Important Questions for Computer Networks (CS-602)

Unit I: Architecture & Physical Layer
- Compare and contrast the ISO/OSI reference model with the TCP/IP model.
- Explain connection-oriented vs. connectionless services with service primitives.
- Describe principles of the physical layer: bandwidth, data rate, and modulation techniques.

Unit II: Data Link Layer & MAC
- Differentiate 1-bit Sliding Window, Go-Back-N, and Selective Repeat protocols.
- Explain the Binary Exponential Back-off algorithm (Ethernet CSMA/CD).
- Compare ALOHA, Slotted ALOHA, CSMA/CD, and CSMA/CA.
- List IEEE 802.x standards and their purposes.

Unit III: Network Layer & Routing
- Illustrate Dijkstra's and Bellman-Ford algorithms with examples.
- Compare IPv4 and IPv6: header, addressing, and fragmentation.
- Explain IP fragmentation/reassembly and ICMP error reporting.
- Discuss hierarchical and multicast routing strategies.

Unit IV: Transport Layer
- Describe TCP connection management (three-way handshake, termination).
- Explain TCP congestion control: Slow Start, Congestion Avoidance, Fast Recovery.
- Compare UDP and TCP: reliability, flow control, and use cases.

Unit V: Application Layer & Security
- Explain HTTP, FTP, and DNS message formats.
- Outline SMTP with MIME and contrast with IMAP.
- Describe SNMP architecture and operations (GET, SET, TRAP).
- Discuss modern ciphers (AES) vs. traditional (Caesar/Vigenère), integrity vs. authentication.