COMPUTER NETWORKS

- SECTION A: Short/Brief Questions

1. What are the applications of Computer Networks?
2. Explain differences between point-to-point and point-to-multipoint.
3. Define fixed and variable size framing.
4. Define delivery in Network Layer.
5. Define Token Bucket.
6. What are headers and trailers? How are they added and removed?
7. What is count-to-infinity problem?
8. What is time-to-live or packet lifetime?
9. What is the difference between network layer and transport layer delivery?
10. Define logical addressing.
11. Explain the role of registered ports.
12. Define datagrams in switching.
13. Write IP ranges of Class A, B, C, and D.
14. List three main functionalities of transport layer.
15. Define QoS (Quality of Service).
16. Explain HTTP. State the difference between HTTP and HTTPS.
17. Define RST flag in TCP header.
18. Define connection-less and connection-oriented services.
19. Write a note on round-trip time (RTT).
20. Define bit rate and baud rate.
21. What is ICMP? Mention its applications.
22. Describe piggybacking.
23. What is Telnet?
24. What are the advantages and disadvantages of mesh topology?
25. What is the use of bridges?
26. Describe the count-to-infinity problem with example.
27. Show error detection in 7-bit Hamming code.
28. Compare OSI and TCP/IP.
29. Explain transmission delay in flow control.

- SECTION B: Medium-Length Conceptual/Calculative

1. Define TCP/IP Model in detail.
2. Define IPv4 header format in detail.
3. Define TCP features and TCP header in detail.
4. Explain SNMP protocol in detail.
5. Define topology. Explain bus, star, and ring topologies with pros and cons.
6. List and explain transmission mediums.
7. Explain encoding types in the physical layer of OSI model.
8. Explain noisy channel protocols with diagrams.
9. Write about commands: ipconfig, netstat, ping, hostname, tracert.
10. Explain working of TCP and differentiate TCP and UDP with frame format.
11. Explain ICMP BGP protocol and application.
12. Define ARQ error control.
13. Explain CSMA/CD with CSMA/CA with diagrams.
14. Explain congestion control with labeled diagram.
15. Define and explain Go-Back-N and Selective Repeat protocols.
16. Discuss asymmetric cryptography. Explain RSA algorithm with example (character “F” or custom input).
17. Explain Quality-of-Service parameters.
18. List and explain four network devices and transmission impairment.
19. List and explain disadvantages of Stop-and-Wait protocol.
20. Discuss role of ICMP in network layer.

- SECTION C: Long Answer / Analytical / Problem-Solving

1. Describe all layers of OSI model with labelled diagram.
2. Differentiate between network topologies with diagrams.
3. Explain various network devices layer-wise on OSI model.
4. Define and compare LAN standards.
5. Explain random access protocols.
6. Describe interdomain and intradomain routing algorithms.
7. Explain three-way handshaking for connection management.
8. Describe cryptography and RSA algorithm with an example.
9. Explain IPv4 vs IPv6 differences.
10. Solve: CRC using polynomial (e.g., x3+x+1x^3 + x + 1x3+x+1) for data like 10011101, 110101, etc.
11. Explain error control in data link layer.
12. Divide given IP network (e.g., 200.1.2.0) into subnets.
13. Describe application and session layer functions in OSI model.
14. Explain DNS, FTP, SMTP, DNS, ARP, HTTP protocols.
15. Calculate total time for transmission (given data size, bandwidth, headers).
16. Sliding window: calculate window size and sequence number (given Tp, Tt).
17. Compare TCP and UDP in context of headers.
18. Calculate efficiency (ALOHA, Stop-and-Wait, etc.) or fault-based degradation.
19. Differentiate between BOOTP and DHCP.
20. Encode bitstreams using line coding schemes (Unipolar, NRZ-L, Manchester, etc.)
