Question Paper

Exam Date & Time: 22-Nov-2022 (09:00 AM - 12:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

DEPARTMENT OF INFORMATION AND COMMUNICATION TECHNOLOGY

V SEMESTER B.TECH. (COMPUTER & COMMUNICATION ENGINEERING)

END SEMESTER EXAMINATIONS, NOVEMBER 2022

NETWORK PROGRAMMING AND ADVANCED COMMUNICATION NETWORKS [ICT 3173]

Marks: 50 **Duration: 180 mins.**

Descriptive Questions

Answer all the questions. Section Duration: 180 mins

Missing data, if any, may be suitably assumed.

1) Multiprotocol label switching uses the best principles of routing and switching. Exemplify the same by illustrating its working principle with relevant diagrams and protocols. (5)

A)

B) Illustrate the architecture of the IP signalling protocol used for Integrated Service models. (3)

C) Write the structure of the socket functions with appropriate syntax for the following operations. (2)

a. Returns name of the service running on a given port number

b. Performs a DNS query for an A record or a AAAA record. This helps in returning IPv4 mapped IPv6 address facilitating interoperability.

2) A) Write the appropriate server-side socket program for connection-oriented service to demonstrate the following scenario. Consider a private IP address and a port number (here consider the last 4 digits of your phone number) for server connectivity. The server performs the following operations: (5)

a. Displays the maximum segment size of the connection.

b. Sets the maximum retransmit time as 10 min.

c. The client sends the input string to the server. The task of the server is to delete a minimum number of characters from the string so that the resulting string is a palindrome.

Note: The order of characters should be maintained.

Example :

Input : aebcbda

Output : 2

Remove characters 'e' and 'd'.

Resultant string will be 'abcba' which is a palindromic string.

B) A typical UNIX system has the following problems: (3)

a. All the daemons contain nearly identical startup code.

b. Each daemon takes a slot in the process table, but they are asleep most of the time.

With the help of a neat schematic representation, explain how inetd (internet service daemon) simplifies the daemon writing process.

C) Illustrate how traffic conditioning is enabled in edge routers of Differentiated Service Model. (2)

3) A) Demonstrate the working principle of multicast communication in UDP datagram socket with a neat diagram. Assume that the multicast address for client-server communication is 224.0.1.1. Write the suitable snippets and address structures to illustrate the major socket options that enable the multicast communication. (5)

B) Assume that power of light beam launched to the optical fiber cable is 3mW (4.7dBm). The photodetector at receiver side receives the minimum power of -45dBm at the data rate of 1Gbps and bit error rate is 10^{-12} with attenuation of optical fiber is 0.35dB/Km. The responsivity of the photodetector is 0.58 A/W, dispersion limit is 0.2, and pulse speed is less than T/4. (3)

a. Compute the maximum usable length of an optical fiber.

b. Calculate the average signal energy per bit.

c. Find the bandwidth-distance product.

C) Write the characteristics of optical fiber cable which enhances the data rate when compared to copper cable. (2)

4) A) How do the two hosts communicate with each other if they are using different byte-ordering to store the data in memory? Explain the same with relevant system calls, and illustrate the working process of concurrent server. (5)

B) Differentiate between Infiniband and Ethernet network. (minimum 6 features) (3)

C) A fiber optical cable with the length of 600m has Pt = 13μW and Pr = 9μW. Find loss in dB/Km (2)

5) A) Develop a neat sketch of client-server communication using socket functions for connection-oriented services and write the differences in six exec functions. (5)

B) Write a brief note on *Value-Result Arguments* of socket address structure. (3)

C) Differentiate the second generation optical fibre with third generation optical fibre. (Minimum 4 features) (2)

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