# COMSATS University Islamabad, Dhamtour Campus
## Department of Computer Science
### Final -Term Examination (Fall 2024)

Class: SE 3A & CS-4B
Subject: Computer Networks
Total Time Allowed: 03 Hours
Time: 9:30 - 12:30

Date: 23rd Jan, 2025
Instructor: Ayesha Irshad
Max Marks: 50 Marks
**Reg. #** Sp23-BCS-077

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**Q1. a)** Explain the main security services defined by the OSI Security Architecture and their significance in ensuring secure communication. **(CLO-1 Marks:5)**

**b)** Discuss different types of transmission impairments and their impact on data transmission. **(CLO-1 Marks:5)**

**Q2. a)** Calculate the throughput efficiency of the protocol. Consider a 20 Gbps link with a propagation delay of 80 ms. A packet of 6000 bytes is transmitted using a reliable data transfer protocol (RDT 3.0), ensuring acknowledgment for each packet. Assume the protocol employs stop-and-wait behavior. **(CLO-2 Marks:5)**

**b)** Illustrate the Finite State Machine (FSM) for RDT 2.0, include all possible states, transitions, and events. **CLO-2 Marks:5)**

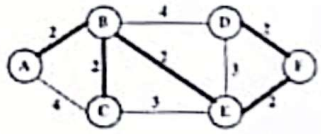
**Q3. a)** Outline the structure of a Transmission Control Protocol (TCP) segment. **(CLO-3 Marks:05)**

**b)** Differentiate the working of Go-Back N and selective repeat RDT protocols at the transport layer. **(CLO-3 Marks:05)**

**Q4.** Using the diagram provided, choose the optimized route from **Node A** to **Node F** using the Link-State Routing Protocol. **(CLO-4 Marks:10)**

**Instructions:**

- Use **Dijkstra's Algorithm** to compute the shortest path.
- Show the step-by-step process, including the following:
  - I. Initial distance table.
  - II. Updates to the table as each node is visited.
  - III. The final optimized route and its total cost.




**Q5. a)** What is the purpose of the Virtual Trunking Protocol (VTP) in a network? **(CLO-3 Marks:5)**

**b)** If the given frame is 1100111011 and the generative polynomial is x3+x+1 Calculate the checksum and actual transmitted frame by using the standard CRC method. **(CLO-4 Marks:5)**

**Best of Luck**

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