Dr Dharmendra Prasad Mahato 11/5/2023

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National Institute of Technology Hamirpur
Himachal Pradesh-177 005, India
End Semester Theory Examination (May 2023)
Department of Computer Science and Engineering

Degree Program: B.Tech
Course Title: Computer Networks
Date of Examination: 11-05-2023,
Teacher's name: Dr. D. P. Mahato
Course Code: CS-380
Student's name: _____

Class: 3^{rd} Year
Semester: 6^{th}
Session: E
Time duration: 3 hours (02.30 AM to 05.30 PM)
Total Marks: 50
Roll No: _____

General Instructions:

- **All the questions are compulsory.**

Q.1) (a) A 4000 km long trunk operates at 2 $Mbps$ and is used to transmit 64-$byte$ frames and uses sliding window protocol. If the propagation speed is 6 $\mu sec/km$, how many bits should the sequence number field be?

(b) A sliding window protocol is designed for a 2 $Mbps$ point-to-point link to the moon which has a one way latency (delay) of 2 sec. Assuming that each frame carries 2 KB of data, what is the minimum number of bits needed for the sequence number?

5+5=10 marks

Q.2) (a) A 20 $Kbps$ satellite link has a propagation delay of 400 ms. The transmitter employs the "go back n ARQ" scheme with n set to 10.

Assuming that each frame is 200 bytes long, what is the maximum data rate possible?

(b) A 2 $Mbps$ satellite link connects two ground stations. The altitude of the satellite is 36504 km and the speed of the signal is 3×108 m/sec. What should be the packet size for a channel utilization of 50% for a satellite link using go back 127 sliding window protocol?

5+5=10 marks

Q.3) (a) Consider a 128×103 $bits/sec$ satellited communication link with one way propagation delay of 100 $msec$. Selective Retransmission (repeat) protocol is used on this link to send data with a frame size of 2 KB. Neglect the transmission time of acknowledgment. What will be The minimum number of bits required for the sequence number field to achieve 100% utilization?

(b) Describe $HDLC$ protocol and PPP protocol with frame formats.

5+5=10 marks

Please turn over...

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Q.4) (a) Explain Classful and Classless Addressing System in IP Addressing.

(b) Suppose a network with IP Address 192.16.0.0. is divided into 2 subnets, find the number of hosts per subnet.

Also for the first subnet, find-

(a) Subnet Address
(b) First Host ID
(c) Last Host ID
(d) Broadcast Address

5+5=10 marks

Q.5) (a) Explain OSI reference model with neat diagram.

(b) Explain ALOHA.

5+5=10 marks
