Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 40928

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2024.

Fourth/Fifth Semester

Computer Science and Engineering

CS 3591 – COMPUTER NETWORKS

(Common to : Computer Science and Engineering (Cyber Security)/
Computer and Communication Engineering/Artificial Intelligence and
Data Science/Information Technology)

(Regulations 2021)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the features of layered architecture in networks.

2. Mention the scenarios in which stream and datagram sockets are utilized.

3. Compare DECbit with RED.

4. How does QoS ensure the prioritization of specific types of traffic on a network?

5. Write the advantages of packet switching.

6. Why do we need subnetting?

7. What does PIM do to overcome the limitations of DVMRP?

8. What are the strengths and weaknesses of distance vector routing?

9. Compare HDLC and PPP protocols.

10. What are the various types of Ethernet frames?

PART B — (5 × 13 = 65 marks)

11. (a) (i) Describe the steps involved in establishing a connection between a client and a server using stream sockets. (8)

       (ii) How do POP3 and IMAP handle email synchronization across multiple devices? (5)

Or

(b) (i) How does SNMPv3 address security concerns compared to earlier versions, and what authentication and encryption mechanisms does it support? (6)

       (ii) Explore the challenges and limitations of FTP in modern network environments. (7)

12. (a) (i) How does SCTP differ from TCP and UDP? (6)

       (ii) Discuss the mechanisms used in TCP for flow control and congestion control, and how they contribute to reliable data transmission. (7)

Or

(b) (i) Discuss the challenges and limitations of QoS implementation in heterogeneous network environments, and potential solutions to address these challenges. (6)

       (ii) How does DECbit enhance congestion control in network communication? (7)

13. (a) (i) Explain the differences between IPv4 and IPv6. (6)

       (ii) How does ICMP facilitate error reporting and feedback in IP networks? Give examples of common error messages generated by ICMP. (7)

Or

(b) (i) How does subnetting help in optimizing the allocation of IP addresses within a network? Provide examples to illustrate subnetting. (8)

       (ii) Find the subnetwork address for the following (5)

IP address: 142.34.21.45 Mask :255.255.218.0

14. (a) (i) Discuss the scalability and convergence properties of link state routing protocols compared to distance vector routing protocols. (7)

   (ii) Describe the basic operation of RIP in terms of how it exchanges routing information between routers. (6)

Or

   (b) (i) Describe the fundamental operation of BGP in exchanging routing information between autonomous systems. (7)

   (ii) Explain how DVMRP routers exchange multicast routing information and update their multicast forwarding tables. (6)

15. (a) (i) Discuss different framing techniques used in data communication. (6)

   (ii) Compare and contrast the methods of flow control mechanisms in data link layer. (7)

Or

   (b) (i) Describe the basic operation of the 802.11 MAC layer and how it handles medium access in wireless networks. (7)

   (ii) Explain the factors that affect the performance of a network. (6)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Develop a LAN infrastructure for a college campus accommodating four departments, each comprising 100 computers distributed across four rooms, each containing 25 computers. Provide rationale for the choice of networking devices and IP address allocation. (10)

   (ii) Calculate the number of hosts and subnets corresponding to the address 122.111.69.10/16. (5)

Or

   (b) (i) Determine the Hamming code for the binary sequence 1001001. Explain how you would detect errors if the receiver received the data bit as 1001011. (6)

   (ii) Given the message M=1111110101010101010 and divisor 110011, calculate the CRC for this message. If the 6th bit of the message changes on the receiver side, determine the resulting remainder value. (9)

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