Roll No. .....

PAPER ID—11132

B.Tech. EXAMINATION, 2025

(Fifth Semester)

COMPUTER NETWORKS

Time : 3 *Hours* *Maximum Marks* : 70

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. **1** is compulsory. All questions carry equal marks.

1. (a) Define data communication and its key components.

(b) What are the various Ethernet standards ?

(c) What is MAC addressing and why is it important ?

(d) What is piggybacking in sliding window protocol ?

(e) Define a gateway. How does it differ from a router ?

(f) What are the different security goals ?

(g) What is Denial of Service attack ?

7×2=14

Unit I

2. (a) What is a Computer Network ? Explain different types of networks and mention their characteristics and applications. 7

(b) What is the need of multiplexing ? Discuss FDM, TDM, WDM and SDM techniques with diagrams, applications, advantages and limitations. 7

3. (a) Compare packet switching, message switching, and circuit switching. Discuss their effect on network performance, latency and throughput with examples. 7

(b) Explain the TCP/IP model layers and their functions and various protocols at each layer and their use. 7

Unit II

4. (a) What is CSMA/CD ? Explain its working with a neat diagram. What is the difference between 1-persistent, non-persistent and p-persistent CSMA ? 7

(b) A Go-Back-N ARQ protocol uses a window size of 4. Draw a timeline diagram showing the transmission of 8 frames, assuming frame 3 is lost. Explain how retransmission occurs. How selective repeat does differ from Go-Back-N ARQ ? 7

5. (a) Describe the working of ARP and RARP. Why are they needed along with the IP protocol ? 7

(b) An organization is granted the block 16.0.0.0/8. The administrator wants to create 500 fixed-length subnets : 7

(i) Find the subnet mask.

(ii) Find the number of addresses in each subnet.

(iii) Find the first and the last address in the first subnet.

Unit III

6. (a) Explain the concept of routing in networks. What is the need, goals and challenges of routing ? Explain, how a router determines the best path for packet delivery ? 7

(b) Explain the structure of an UDP segment. What are the advantages and limitations of using UDP ? Discuss the application areas of UDP. 7

7. (a) Using a suitable sequence diagram, explain the connection establishment and termination process of TCP. 7

(b) Describe hierarchical routing. How does dividing a network into regions improve scalability and reduce routing table size ? Explain with example. 7

Unit IV

8. (a) What is the importance of Quality of Service (QoS) in networks ? What are the key QoS parameters ? Explain giving examples of applications sensitive to each. 7

(b) How does HTTP works ? What role does DNS has in the working of HTTP ? Describe the packet format for different HTTP messages. 7

9. Write short notes on the following : **2×7=14**

(a) Security attacks on networks

(b) Types of firewalls.

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