is to establish, maintain and synchronize the interaction between communicating systems.	
23.	Presentation Layer		The Presentation Layer deals with the syntax and semantics of the information being exchanged.	
24.	Application Layer		This layer is responsible for accessing the network by user	
25.	TCP/IP Protocol		TCP/IP, or the Transmission Control Protocol/Internet Protocol, is a suite of communication protocols used to interconnect network devices on the internet. TCP/IP can also be used as a communications protocol in a private network	
Unit II: Data Link Layer				
26.	Digital Signal		A digital signal refers to an electrical signal that is converted into a pattern of bits.	-
27.	Hub		A hub, also called a network hub, is a common connection point for devices in a network.	
28.	Repeaters		A repeaters is an electronic device that receives a signal and retransmits it.	
29.	Bridges		A bridge is a type of computer network device that provides interconnection with other bridge networks that use the same protocol. It will operate in the data link layer of the OSI model.	
30.	Redundancy		It is the error detecting mechanism, which means a shorter group of bits or extra bits may be appended at the destination of each unit.	
31.	Single bit error		The term single bit error means that only one bit of a given data unit (such as byte character/data unit or packet) is changed from 1 to 0 or from 0 to 1.	
32.	Burst error		Means that 2 or more bits in the data unit have changed from 1 to 0 from 0 to 1.	

33.	Responsibilities of data link layer		a) Framing b) Physical addressing c) Flow control d) Error control e) Access control	
34.	LRC		In longitudinal redundancy check (LRC), a block of bits is divided into rows and a redundant row of bits is added to the whole block.	
35.	CRC		A cyclic redundancy check (CRC) is an error-detecting code commonly used in digital networks and storage devices to detect accidental changes to raw data.	
36.	Checksum		The error detection method used by the higher layer protocol is called checksum. Checksum is based on the concept of redundancy.	
37.	Error Correction		It is the mechanism to correct the errors	
38.	Error Correcting Methods		a) Single bit error correction b) Burst error correction.	
39.	Hamming Code		Hamming code is a set of error-correction codes that can be used to detect and correct the errors that can occur when the data is moved or stored from the sender to the receiver.	
40.	Flow control		Flow control refers to a set of procedures used to restrict the amount of data. The sender can send before waiting for acknowledgment.	
41.	Buffer		Each receiving device has a block of memory called a buffer, reserved for storing incoming data until they are processed.	
42.	Stop and Wait		Send one from at a time	
43.	Sliding window		Send several frames at a time	
44.	Data Link Control		DLC (data link control) is the service provided by the Data Link layer of function defined in the Open Systems Interconnection (OSI) model for network communication.	
45.	HDLC		High-level Data Link Control (HDLC) is a group of communication protocols of the data link layer for transmitting data between network points or nodes.	
46.	PPP		Point - to - Point Protocol (PPP) is a communication protocol of the data link layer that is used to transmit multiprotocol data between two directly connected (point-to-point) computers.	
47.	MAC		MAC is responsible for the transmission of data packets to and from the network-interface card, and to and from another remotely shared channel.	
48.	Ethernet		Ethernet (pronounced "eether net") is a computer network technology which is used in different area networks like LAN, MAN, WAN. Ethernet connecting computers together with cable so the computers can share information.	
49.	IEEE 802.11		IEEE 802.11 refers to the set of standards that define communication for wireless LANs (wireless local area networks, or WLANs). The technology behind 802.11 is branded to consumers as Wi-Fi.	

50.	Bluetooth		Bluetooth technology essentially works by using short-range wireless communication technology to connect two devices together.	
Unit III: Network Layer				
51.	IPV4 addressing		The IP address in IPV4 is 32 bits. It is represented in 4 blocks of 8 bits. It uniquely defines the connection of a device	
52.	IPV6 addressing		An IPv6 address is a 128-bits.Pv6 has the capability to provide unique addresses to each and every device or node attached to the Internet.	
53.	Subnetting		Bigger network is divided into smaller networks, in order to maintain security, then that is known as Subnetting. So, maintenance is easier for smaller networks.	
54.	CIDR		Classless inter-domain routing (CIDR) is a set of Internet protocol (IP) standards that is used to create unique identifiers for networks and individual devices.	
55.	Internetworking		Internetworking is the process or technique of connecting different networks by using intermediary devices such as routers or gateway devices.	
56.	Responsibilities of Network Layer		The Transport Layer is responsible for source-to-destination delivery of the entire message. a. Service-point Addressing b. Segmentation and reassembly c. Connection Control d. Flow Control e. Error Control	
57.	Dual Stack Routers		A router's interface is attached with Ipv4 and IPv6 addresses configured is used in order to transition from IPv4 to IPv6.	
58.	Tunneling		Tunneling is used as a medium to communicate the transit network with the different ip versions	
59.	NAT		NAT (Network Address Translation) is an Internet standard that enables a local-area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for external traffic.	
60.	ARP		ARP stands for Address Resolution Protocol. It is used to transform an IP address to its corresponding physical network address.	
61.	RARP		RARP stands for Reverse Address Resolution Protocol, maps a MAC address to an IP address.	
62.	DHCP		A DHCP Server is a network server that automatically provides and assigns IP addresses, default gateways and other network parameters to client devices. It relies on the standard protocol known as Dynamic Host Configuration Protocol or DHCP to respond to broadcast queries by clients.	
63.	ICMP		Internet Control Message Protocol is a collection of error messages that are sent back to the source host whenever a router or host is unable to process an IP datagram successfully.	
64.	BGP Messages		• OPEN • UPDATE • KEEPALIVE • NOTIFICATION	
65.	Local sub-network		Addresses in the range of 224.0.0.0 to 224.0.0.255 are individually assigned by IANA and designated for multicasting on the local subnetwork only.	

66.	Peer-Peer process		The processes on each machine that communicate at a given layer are called peer-peer process.	
67.	Round Trip Time		The duration of time it takes to send a message from one end of a network to the other and back, is called RTT.	
68.	Unicasting		Message sent from a source to a single destination node.	
69.	Multicasting		Message sent to some subset of other nodes.	
70.	Broadcasting		Message sent to all the m nodes in the network.	
71.	Server-based network		It provide centralized control of network resources and rely on server computers to provide security and network administration	
72.	Router		A router is a device that forwards data packets along networks.	
73.	Circuit Switching		When two nodes communicate with each other over a dedicated communication path, it is called circuit switching.	
74.	Message Switching		Whole message is treated as a data unit and switching / transferred entirely.	
75.	Packet Switching		Packet switching is a method of grouping data that is transmitted over a digital network into packets.	
Unit IV: Transport Layer				
76.	IGMP		The Internet Group Management Protocol (IGMP) is a communications protocol used by hosts and adjacent routers on IPv4 networks to establish multicast group memberships. IGMP is an integral part of IP multicast.	
77.	Properties of Routing Algorithm		Correctness, Simplicity, Robustness, Stability, Fairness, and Optimality.	
78.	Shortest Path Routing		A technique to study routing algorithms: The idea is to build a graph of the subnet, with each node of the graph representing a router and each arc of the graph representing a communication line.	
79.	Flooding		Another static algorithm is flooding, in which every incoming packet is sent out on every outgoing line except the one it arrived on.	
80.	Multicasting		Multicast is group communication where data transmission is addressed to a group of destination computers simultaneously. Multicast can be one-to-many or many-to-many distribution.	
81.	User Datagram		User Datagram UDP packets, called user datagram, have a fixed-size header of 8 bytes made of four fields, each of 2 bytes (16 b	
82.	Process-to-Process Communication		UDP provides process-to-process communication using socket addresses, a combination of IP addresses and port numbers.	
83.	Connectionless Services		This means that each user datagram sent by UDP is an independent datagram. There is no relationship between the different user data grams even if they are coming from the same source process and going to the same destination program.	

84.	SCTP		SCTP is a new transport-layer protocol that combines the features of UDP and TCP.	
85.	Routing protocols		Routing protocols are configured on routers with the purpose of exchanging routing information. Their types are 1. Distance vector (RIP, IGRP) 2. Link state (OSPF, IS-IS)	
86.	Distance-Vector Routing		A distance-vector routing (DVR) protocol requires that a router inform its neighbors of topology changes periodically.	
87.	Link State Routing		It is a dynamic routing algorithm in which each router shares knowledge of its neighbors with every other router in the network. A router sends its information about its neighbors only to all the routers through flooding.	
88.	RIP		Routing Information Protocol (RIP) is a dynamic routing protocol which uses hop count as a routing metric to find the best path between the source and the destination network.	
89.	OSPF		Open Shortest Path First (OSPF) is a routing protocol for Internet Protocol (IP) networks. It uses a link state routing (LSR) algorithm and falls into the group of interior gateway protocols (IGPs), operating within a single autonomous system (AS).	
90.	BGP		Border Gateway Protocol (BGP) is a standardized exterior gateway protocol designed to exchange routing and reachability information among autonomous systems (AS) on the Internet. The protocol is classified as a path vector protocol	
91.	UDP		UDP (User Datagram Protocol) is an alternative communications protocol to Transmission Control Protocol (TCP) used primarily for establishing low-latency and loss-tolerating connections between applications on the internet.	
92.	TCP Flow Control		Flow Control basically means that TCP will ensure that a sender is not overwhelming a receiver by sending packets faster than it can consume. ... Congestion control is about preventing a node from overwhelming the network (i.e. the links between two nodes), while Flow Control is about the end-node.	
93.	Error Control in TCP		TCP is a reliable transport layer protocol. Error control includes mechanisms for detecting corrupted segments, lost segments, out-of-order segments, and duplicated segments. Error control also includes a mechanism for correcting errors after they are detected.	
94.	Congestion control		Congestion control is a network layer issue, and is thus concerned with what happens when there is more data in the network than can be sent with reasonable packet delays, no lost packets, etc. Flow control is a local, congestion control is global.	
95.	QoS		Quality of service (QoS) refers to any technology that manages data traffic to reduce packet loss, latency and jitter on the network.	

96.	Elements of transport protocols		1. Addressing 2. Connection Establishment. 3. Connection Release. 4. Error control and flow control 5. Multiplexing.	
97.	Multiplexing		In networks that use virtual circuits within the subnet, each open connection consumes some table space in the routers for the entire duration of the connection.	
98.	TPDU		Transmissions of message between 2 transport entities are carried out by TPDU.	
99.	Window management in TCP		Window management in TCP decouples the issues of acknowledgement of the correct receipt of segments and receiver buffer allocation	
100.	Sliding Window protocol		Sliding window protocols are data link layer protocols for reliable and sequential delivery of data frames.	
Unit V: Application Layer				
101.	Security in CN		Network security is the security provided to a network from unauthorized access and risks.	
102.	WWW		It is an internet application that allows users to view web pages and move from one web page to another.	
103.	Aspects of Security		• Privacy • Authentication • Integrity • Non-repudiation	
104.	Web Browser		Web browser is a software program that interprets and displays the contents of HTML web pages.	
105.	URL		URL is a string identifier that identifies a page on the World Wide Web.	
106.	TELNET		TELNET is used to connect remote computers and issue commands on those computers.	
107.	HTTP		It is used mainly to access data on the World Wide Web. The protocol transfers data in the form of plaintext, hypertext, audio, video and so on.	
108.	FTP		It is a standard mechanism provided by the internet for copying a file from one host to another.	
109.	Electronic Mail		Electronic mail (email or e-mail) is a method of exchanging messages ("mail") between people using electronic devices.	
110.	Telnet		Telnet is an application protocol used on the Internet or local area network to provide a bidirectional interactive text-oriented communication facility using a virtual terminal connection.	
111.	SSH		Secure Shell (SSH) is a cryptographic network protocol for operating network services securely over an unsecured network.	
112.	DNS		DNS is a client/server application that identifies each host on the internet with a unique user friendly name.	
113.	SMTP		Simple Mail Transfer Protocol is a standard and reliable host to host mail transport protocol that operates over the TCP port 25.	
114.	SNMP		The primary purpose of SNMP is to allow the network administrator to monitor and configure devices on the network, remotely via the network. These configuration and	

			monitoring capabilities are collectively referred to as management.	
115.	POP		Post Office Protocol, version3 (POP3) and Internet Mail Access Protocol version4 (IMAP4) are protocol used by a mail server in conjunction with SMTP to receive and hold mail for hosts.	
116.	Cryptographic Algorithms		The technology comes in many forms, with key size and strength generally being the biggest differences in one variety from the next.	
117.	Authentication		In computing, authentication is the process of verifying the identity of a person or device. A common example is entering a username and password when you log in to a website.	
118.	Confidentiality		Keeps the information away from an unauthorised person	
119.	Integrity		Identifying any alteration to the data	
120.	Non repudiation		An entity cannot refuse the ownership of a previous action or commitment.	
121.	Symmetric key encryption		Same keys are used for encrypting and decrypting	
122.	Asymmetric Key Encryption		Different keys are used for encrypting and decrypting the information	
123.	Public Key Cryptography		Public key cryptography is a method of encrypting data with two different keys and making one of the keys, the public key, available for anyone to use. The other key is known as the private key.	
124.	X. 509		An X. 509 certificate is a digital certificate that uses the widely accepted international X. 509 public key infrastructure (PKI) standard to verify that a public key belongs to the user, computer or service identity contained within the certificate	
125.	Firewall		A Firewall is software that blocks unauthorized users from connecting to your computer.	
PLACEMENT QUESTIONS				
126.	What is the average of first five multiples of 12?		Average = $12*(1+2+3+4+5) * \frac{1}{5}$ $= 12 * 15* \frac{1}{5}$ $= 12 * 3= 36$	
127.	What is the difference in the place value of 5 in the numeral 754853?		The digit 5 has two place values in the numeral, $5 * 10^5$ = 50,000 and $5 * 10^1 = 50$. ∴Required difference = 50000 - 50 = 49950	
128.	A number added to 1459 so that it is exactly		On dividing 1459 by 12, the remainder is 7. ∴The number to be added would be = 12 - 7 = 5	

	divisible by 12.			
129.	In the given expression (1.05)2 *x = 44.1, find the value of x.		(1.05)2 *x=44.1 Or, x = 44.1/ (1.05)2 = 44.1/ (1.05 * 1.05) Hence, x = 40.00	
130.	If January 1, 1996, was Monday, what day of the week was January 1, 1997?		The year 1996 is divisible by 4, so it is a leap year with 2 odd days. As per the question, the first day of the year 1996 was Monday, so the first day of the year 1997 must be two days after Monday. So, it was Wednesday.	
131.	A: B: C is in the ratio of 3: 2: 5. How much money will C get out of Rs 1280?		C's share = [C's ratio/ sum of ratios] * total amount C's share = (5/10) * 1280 C's share = 640	
132.	Today is Wednesday, after 69 days, it will be		Each day of a week is repeated after 7 days, so after 70 days, it will be Wednesday. Therefore, after 69 days, it will be Tuesday.	
133.	A Number times the hands of a clock coincide in a day		The hands of a clock coincide only once between 11 O' clock and 1 O' clock, so in every 12 hours, the hands of a clock will coincide for 11 times. ∴ In a day or 24 hours, the hands of a clock will coincide for 22 (11+11) times.	
134.	The area of a triangle with base 10 meters and height 20 meters.		Area of a triangle = ½ * base * height So, the area = ½* 10 * 20 =100 square meters	
135.	A: B: C:D is in the ratio of 3: 2: 5:2. Calculate C's share out of 1260.		C's share = [C's ratio/ sum of ratios] * total amount C's share = (5/10) * 1260 C's share = 630	
136.	CKDL, EKFL, GKHL, _,		The second and fourth letters (K and L) in the series are static. The first and third letters are in alphabetical order starting with the letter C. So, the missing letters are IKJL.	

	KKLL,			
137.	RQP, ONM, _, IHG, FED,		The series consists of letters in reverse alphabetical order. Therefore, the missing letters are LKJ.	
138.	GAH, IBJ, KCL, MDN		The middle letters in this series follow the order ABCDE. The first and third letters are in alphabetical order starting with the letter G.	
139.	E3FG, _, E5FG, E6FG, E7FG		The letters are the same in the series; they differ only in numbers. So, focus on the number series which is a simple series of numbers; 3, 4,5,6,7. Therefore, the missing letters are E4FG.	
140.	BKK, DMM, FOO, _, JSS		The first letters of the series are in an alphabetical order in which a letter is skipped between each two letters; B, D, F, H, J. The second and third letters are repeated in each segment, and they are also in alphabetical order with a skipped letter; K, M, O, Q, S. So, the missing letters are HQQ.	
141.	4, 7, 12, 19, _, 39		In this series, the difference between the consecutive numbers increases by 2; 7 - 4 = 3 12 - 7 = 5 19 - 12 = 7 Therefore, the next number would be 19 + 9 = 28	
142.	15, 20, 24, 15, 28, 32 15, _, _, 15		This is a simple addition series in which the number "15" is interpolated as every third number. And, except 15, four is added to each number to arrive at the next number	
143.	77, 70, 63, 56, 49, _,		This is a simple subtraction series in which each number is 7 less than the previous number.	
144.	12, 24, 14, 28, 18, 36, __,		This is an alternating multiplication and subtraction series; first multiply by 2 then subtract 10. Therefore, 26 (36 - 10) should come next.	
145.	72, 36, 18, ...		On dividing 72 by 2, we get 36 On dividing 36 by 2, we get 18 So, on dividing 18 by 2, we will get 9	
146.	40 % of 280 =		x % of a given number 'n' $= \frac{x}{100} * n$ x = 40 and n = 280 ∴ 40 % of 280 $= \frac{40}{100} * 280 = 112$	
147.	GAH, IBJ, KCL, MDN, _.		The middle letters in this series follow the order ABCDE. The first and third letters are in alphabetical order starting with the letter G.	

148.	U, O, I, _, A		The series contains vowels in reverse order, U, O, I, E, A. So, the missing letter is E.	
149.	467X4 is divisible by 9		The number is divisible by 9 so the sum of its digits would be divisible by 9. ∴4 + 6 + 7 + X + 4 = 21+ X, must be divisible by 9.X = 6, fulfills our requirement so the required digit is 6.	
150.	A shopkeeper sold an article for Rs. 2500. If the cost price of the article is 2000, find the profit percent.		C.P. = Rs. 2000 S.P. = Rs. 2500 Profit or Gain = S.P. -C.P. = 2500 - 2000 = 500 **Apply formula:** Profit % = $\frac{\text{Profit}}{\text{C.P.}} * 100$ $= \frac{500}{2000} * 100 = 25\ \%$	
Prepared by		**Dr.J.Preetha,Prof& HOD In-Charge**	**Signature:**	**HoD:**