Exam No: _____

GANPAT UNIVERSITY
M. TECH SEM- I (Information Technology) REGULAR EXAMINATION– NOV-DEC-2014
3IT101: Advanced Topics in Networks

MAX. TIME: 3 HRS

MAX. MARKS: 60

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1 A Consider the following chain topology: **(04)**

A ---- B ----- C ---- D

A is sending packets to D 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).

A. What is the RTT between A and D?
B. What is the throughput of a stop-and-wait protocol at A in the absence of any losses at the nodes?
C. 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?

Q.1 B How SACK can improve the performance? Explain with an example. **(04)**
Q.1 C Explain the concept of priorities in 802.11 **(02)**

OR

Q.1 A Describe TCP New Reno. **(04)**
Q.1 B Describe Hidden terminal & Exposed terminal problems. Discuss the solutions to it. **(04)**
Q.1 C A system uses the "stop – and – wait" ARQ protocol. If each packet carries 1500 bytes of data, how long does it take to send 1 MB 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. **(02)**

Q.2 A Describe the concept of Mobile IP **(04)**
Q.2 B Explain the issues of wireless networks that affect the performance of TCP. **(03)**
Q.2 C At time t, a TCP connection has a congestion window of 6000 bytes. The maximum segment size used by the connection is 1000 bytes. What is the congestion window after it sends out 6 packets and receives acks for all of them? Suppose there is one ack per packet. **(03)**
a. If the connection is in slow-start?
b. If the connection is in congestion avoidance phase?

OR

Q.2 A Explain Slow start, Congestion avoidance, Fast retransmission and Fast recovery mechanism of TCP. **(05)**
Q.2 B A cellular system uses FDMA with spectrum allocation of 12.5 MHz in each direction, a guard band at the edge of the allocated spectrum of 10 kHz and a channel bandwidth of 30 kHz. What is the number of available channels? **(03)**

Q.2 C Explain receiver reneging with an example **(02)**

Q.3 A Suppose there are 3 stations S1, S2 & S3 wants to send the packet of size 500 bytes, 1600 bytes & 1400 bytes at time 0, 110 & 250 µs respectively. Assume Slot Time of 20µs, SIFS Time of 10µs, RTS Threshold of 1300 bytes, Fragmentation Threshold of 2400 bytes and RTS, CTS & ACK of 100 bytes. Each station can Transmit 200 bytes per Slot Time. When does data transfer complete for all stations? Write any assumptions if required. (04)

Q.3 B Explain AODV with an example. (04)

Q.3 C Describe Path MTU discovery and TCP for transaction. (02)

SECTION: II

Q.4 A Describe GSM architecture in detail. **(05)**

Q.4 B Suppose in a cellular system total bandwidth available is 33 Mhz and need to allocate 25Khz in each direction per channel for the voice communication. Calculate the number of channels allocated per cell if we use 4 & 7 cell reuse pattern. Write your conclusion on the number of channels/cell. **(03)**

Q.4 C Differentiate wired and wireless networks. **(02)**

OR

Q.4 A Describe GPRS architecture in detail. **(05)**

Q.4 B Suppose in a cellular system total bandwidth available is 66 Mhz and need to allocate 50 Khz in each direction per channel for the voice communication. Calculate the number of channels allocated per cell if we use 7 & 12 cell reuse pattern. Write your conclusion on the number of channels/cell. **(03)**

Q.4 C Explain Error protection mechanism in GSM. **(02)**

Q.5 A Describe the proactive routing approach for MANET. Explain DSDV with an example. **(05)**

Q.5 B Consider two nodes, A and B. Suppose the network path from A to B has a bandwidth of 5 KBytes/s (5,000 bytes per second) and a propagation time of 120 ms. The path in the reverse direction, from B to A, has a bandwidth of 10 KBytes/s and a propagation time of 80 ms. Let data packets have a size (including all headers) of 500 bytes and acknowledgment packets a size of 100 bytes. Answer the following: **(05)**

a. Calculate the throughput A can achieve in transmitting to B using Stop-and-Wait. You can treat a 500-byte data packet as transferring 500 bytes of useful data.
b. Calculate the size of the window, in terms of number of data packets that A must use in order to transfer its data as fast as possible, if A instead uses Sliding Window.

OR

Q.5 A Describe the reactive routing approach for MANET. Explain DSR with an example. **(05)**

Q.5 B Calculate the total delay from first bit sent to last bit received for the following: **(05)**

A. Sender and receiver are separated by two 1-Gigabit/s links and a single switch. The packet size is 50000 bits, and each link introduces a propagation delay of 50 microseconds. Assume that the switch begins forwarding immediately after it has received the last bit of the packet and the queues are empty.
B. Same as (A) with three switches and four links.

Q.6 A Explain CSMA/CA with an example. **(04)**

Q.6 B Describe TCP's flow control mechanism using window size field of the TCP header. How Window size field lengths affect the performance of TCP? Suggest the solution for the same. **(04)**

Q.6 C Differentiate WLAN and Ad-hoc Networks **(02)**

----------END OF PAPER----------