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Enrolment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, May 2019

Course: Data Communication and Computer Networks

Program: B.Tech. (CSE, IBM All Branches)

Semester: IV

Time 03 hrs.

Course Code: CSEG 2009 Max. Marks: 100

Instructions:

1. Section A - 20 marks (Attempt All 5 Questions in this Section. Each question carries 4 marks)

2. Section B - 40 marks (Attempt All 4 questions. Each question carries 10 marks)

3. Section C - 40 marks (Attempt All 2 question. Each question carries 10 marks)

SECTION A

S. No.		Marks	CO
Q 1	Enlist the scenarios where unguided communication media are preferred over guided media. Explain TWO advantages and TWO disadvantages of coaxial cable for communication.	2+2	CO1
Q 2	Differentiate the two protocols at transport layer TCP and UDP on various parameters.	4	CO5
Q 3	Compare and contrast various switching techniques?	4	CO2
Q 4	Describe the significance of error detection and error correction mechanisms employed at data link layer. Enlist different mechanisms under both categories.	1+1+2	CO3
Q 5	As you are an administrator of a network company, you are allotted a network address 192.10.1.0. There are 3 Departments Sales with 110 users, Purchase with 55 users and Management with 12 users. You need to create subnets for all these departments. Allocate valid IP addresses to all users.	4	CO4
	SECTION B		
Q 6	Explain IPV-4 header format with suitable diagram, explicitly explaining all the fields and their relevance.	10	CO4
Q 7	 a) Why routing is important in communication and which layer is responsible for routing in OSI model? With a suitable example explain Link State Routing algorithm. b) Discuss the disadvantages of Distance Vector Routing algorithm. Consider the given topology (Fig. a) and the vectors received by router J from its neighbors. 	4+6	CO4
	Based on this information calculate the new routing table of J. Show the detailed calculations.		

	Router A		
Q 8	Compare and contrast three IEEE standards 802.3, 802.4 and 802.5.	10	CO3
Q 9	a) What do you understand with Domain Name System (DNS)?b) Name the different types of network topologies and brief their advantages?c) What is Piggybacking? For what purpose it is used and how is it helpful?	3+4+3	CO6 CO1 CO3
	SECTION-C		
Q 10	 a) Write down the FOUR functions of Application layer. b) Explain steps involved during connection establishment and connection termination in detail in TCP connection management with suitable diagram. OR a) Explain FTP with suitable diagram. b) How window management takes place in TCP through which flow control is achieved. Explain with the help of following scenario: A TCP connection is using a window size of 1000 B and the previous acknowledgment number was 22,001. It receives a segment with acknowledgment number 24,001. Draw a diagram to show the situation of the window after and before the acknowledgment is received. If the window size is changed to 11000 B and 9000 B separately then what will be the situation. (you may take different scenario on your own but will lose 2 marks) 	5+15	CO5, CO6
Q 11	Write short notes on the followings: a) HTTP b) OSPF vs BGP c) TDM vs FDM d) SNMP	20	CO6, CO3, CO4

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- 2. Section B 40 marks (Attempt All 4 questions. Each question carries 10 marks)
- 3. Section C 40 marks (Attempt All 2 question. Each question carries 10 marks)

	SECTION A		
S. No.		Marks	CO
Q 1	We need to send 265 kbps over a noiseless channel with a bandwidth of 20 kHz. How many signal levels do we need?	4	CO1
Q 2	Give the format for UDP datagram and explain each field with function.	4	CO5
Q 3	Draw OSI layer architecture of computer networks. Place following concepts into correct layers of ISO-OSI reference model and justify your answer: a) Forming a modem connection b) Responsibility of delivery between adjacent nodes c) Reliable process to process data transportation	4	CO2
Q 4	To share the same communication media among various users is termed as channel allocation problem. Which layer in the architecture of networks is responsible for this function? Classify various channel allocation schemes with brief of each of them.	4	CO3
Q 5	What is the problem of synchronization in communication? Draw Manchester and Differential Manchester Encoding of the bit stream 110100011001	4	CO3
	SECTION B		
Q 6	What is multiplexing? Explain its types and advantages in communication.	10	CO5
Q 7	Explain inter-networking connecting devices in reference to OSI layers. OR	10	CO4
	Explains the drawbacks of distance vector routing scheme. Consider the given topology (Fig. a) and the vectors received by router J from its neighbors. Based on this information calculate the new routing table of J. Show the detailed calculations.		

	Router A		
Q 8	What is the problem in Go-Back-N protocol? How it can be solved, justify your answer.	10	CO3
Q 9	What is classful addressing? A Class 'C' network address 205.16.37.0 has been granted to an organization. This organization requires 6 subnetworks within it. Design the subnets and give the range of each subnetwork addresses. All calculations are required to be shown in detail.	2+8	CO4
	SECTION-C		
Q 10	 a) Draw and explain HDLC frame format and all fields therein. b) Explain TCP header format with suitable diagram. Write the functions/purpose of each field therein. OR a) Write a brief note on checksum and Hamming Code in reference to error correction and detection. b) How window management takes place in TCP through which flow control is achieved. Explain with the help of following scenario: A TCP connection is using a window size of 1000 B and the previous acknowledgment number was 22,001. It receives a segment with acknowledgment number 24,001. Draw a diagram to show the situation of the window after and before the acknowledgment is received. If the window size is changed to 11000 B and 9000 B separately then what will be the situation. (you may take different scenario on your own but will lose 2 marks) 	8+12	CO3, CO5
Q 11	Write short notes on the following: (i) TCP/IP reference model (ii) FDDI (iii) SNMP (iv) DNS	20	CO2, CO6

Name:

Enrollment No:



UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, July 2020

Course: Data Communication & Computer Networks

Program: B.Tech-CSE+MAD
Course Code: CSEG 2009

Max. Marks: 100

Semester: IV

Time: 03 hrs.

Instructions: Attempt all the questions.

	SECTION A	
S.No.		Marks
Q 1	List down the factors which determine whether a communication system is a LAN or a WAN.	5
Q 2	How do the layers of TCP/IP protocol suite correlate to that of OSI model?	5
Q 3	State the difference between the byte-stuffing and bit-stuffing. Which one of these two is more popular?	5
Q 4	State the difference between classful and classless addressing in IPv4.	5
Q 5	Discriminate between the direct and indirect delivery of packets.	5
Q 6	Compute the value of receiver window for a host named 'Abhigyan' if the receiver, a host named 'Shivam' has a buffer size of 10000 bytes and 2500 bytes of received an unprocessed data.	5
	SECTION B	
Q 7	A network that employs CSMA/CD has a bandwidth of 10 Mbps. If the maximum propagation time is 256e-7 sec, what is the minimum size of frame? Explain why collision is an issue in a random access protocol but not in controlled access protocol and channelization protocol.	10
Q 8	Provide at least one address for each of the category mentioned below: a) Unicast MAC address b) Multicast MAC address c) Multicast IPv4 address (Assume any class of your choice) d) Broadcast IPv4 address (Assume any class of your choice) e) Well Known Port Address Compute the transmittable codeword for a dataword 110110101010 by a system a) which has implemented Hamming Code for Error Detection b) which has implemented Checksum scheme for Error Detection with block sizes of 4-bits	10

Q 10	Compare the TCP header and the UDP header by listing the fields in the TCP header that are missing from UDP header. Give the reasons for their absence	10
Q 11	Attempt both the parts. a) State an advantage of a hierarchical name space over a at name space for a system with the scale of Internet. b) Which domain is used by your system/institution, generic or country?	10
	SECTION-C	
Q 12	Let you be the network administrator in a company. Assume that you are given a block of addresses starting with 196.186.24.128/25 and the company wants you to distribute the address blocks to 5 departments with each receiving at least 10 addresses. Determine the followings: a) Network address for each department b) range of valid addresses for each department	20

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES End Semester Examination, May 2022

Semester: IV

Time: 03 hrs.

Course: Data Communication & Computer Networks

Program: B. Tech CSE (All Specializations)

Course Code: CSEG 2009 Max. Marks: 100

	SECTION A		
S. No.		Marks	CO
Q 1	Determine the total number of links needed for an N node connected as mesh topology, star topology, ring topology, and bus topology.	4	CO1
Q 2	If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?	4	CO4
Q 3	Compare space-division and time-division switches.	4	CO1
Q 4	What is the propagation time if the distance between the two points is 12,000 km? Assume the propagation speed to be 2.4×108 m/s in the cable.	4	CO1
Q 5	List four differences between distance vector routing and link-state routing.	4	CO3
	SECTION B		
Q 6	Explain the following terms in the Go-Back-N ARQ protocol using a flow diagram: a) Sequence Numbers b) Sender's and Receiver's window size c) Timers d) Acknowledgement	10	CO2
Q 7	Compare and contrast CSMA/CD with CSMA/CA.	10	CO2
Q 8	Explain the OSI layer in detail with a suitable diagram with the functions of each layer.	10	CO1
Q 9	A 12-bit Hamming code whose hexadecimal value is 0xE4F arrives at a receiver. What was the original value in hexadecimal? Assume that not more than 1 bit is in error. OR Given the data word 1010011110 and the divisor 10111, a) Show the generation of the codeword at the sender site (using binary division). b) Show the checking of the codeword at the receiver site (assume no error).	10	CO2
	SECTION-C		
Q 10	We have a big single network having IP Address 200.1.2.0/24. We want to do subnetting and divide this network into 4 subnets. Identify the following: a) IP Address of each subnets, b) Total number of IP Addresses in each subnet, c) Total number of hosts that can be configured in each subnet, d) Range of IP Addresses in each subnet, e) Broadcast Address in each subnet.	20	CO3
Q 11	Write short notes on:		CO4

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End Semester Examination, May 2023

Course: Data Communication and Computer Networks

Semester: IV Program: B.Tech CSE Time: 03 hrs. Course Code: CSEG 2009 Max. Marks: 100

Instructions:

SECTION A (5Ox4M=20Marks)

	(5Qx4M=20Marks)		
S. No.		Marks	CO
Q 1	If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer?	4	CO1
Q 2	Consider the same noiseless channel transmitting a signal with four signal levels (for each level, we send 2 bits). Calculate the maximum bit rate.	4	CO1
Q 3	Suppose a computer sends a packet at the network layer to another computer somewhere in the Internet. The logical destination address of the packet is corrupted. What happens to the packet? How can the source computer be informed of the situation?	4	CO2
Q 4	What is the congestion control mechanism in TCP? Explain with a suitable diagram.	4	CO4
Q 5	Explain the concept and need for supernet in the network with example.	4	CO3
	SECTION B		
	(4Qx10M=40 Marks)		
Q 6	Consider the given topology (Fig. a) and the vectors received by router J from its neighbors. Based on this information calculate the new routing table of J. Show the detailed calculations.	10	CO3

	Router A 0 24 20 21 28 36 31 28 39 39 39 39 39 39 39 39 39 39 39 39 39			
Q 7	Explain the TCP/IP protocol suite in detail with a suitable diagram with the functions of each layer.	10	CO1	
Q 8	Write short notes on: a. HTTP b. FTP c. SNMP d. DNS	10	CO4	
Q 9	A sloted ALOHA network transmits 200 bit frames using shared channel with a 200 kbps bandwidth. Find the throughput if the system (all station together) produces 250 frames per second.	10	CO2	
Q 10	Encode a binary word 11001 into the even parity hamming code.	10	CO2	
SECTION-C (2Qx20M=40 Marks)				
Q 11	An Internet Service Provider (ISP) has the following chunk of CIDR-based IP addresses available with it: 245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Find the first and last address of each Organization including the unallocated address. Also, calculate the subnet mask and broadcast address of each organization.	20	соз	
Q 12	A TCP connection is using a window size of 1000 B and the previous acknowledgment number was 22,001. It receives a segment with acknowledgment number 24,001. Draw a diagram to show the situation of the window after and before the acknowledgment is received. If the window size is changed to 11000 B and 9000 B separately then what will be the situation.	20	CO4	
	OR			

The following is part of a TCP header dump (contents) in hexadecimal format.	
E293 0017 00000001 00000000 5002 07FF	
a. What is the source port number?	
b. What is the sequence number?	
c. What is the acknowledgment number?	
d. What is the length of the header?	
e. What is the window size?	