QP Code:CS2T03-1 **(Pages: 3)**

Reg No : ..... Name : .....

MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Govt. Aided Autonomous Institution)

Third Semester B.Tech. Degree (SAY) Examination, February, 2026

Course Code: B24CS2T03

Course Name: COMPUTER NETWORKS

Max. Marks: 100 Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)

Answer all questions

1. Differentiate between network hardware and network software with one example each.
2. Mention any two services provided by the Application Layer.
3. Consider the data 1001001 with even parity. What will be the transmitted code word using parity check?
4. What is the basic working principle of the Stop-and-Wait protocol?
5. Write the default subnet mask of Class C IP address.Describe why Class D addresses cannot be assigned to hosts.
6. Define IPv6 addressing and state its size in bits.
7. What is the three-way handshake in TCP? Why is it required?.
8. What are the different types of ports in the transport layer?
9. Why is the application layer called the "user interface" to the network?
10. Mention any two functions of SMTP.

PART - B: 70 Marks (5 Qns x 14 Marks)

Answer any One full question from each module.

Module 1

11. (a) Explain coaxial cable as a transmission medium with applications. (4 Marks)

(b) Differentiate between OSI and TCP/IP reference models with supporting architectures. (10 Marks)

OR

12. (a) Explain Manchester and Differential Manchester encoding with diagrams. (8 Marks)

(b) Encode the bit stream 1100110 using Differential Manchester encoding. (6 Marks)

Module 2

13. Draw the frame format of IEEE 802.3 and IEEE 802.11 and explain each field.

OR

14. Explain in detail the various Medium Access Control methods used in Data Link layer.

Module 3

15. (a)Differentiate between interior gateway protocols like OSPF and exterior gateway protocols like BGP, focusing on scalability and policy-based routing. (7 Marks)

(b)In a network with 5 routers, apply the RIP protocol to compute the routing table for one router assuming hop-count metric and given link costs. Show the steps for one update cycle. (7 Marks)

OR

16. Describe the Token Bucket algorithm for congestion control in detail. Using an example with token generation rate = 5 tokens/sec and bucket size = 10, demonstrate step by step procedure to trace how packets arriving at different times. Compare its effectiveness with the Leaky Bucket algorithm in terms of flexibility and burst handling.

Module 4

17. (a)Explain how TCP uses the congestion window (cwnd) and Slow Start threshold (ssthresh) to manage network congestion. Describe their interaction during packet loss events and their role in balancing throughput and fairness. (7 Marks)

(b)Explain the Fast Retransmit and Fast Recovery mechanisms in TCP congestion control. Discuss how they detect and respond to packet loss, and why they improve performance compared to timeout-based recovery.

(7 Marks)

OR

18. A TCP sender observes packet loss due to congestion. Describe the detail of understanding Congestion Detection and Congestion Avoidance to explain step by step how the sender adjusts its congestion window in the following two cases: (i) when loss is detected by timeout, and (ii) when loss is detected by duplicate ACKs. Use diagrams to show the difference in congestion window growth before and after the loss event.

Module 5

19. Discuss the features, advantages, and limitations of FTP. How does FTP ensure reliable file transfer?

OR

20. Explain different types of cybersecurity attacks such as phishing, denial of service (DoS), malware, and man-in-the-middle attacks, with supporting examples.

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