Dr Priyanky

DA 6822

National Institute of Technology Hamirpur (H.P.) Computer Science & Engineering End Semester Examination

Branch/Semester: BTech (3rd Year) Subject code: CS-324 Subject Name: Computer Networks Date: 01/05/2023

Semester: 6th Duration: 180 Minutes Max Marks: 50 Time: 02:30 AM - 05:30 PM

Note: All questions are compulsory.

1. What is the maximum efficiency of pure aloha and slotted aloha? Justify your answer with

Consider the sliding window flow control protocol operating between a sender and a receiver over a full duplex error free link. Assume the following:

- The time taken for processing the data frame by the receiver is negligible.
- The time taken for processing the acknowledgment frame by the sender is negligible.
- The sender has infinite number of frames available for transmission.
- The size of data frame is 2000 bits and size of acknowledgement frame is 10 bits.
- The link data rate in each direction is 1 Mbps (= 10^6 bits per second)
- One way propagation delay of the link is 100 milliseconds.

What will be the minimum value of the sender's window size in terms of the number of frames (rounded to the nearest integer) needed to achieve a link utilization if 50%?

- 2. Consider a simplified time slotted MAC protocol, where each host always has data to send and transmits with probability p=0.2 in every slot. There is no backoff and one frame can be transmitted in one slot. If more than one host transmits in the same slot, then the transmissions are unsuccessful due to collision. What is the maximum number of hosts which this protocol can support, if each host has to be provided a minimum throughput of 0.16 frames per time slot? (7)
- 3. In an RSA cryptosystem, a particular A uses two prime numbers, 13 and 17, to generate the public and private keys. If the public of A is 35. What will be the private key of A? (7)
- 4. What is the difference between Dr Thomas convention and IEEE 802.3 convention in (7)Manchester encoding. Explain with example.
- 5. Every host in an IPV4 network has a 1-second resolution real-time clock with battery backup. Each host needs to generate up to 1000 unique identifiers per second. Assume that each host has a globally unique IPV4 address. Design a 50-bit globally unique ID for this purpose. After what (7)period (in seconds) will the identifiers generated by a host wrap around?
- 6. A sender uses the stop and wait ARQ protocol for reliable transmission of frames. Frames are of size 1000 bytes and the transmission rate of sender is 80 kbps. Size of an acknowledgement is 100 bytes and the transmission rate at receiver is 8 Kbps. The oneway propagation delay is 100 milliseconds. Assuming no frame is lost, what will be the (7)throughput of sender?

(8)

- 7. Describe the following:
- a) Remote procedure call
- b) Data compression Techniques