INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)
Dundigal, Hyderabad - 500 043

ELECTRONICS AND COMMUNICATION ENGINEERING

TUTORIAL QUESTION BANK

Course Name	:	COMPUTER NETWORKS
Course Code	:	A70515-R15
Class	:	IV B. Tech I Semester
Branch	:	Electronics and Communication Engineering
Year	:	2018 – 2019
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OBJECTIVES:

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome-based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

UNIT – I
Overview of the Internet, Physical and Data Link Layer

PART - A (SHORT ANSWER QUESTIONS)

S. No.	Question	Blooms Taxonomy Level	Course Outcome
1.	Define Network and give its usages with examples.	Remember	1
2.	What are the different types of networks?	Understand	2
3.	Describe Why protocols are needed with examples.	Understand	2
4.	Describe Access point with examples	Understand	1
5.	State the goals of computer networks.	Remember	2
6.	Describe the importance of networking.	Understand	1
7.	List two advantages of layering principle in computer Networks.	Remember	2
8.	Classify different types of Layers with neat sketch.	Understand	2
9.	Define the responsibilities of data link layer.	Remember	1
10.	Enumerate the types of errors with examples.	Remember	1
11.	Describe the role of ARPANET in computer networks.	Understand	2
12.	Discuss two points to improve the performance of network.	Understand	1
13.	Describe the importance of networking.	Remember	2
14.	List different types of Transmission Media.	Remember	2
15.	Describe Why standards are needed with examples.	Understand	1
16.	Describe the characteristics of twisted pair cable.	Understand	1
17.	Give brief note about MAN (Metropolitan networks).	Understand	1
18.	Discuss about Sliding Window Protocol.	Understand	2
19.	Give a short note about WAN with example diagram.	Understand	2

20.	Define peer-to-peer process with neat sketch.	Remember	1
21.	Describe an internet and narrate with neat sketch.	Understand	2
22.	Define Intranet and narrate with neat sketch.	Remember	3
23.	Define Extranet and explain with diagram.	Remember	1
24.	Write a brief note about LAN with neat sketch.	Understand	1
25.	Describe the advantages of a multipoint connection over a point-to-point connection.	Understand	2
26.	List out the available detection methods.	Remember	2
27.	Discuss the responsibilities of the data link layer in the Internet model.	Understand	1
28.	Discuss how the layers of the Internet model correlate to the layers of the OSI model.	Understand	1
29.	Differentiate four basic topologies and draw diagrams.	Understand	1
30.	Define CRC and explain with one example.	Remember	2
31.	List the Elementary Data link Layer protocols.	Remember	1
32.	List the Sliding Window Protocols.	Remember	1
33.	Define checksum and explain with one example.	Remember	2

PART-B (LONG ANSWER QUESTIONS)

1.	Explain how OSI and ISO related to each other are.	Understand	1
2.	Illustrate some of the factors that determine whether a communication system is a LAN or WAN.	Understand	2
3.	List the responsibilities of the data link layer in the Internet model.	Remember	2
4.	Suppose a computer sends a frame to another computer on a bus topology LAN. The physical destination address of the frame is corrupted during the transmission. What happens to the frame? How can the sender be informed about the Situation? Describe.	Understand	1
5.	List three types of transmission impairment.	Remember	1
6.	Distinguish between baseband transmission and broadband transmission.	Understand	2
7.	Explain the categories of networks and draw neat sketch.	Understand	2
8.	State ISO/OSI Reference model with neat diagram.	Understand	1
9.	Define topology and explain the topologies of the network.	Remember	2
10.	Discuss on error detection and error correction techniques.	Understand	1
11.	Explain the flow control mechanism with example.	Understand	2
12.	Describe about HDLC Protocols with examples.	Understand	1
13.	Explain the timers and time registers in FDDI.	Understand	1
14.	Discuss on error control mechanism with one example.	Understand	2
15.	Examine about SONET and Bridges with neat sketch.	Understand	1
16.	Identify how OSI and ISO related to each other are.	Understand	1
17.	Describe some of the factors that determine whether a communication system is a LAN or WAN.	Understand	2
18.	List the responsibilities of the data link layer in the Internet model.	Remember	2
19.	Suppose a computer sends a frame to another computer on a bus topology LAN. The physical destination address of the frame is corrupted during the transmission. What happens to the frame? How can the sender be informed about the situation? Explain	Understand	1
20.	List three types of transmission impairment.	Remember	1
21.	Distinguish between baseband transmission and broadband transmission.	Understand	2
22.	Explain the categories of networks with examples diagrams.	Understand	2

PART-C (ANALYTICAL QUESTIONS)

1.	Consider a 1 km 10Mbps channel. What would be the utilization of this channel when 100 nodes are connected in an Ethernet configuration? If the channel is converted to a ring, running token ring, what would be the utilization of the channel? Assume fixed frame size of 1024 bits in both cases.	Understand	2
2.	Describe in detail about the concept of data transmission and its terminology with necessary example.	Understand	2
3.	For P = 110011 and M = 1100011, find CRC.	Understand	2
4.	For each of the following four networks, Discuss the consequences if a connection fails. a) Six devices arranged in a bus topology b) Four devices arranged in a ring topology	Understand	1

S. No.	Question	Blooms Taxonomy Level	Course Outcome
	c) five devices arranged in a mesh topology d) Seven devices arranged in a star topology		
5.	Calculate the hamming distance for each of the following code words. a) d(10000,01000) b) d(10101,10010) c) d(1111,1111) d) d(0000,0000)	Understand	1

UNIT – II
Multiple Access Protocols

PART-A (SHORT ANSWER QUESTIONS)

S. No.	Question	Blooms Taxonomy Level	Course Outcome
1.	Define ALOHA Protocol with neat sketch.	Remember	4
2.	What is meant by collision free protocols and give some examples.	Remember	4
3.	List out advantage of token passing protocol over CSMA/CD protocol.	Remember	5
4.	Define MAC(media access control).	Remember	5
5.	List the drawbacks of token ring topology.	Remember	3
6.	Define Ethernet.	Remember	3
7.	Illustrate in what way the MAC protocol of FDDI differs from that of token ring.	Remember	4
8.	Illustrate how FDDI offers higher reliability than token ring protocol.	Understand	4
9.	What is the difference between router and gateway.	Remember	4
10.	Describe the two techniques for implementing Ethernet switches.	Understand	4
11.	Define Bridge and explain with neat sketch.	Remember	4
12.	Define Hub and explain with neat sketch.	Remember	4
13.	Define Router and explain with neat sketch.	Remember	5
14.	What situations contention based MAC protocols are suitable?	Understand	4
15.	Illustrate What is vulnerable period? How it affects the performance in MAC protocols.	Understand	4
16.	List three categories of multiple access protocols.	Remember	5
17.	Define CSMA and CDMA and explain with neat sketch.	Remember	5
18.	Define Ethernet and explain with neat sketch.	Remember	5
19.	Describe how performance is improved in CSMA/CD protocol compared to CSMA protocol..	Understand	3
20.	Write how throughput is improved in slotted ALOHA over pure ALOHA.	Understand	4
21.	Define Vulnerable Time and explain with neat sketch.	Understand	5
22.	Distinguish between FDMA and TDMA.	Understand	3
23.	Define Bandwidth and explain with neat sketch.	Remember	5
24.	Define Spanning Tree Bridges and explain with neat sketch.	Remember	4
25.	Discuss Ethernet Physical Layer and explain with neat sketch.	Understand	5
26.	Discuss Ethernet MAC sub layer and explain with neat sketch.	Understand	5

PART-B (LONG ANSWER QUESTIONS)

S. No.	Question	Blooms Taxonomy Level	Course Outcome
1.	State the functions of MAC and explain with example.	Remember	3
2.	How performance is improved in CSMA/CD protocol compared to CSMA protocol? Explain?	Understand	4
3.	Explain the term sliding window. Also illustrate and explain the operation of selective repeat.	Understand	5
4.	How CSMA/CA differs from CSMA/CD. Explain in brief?	Understand	5
5.	Explain in details about the access method and frame format used in Ethernet and token ring.	Understand	4
6.	Explain the working of carrier sense multiple access protocol.	Understand	5
7.	Discuss the MAC layer functions of IEEE 802.11.	Understand	4
8.	Explain in details the types of bridges.	Understand	5
9.	What are the different types of error detection methods?.Explain the CRC error detection technique using generator polynomial	Understand	5

	x4+x3+1 and data 11100011.		
10.	How a Token Ring LAN does operate? Discuss that can be used to set up wireless LAN's?	Understand	5
11.	List and briefly discuss the two different basic transmission technologies.	Remember	5
12.	List the four basic network topologies and explain them giving all the Relevant features.	Remember	4
13.	Explain the frame format, operation and ring maintenance feature of IEEE 802.5 MAC protocol.	Understand	4
14.	Define key requirements and functioning of wireless LANs.	Remember	5
15.	Explain why collision is an issue in a random access protocol but not in controlled access or channelizing protocols.	Understand	4
16.	Compare and contrast a controlled access protocol with a channelizing protocol.	Understand	4
17.	Explain in detail the operation of pure ALOHA and slotted ALOHA.	Understand	4
18.	Do we need a multiple access protocol when we use the local loop of the telephone company to access the internet? Explain.	Understand	5

PART -C (CRITICAL THINKING QUESTIONS)

1.	Derive the Laplace transform of the message delay in FDMA in which every message contains a random number of packets. Compare the expected message delay with that of TDMA.	Understand	4
2.	A network with one primary and four secondary stations uses polling. The size of a data frame is 1000 bytes. The size of the poll, ACK, and NAK frames are 32 bytes each. Each station has 5 frames to send. How many total bytes are exchanged if there is no limitation on the number of frames a station can send in response to a poll.	Understand	3
3.	Derive the steady-state distribution and the first two moments of the number of messages in a TDMA system where L (z) is the generating function of the number of packets in a message.	Understand	5
4.	One hundred station on a pure ALOHA network share a 1-Mbps channel. If frames are 1000 bits long, find the throughput if each station is sending 10frames/sec.	Understand	3
5.	Assume that a portion y of every transmitted packet is overhead (e.g., address, sync bits, etc.). 1. What will be the throughput delay characteristic of an FDMA channel? 2. What will be the throughput delay characteristic of a TDMA channel.	Understand	4
6.	What are the different types of error detection methods? Explain the CRC error detection technique using generator polynomial x4+x3+1 and data 11100011.	Understand	4

UNIT – III Network Layer

PART-A (SHORT ANSWER QUESTIONS)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	List Design Issues Of Network layer with neat sketch of network layer.	Understand	6
2.	List network support layers and the user support layers with neat sketch.	Remember	7
3.	Describe the routing strategies with examples.	Remember	6
4.	List out the difference between connectionless and connection oriented networks.	Remember	6
5.	What is Optimality principle with neat sketch.	Understand	6
6.	List out difference between connection-less and connection oriented service.	Remember	4
7.	Define protocol data unit and explain with example.	Remember	4
8.	Define Connection oriented service and explain with some examples.	Understand	4
9.	List the design issues of network layer and draw the diagram of network layer.	Remember	5
10.	Define Connection-less service with neat sketch.	Understand	6
11.	List out responsibilities of network layer.	Remember	6
12.	Define datagram's and draw the diagram of datagram.	Remember	7
13.	Describe how broadcast and multicast address is represented in IP addressing scheme.	Understand	6
14.	List some of the uni-cast routing protocols.	Remember	7

15.	List out the differences between Datagram and datagram networks.	Remember	7
16.	Define routing and list out various rooting algorithms.	Remember	6
17.	List out functions of IP(Internet Protocol) Protocol.	Remember	7
1.	Define Distance vector routing algorithms with example.	Remember	5
2.	What is store and forward circuit switching.	Remember	8
3.	What is meant by routing algorithm.	Understand	7
4.	Define session routing and explain with example.	Remember	6
5.	Define Flooding rooting algorithm.	Remember	6
6.	Define Link state Routing algorithm.	Remember	7
7.	State Leaky bucket algorithm with neat sketch.	Remember	7
8.	Define Choke packet with neat sketch.	Understand	7
9.	Define packet switching with neat sketch.	Remember	6
10.	State circuit switching with neat sketch.	Remember	7
11.	What is congestion control algorithm?	Understand	8
12.	Define Admission control with neat sketch.	Remember	6
13.	Define Optimality principle with neat diagram.	Remember	9
14.	List out various congestion control algorithms.	Remember	5
15.	Define count to infinity problem.	Remember	8
16.	Illustrate shortest path.	Understand	5
17.	Define Flooding .	Understand	5

PART-B (LONG ANSWER QUESTIONS)

1.	Define switching? Explain Virtual circuit switching techniques.	Remember	7
2.	Explain Packet switching technique in detail with neat sketch.	Understand	6
3.	Explain Internet Protocol with the neat block diagram of IP header format.	Understand	7
4.	Give the general principles of various congestion control algorithm.	Understand	7
5.	Discuss about Address Resolution Protocol with neat sketch.	Understand	7
6.	Explain about Internet Control Message Protocol.	Understand	6
7.	Define BGP Protocol. Describe its routing functionality in detail.	Remember	7
8.	Write short notes on a) RARP b) ARP.	Remember	6
9.	Explain the various congestion control mechanism in detail.	Understand	6
10.	Explain the Link State routing algorithm with an example.	Understand	6
11.	Describe the Routing Information protocol and Distance vector routing protocol.	Understand	7
12.	Explain the Datagram delivery and Forwarding in Internet Protocol.	Understand	6
13.	Explain the two approaches of packet switching techniques.	Understand	7
14.	Define Routers and explain the type of routers.	Remember	6
15.	Explain IP addressing method and its classes with neat sketch.	Understand	7

PAR -C (CRITICAL THINKING QUESTIONS)

1.	A Router has the following RIP routing table : Net1 5 B Net2 1 C Net3 2 F Net4 4 G What would be the contents of the table if the router received the following RIP message from router C. Net1 2 Net2 2 Net3 4 Net4 8	Understand	5
2.	A Router using DVMRP receives a packet with source address 10.14.17.2 from interface 2.If the router forwards the packet, What are the contents of the entry related to this address in the uni-cast routing table.	Understand	5
3.	A Frame goes from A to B. There is congestion in both directions. Is the FECN bit set? Is the BECN bit set? Explain.	Understand	6

4.	Show a routing table for a host that is connected to a LAN without being connected to a internet? Explain.	Understand	6
5.	Design the autonomous system with the following specifications : a) There are 8 networks (N1 toN8) b) There are 8 routers (R1 toR8) c) N1,N2,N3,N4,N5 and N6 are Ethernet LANs d) N7 and N8 are point to point WANs e) R1 connects N1 andN2 f) R2 connects N1 andN7 g) R3 connects N2 andN8	Understand	5

UNIT – IV
Internetworking

PART-A (SHORT ANSWER QUESTIONS)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	List out functions of transport layer.	Remember	9
2.	Define Multi-protocol router.	Remember	7
3.	List out duties of the transport layer.	Remember	8
4.	Define BGP Protocols with neat sketch.	Remember	6
5.	Differentiate between network layer delivery and the transport layer delivery.	Remember	8
6.	Define IP Address and list out its classes.	Remember	7
7.	Define quality of service with example.	Remember	8
8.	What is Subnet Mask with example.	Understand	7
9.	Define Payload with neat sketch.	Remember	9
10.	Describe about CIDR with example.	Understand	7
11.	How an application process running in one host is addressed by another process through TCP?	Understand	8
12.	Describe Datagram Format of UDP.	Understand	9
13.	Define ICMP Protocol.	Remember	9
14.	State two protocols available at transport layer.	Remember	9
15.	List out various congestion avoidance techniques.	Remember	8
16.	Distinguish between Contention and Congestion.	Understand	9
17.	Define Tunneling with neat sketch.	Remember	8
18.	State the four major aspects of reliable delivery at the transport layer.	Remember	8
19.	Define how check sum is calculated in TCP.	Understand	9
20.	Define CODE BITS in TCP header.	Understand	9
21.	State the use of SYN and FIN bits in TCP.	Remember	8
22.	Define RARP Protocol.	Remember	9
23.	What is DHCP and draw its diagram.	Understand	9
24.	Discuss about Transport Layer Services.	Understand	8
25.	Discuss Types of Payload.	Understand	8
26.	Define Multiplexing with example.	Remember	9
27.	Define how connection Establishment is acquiring.	Understand	8
28.	Discuss how to release a connection from the network.	Understand	9
29.	What is crash Recovery.	Understand	9

PART-B (LONG ANSWER QUESTIONS)

1.	Explain the real transport protocol of UDP and how will you calculate checksum in UDP.	Understand	8
2.	Explain the TCP segment format with neat sketch.	Remember	9
3.	Write short notes on Wrap around time (8).	Remember	9
4.	Describe the Adaptive retransmission policy in detail.	Understand	8
5.	Explain the TCP Connection establishment and termination using Timeline diagram.	Understand	8
6.	Describe the three way handshake protocol to establish the transport level connection.	Understand	9
7.	Explain TCP state Transition diagram with neat sketch.	Understand	8
8.	Explain the connection establishment.	Understand	9
9.	Discuss about the TCP sliding window algorithm for flow control.	Understand	8

10.	Explain congestion control algorithms in detail.	Understand	9
11.	Explain leaky bucket and token bucket algorithm.	Understand	8
12.	Explain UDP &TCP packet format with neat sketch.	Understand	9
13.	Explain congestion avoidance techniques in detail.	Understand	8
14.	List major types of networks and explain.	Remember	9
15.	Illustrate data units at different layers of the TCP / IP protocol suite..	Understand	8

PART -C (CRITICAL THINKING QUESTIONS)

1.	Translate the following MASKS in slash notation (/n).
	  a) 255.0.0.0
	  b) 255.255.224.0
	  c) 255.255.255.0
	  d) 255.255.240.0
		Understand	7

2.	Identify the class of the following IP addresses.
	  a) 237.14.2.1
	  b) 208..35.54.12
	  c) 129.14.6.8
	  d) 114.34.2.8
		Understand	7

3.	A router with IPV4 address 123.45.21.12 and Ethernet physical address 23:45: BA: 00:67: CD has received a packet for a host destination with IP address 124.10.78.10.Identify the entries in the ARP request packet sent by the router. Assume no sub-netting.	Understand	8
4.	An IPV4 datagram arrives with fragmentation offset of 0 and an M bit (more fragment bit) of 0.Identify is this a first fragment middle fragment or last fragment.	Understand	8
5.	An IPV4 fragment has arrived with an offset value of 100.Describe how many bytes of the data were originally sent by the source before the data in this fragment.	Understand	8

UNIT – V **The Internet Transport Protocols, Application Layer**

PART-A (SHORT ANSWER QUESTIONS)

S. No	Questions	Blooms Taxonomy Level	Course Outcome
1.	What is Internet Transport Protocol.	Understand	10
2.	Define UDP with neat sketch.	Remember	10
3.	List and explain the functions of Transport layer.	Remember	10
4.	State advantages of stateless server of HTTP.	Remember	10
5.	Draw the TCP segment format.	Remember	10
6.	Define TCP Protocol with neat sketch.	Remember	10
7.	Describe about TELNET.	Understand	10
8.	Differentiate between FTP & HTTP.	Understand	10
9.	Define TCP segment Header.	Understand	10
10.	Write the application layer paradigms.	Understand	10
11.	What is Sliding Window Protocol.	Understand	10
12.	Define DNS Name Space.	Understand	10
13.	List the advantages of Email.	Remember	10
14.	Define SMTP Protocol.	Remember	10
15.	Write the concept of Telnet.	Understand	9
16.	Define FTP Protocol.	Remember	5
17.	What is MIME Protocol.	Understand	10
18.	Discuss the use of MIME Extension.	Understand	10
19.	Define WWW Protocol with neat sketch.	Understand	6
20.	Define Lossy Compression and Lossless Compression.	Remember	9
21.	List two applications of Application Layer.	Remember	9

PART-B (LONG ANSWER QUESTIONS)

1.	List different Data types used for Presentation formatting.	Remember	10
2.	Explain two methods of HTTP.	Remember	10
3.	Define Big-endian format and little-endian format.	Remember	10
4.	Describe the role of the local name server and the authoritative name server in DNS.	Understand	10
5.	Define Domain Name Service (DNS) and explain in detail about the domain hierarchy and name servers.	Remember	10

6.	Explain in detail about the working principles of Simple Network Management Protocol (SNMP).	Understand	10
7.	Discuss how the Simple Mail Transfer Protocol (SMTP) is useful in electronic mail.	Understand	10
8.	Describe in detail about the World Wide Web (WWW).	Understand	10
9.	Explain the working principle of FTP in detail with neat diagram.	Understand	10
10.	Explain the WWW in detail and draw with neat sketch.	Understand	10
11.	Differentiate between ARP and RARP and draw the neat sketch.	Understand	10
12.	Explain the specific purposes of the DNS, HTTP, SMB, and SMTP/POP application layer protocols.	Understand	10
13.	Compare and contrast client/server with peer-to-peer data transfer over networks.	Remember	10
14.	Explain three domains of the Domain Name Space.	Understand	10
PART -C (CRITICAL THINKING QUESTIONS)			
1.	A client uses UDP to send data to a server. The data are 15 bytes. Report the efficiency of this transmission at the UDP level (ratio of useful bytes to total bytes).	Understand	9
2.	A TCP connection is using a window size of 12000 bytes and the previous acknowledgement number was 22001.It receives a segment with acknowledgment number 24001 and window size advertisement of 12000. Sketch a diagram to show the situation of the window before and after.	Remember	9

3.	Recognize which of the following is an FQDN and which is a PQDN.
	    a) mil
	    b) edu
	    c) xxx.yyy.net
	    d) zzz.yyy.xxx.edu
		Understand	9

4.	Interpret the following sequences of characters (In Hexadecimals) received by a TELNET client or server.
	    a) FFFB01
	    b) FFFE01
	    c) FFF4
	    d) FFF9
		Remember	9

5.	Identify the sequence of bits sent from a client TELNET for the binary transmission of 11110011 00111100 11111111	Understand	9

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