Question Paper

Exam Date & Time: 06-Jan-2024 (02:30 PM - 05:30 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

V SEMESTER B.TECH (COMPUTER COMMUNICATION ENGINEERING)

MAKEUP EXAMINATIONS, JANUARY 2024

NETWORK PROGRAMMING AND ADVANCED COMMUNICATION NETWORKS [ICT 3173]

Duration: 180 mins.

Descriptive

Answer all the questions.

Marks: 50

Missing data may be suitably assumed

1A)	Illustrate the workings of Socket System Calls for a connection-less protocol, incorporating a timeline diagram to demonstrate key stages. Explain the significance of each step in facilitating communication within this protocol.	(5)
1B)	List and explain different IPv4 socket options with syntax.	(3)
1C)	Distinguish the major differences between write() and writev().Write a packet that contains multiple separate data elements which are "03", "17" and "Network Programming".	(2)
2A)	Consider a scenario where jobs follow the Poisson process, arriving at an inspection station with a mean rate of 2 per hour. These jobs are inspected one at a time on a First-In-First-Out (FIFO) basis by the quality control engineer, who also performs minor adjustments. The total service time for each job follows an Exponential Distribution (ED) with a mean of 25 minutes. Jobs that arrive but cannot be immediately inspected by the engineer are stored until the engineer is available. Each job requires 1 square meter of space. Determine:	(5)
	i. The length of the waiting line.ii. The waiting time for a job.iii. The percentage of idle time for the engineer.iv. The floor space needed in the quality control room.	
2B)	Demonstrate the operation of the leaky bucket algorithm using a flowchart and proper explanations.	(3)
2C)	Define the type of the following destination addresses with proper explanations:	(2)
	i. 4A:30:10:21:10:1A	
	ii. 47:20:1B:2E:08:EE	
3A)	Consider a client is sending message " Computer Networks " to the server. Here, client sends with exactly 200ms delay between each character and RTT is 500ms. The server sends back the echo along with the ACK for each character sent by the client. Calculate and compare the total time taken in this communication for TCP_NODELAY enable and disable. Discuss Nagle algorithm to prove that it reduces the number of packets communicated in a communication.	(5)
3B)	Suppose a computer on a 10 MBPS network is governed by a token bucket. The token bucket is	(3)

replenished at a rate of 2 MBPS and has an initial capacity of 16 megabits. Determine the maximum duration for which the computer can transmit data at the full 10 MBPS speed.

- 3C) Define Fast Ethernet and outline its characteristics for both two-wire and four-wire implementations. (2)
- 4A) Illustrate the major problems of multicast on a wide area network and its solutions. (5)
- 4B) Illustrate the concept of VC merging with suitable block diagrams.
- 4C) How does IGMP help in managing the multicast group? Explain the IGMP message exchange for (2) joining and leaving a group.
- 5A) Compute the size of hostent structure for the following scenario and write the pseudocode for (5) initializing the same to the hostent structure. Consider your subject name with subject code as a canonical name and the IP address is 120.10.10.10, and it has an alias name i.e. computer.net (131.21.34.42).
- 5B) Identify the key differences of IP packet in MPLS network compared to normal network and explain (3) the importance of Label Switch Path (LSP) in MPLS network.
- 5C) Compute the ethernet multicast physical address from the given multicast IP address 230.43.14.7. (2)

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(3)