

M. E. Electronics & Telecommunication Engineering Examination 2025
(1st Year, 1st Semester)
Computer Communication Networks (COMM/COMP)

Time: Three hours

Full Marks: 100

Answer any five questions
All questions carry equal marks
Answer all the parts of a question in the same place

1. a) What do you mean by protocol and standard?
b) Briefly describe the functions of network layer and transport layer of OSI model.
c) For n devices in a network, what is the number of cable links required for a mesh, ring, bus, and star topology?
d) Using flow diagram explain the connection establishment phase and transfer of information frame through a noisy channel in HDLC protocol.
(3+5+2+10)

2. a) Why logical addresses are necessary for universal communication? What do you mean by mask? Write the drawbacks of classful addressing.
b) A block of addresses is granted to an organization and one of the addresses is 205.16.37.39/28. Find the first address, last address and number of addresses.
c) How FCS is generated? Calculate the CRC for 1101011011 using the generator 10011.
((2+2+3) + 5 + (2+6))

3. a) What are the reasons for poor channel utilization in ALOHA systems? How the same is improved in CSMA?
b) A pure ALOHA network transmits 500-bit frame on a shared channel of 500 kbps. Calculate the throughput if the system (all stations together) produces 500 frames per second. Also find the throughput if pure ALOHA protocol is replaced by slotted ALOHA.
c) Describe the working principle of CSMA/CD protocol using a flow diagram.
((3+3) + 4 + 10)

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4. a) What do you mean by congestion? Why congestion occurs in a computer network?
 b) Write the effects of congestion on network performance.
 c) Briefly describe different closed loop congestion control techniques.
 d) With a neat sketch explain the working principle of token bucket algorithm.
 (5+3+8+4)

5. a) What is flooding? Why flooding technique is not commonly used for routing?
 b) Briefly describe the working principle of hierarchical routing technique.
 c) What do you mean by home address and care-of address in case of routing for mobile host?
 d) Illustrate the routing procedure for mobile hosts.
 (4+7+3+6)

6. a) Describe the importance of cryptography in network security.
 b) Explain the working principle of Diffie Hellman key exchange protocol.
 c) User A and B use the Diffie Hellman key exchange protocol with a common prime $p = 71$ and a primitive root $\alpha = 7$. i) If user A has private key $X_A = 5$, what is A's public key? ii) If user B has private key $X_B = 12$, what is B's public key? iii) Calculate the shared secret key.
 d) Describe a scheme where confidentiality and authenticity can be provided simultaneously for a transmitted message.
 e) Write the applications of AES.
 (3+5+6+4+2)

7. a) Explain the features of TELNET.
 b) What do you mean by internetworking? Briefly describe the different techniques that are employed to improve QoS in internetworking.
 c) Write the working principle of OSPF (Open Shortest Path First) protocol.
 (5+7+8)