Enrollment No._____

GANPAT UNIVERSITY

M. Tech Semester – II, Computer Engineering
Regular Examination –May-June, 2014
3CE205: Satellite Networking (Elective II)

Time: 3 Hours] **[Total Marks: 70**

Instructions:

1. Attempt all questions.
2. Figures to the right indicate full marks
3. Each section should be written in a separate answer book

SECTION-I

Q-1. **(A)** Explain the following equation and each term of the equation: **[5]**
$D = t_t + t_{up} + t_i + t_{down} + t_s + t_q$.
Calculate t_t to transmit an ATM cell at a 10 Mbps link.

(B) Describe the satcom system in brief. **[4]**

(C) Define BER. Discuss the relationship between PER and segment size. **[3]**

OR

Q-1. **(A)** Consider the chain topology: A ---- B ----- C ---- D ---- E---- F **[5]**

A is sending packets to F using a reliable transport protocol. Each link above can transmit one packet per second. There are no queues or other sources of delays at the nodes (except the transmission delay of course).

i. What is the RTT between A and F?
ii. What is the throughput of a stop-and-wait protocol at A in the absence of any losses at the nodes?
iii. If A decides to run a sliding window protocol, what is the optimum window size it must use? What is the throughput achieved when using this optimum window size?

(B) Describe the concept of VP, VC and TP in ATM **[4]**

(C) Describe the concept of time domain and frequency domain. **[3]**

Q-2. **(A)** Suppose host A is sending a large file to host B over a TCP connection. The two end hosts are 30 msec apart (60 msec RTT) connected by a 1 Gbps link. Assume that they are using a packet size of 1000 bytes to transmit the file. Also assume for simplicity that ACK packets are extremely small and can be ignored. **[5]**

i. At least how big would the window size (in packets) have to be for the channel utilization to be greater than 80%.
ii. Assuming infinite initial threshold, no losses and competing traffic, approximately how long (in seconds) would it take for the normal slow start mechanism to achieve 80% utilization?

(B) Explain GEO, MEO and LEO with respect to its coverage. **[4]**

(C) Differentiate the concept of multiplexing and multiple access. **[2]**

OR

Q-2. **(A)** Differentiate Synchronous & Asynchronous transfer mode. **[3]**

(B) Describe DVB over Satellite. **[4]**

(C) Explain the concept of IP over satellite **[4]**

Q-3. **Answer the following** **[12]**

(A) Suppose the distance between satellite earth station & earth receiver through GEO satellite is 36000 kms. Calculate the total time required to successfully transmit the segment of 1500 bytes on 100 Mbps link. Assume that ACK indicates the successful transmission of the segment.

(B) What do you mean by burst error? Discuss the impact of satellite burst errors on the ATM layer.

(C) Discuss the merits and demerits of satellite communication.

SECTION-II

Q-4. (A) Explain the TCP performance issues on the satellite link. [4]

(B) What are TCP variations? Explain New Reno in details. [6]

(C) Differentiate the flow control mechanism at data link layer and transport layer [2]

OR

Q-4. (A) Explain the differences between satellites with transparent and onboard switching techniques. Why satellites use the translators? [6]

(B) Differentiate Reno & New Reno in brief. Discuss the performance of both the flavor in presence of multiple losses. [6]

Q-5. (A) At time t, a TCP connection has a congestion window of 4000 bytes. The maximum segment size used by the connection is 1000 bytes. What is the congestion window after it sends out 4 packets and receives acks for all of them? Suppose there is one ack per packet. [5]

a. If the connection is in slow-start?

b. If the connection is in congestion avoidance phase?

(B) Discuss the concept of SACK. Explain the performance of TCP with SACK & without SACK. [4]

(C) Describe the issue of receiver reneging. [2]

OR

Q-5. (A) What is the need to design the TCP westwood? Discuss the performance issues of TCP westwood for satellite link. [4]

(B) Describe the mechanism of: MTU path discovery and large initial window. [4]

(C) A system uses the "stop – and – wait" ARQ protocol. If each packet carries 500 bits of data, how long does it take to send 1 million bits of data if the distance between the sender and receiver is 6000 km and the propagation speed is $2*10^8$ m? Ignore transmission, waiting, and processing delays. We assume no data or control frame is lost or damaged. [3]

Q-6. **Answer the following.**

(A) Describe the approach of TCP Hybla. What are the performance issues with TCP Hybla? [4]

(B) Explain the concept of Performance Enhancing Proxy. [4]

(C) Describe the concept of bottleneck link. How BDP of the link will affect the performance of transport layer protocol. [4]

END OF PAPER