Nirma University

Institute of Technology

Class Test, August 2021

B. Tech. in Computer Science and Engineering, Semester V

2CS502 Computer Networks

Time: 1 Hour 15 Minutes **Max. Marks: 35**

Instructions:

1. Attempt all questions.
2. Figures to the right indicate full marks.
3. Draw neat sketches wherever necessary.
4. Assume suitable data wherever necessary and specify them.
5. **Sub-questions of each of the main questions must be written together.**

Q.1 Write pseudo code of one-bit bidirectional sliding window protocol for error-free channel. The protocol should include flow control and piggybacking. Assume that the network layer does not always have packets for transmission. **[7]**

Q.2 Design a Local Area Network (LAN) supporting an online meeting application. Make design choices for the following along with the justification. **[12]**

i) Network Topology
ii) Communication Medium
iii) Encoding method
iv) Layers in the network architecture along with sub-layers, if any.
v) Functions of (Services and type of service provided by) each layer
vi) How different functions will be fulfilled at each layer? Choose a suitable method along with the justification for each of the functionality at each layer from available options.

Q.3 A system uses the Stop and Wait protocol. If each packet carries 1000 bits of data, how long does it take to send 1 million bits of data if the distance between the sender and receiver is 2500km and propagation speed is $2*10^8$ m? Ignore waiting and processing delays. We assume no data or control frame is damaged or lost. **[4]**

Q.4 In Go-Back-N sliding window protocol, the sender window size is 256 frames of 500 bits each, transmission speed is 5 kbps, the distance between the sender and receiver is 2.5 Km, the speed of signal propagation is 2 x 10^8 m/s, timeout interval is 1.2 x RTT. How many frames the sender will have to retransmit in the event of an erroneous frame? **[6]**

Q.5 Justify the use of packet switching instead of circuit switching in computer networks. **[3]**

Q.6 If the bandwidth of a line is 1 Mbps, round trip time is 30 ms, and packet size is 1000 bits then what will be the link utilization for the Stop and Wait protocol? **[3]**