**12th week Exam. Time: 1:30 Hour**

**(You can use the text book)**

**Answer the following questions**

(1) An ISP has a fixed part of its IP address given by:

11001000 00010111 0010000 (200.23.32.0/23)

1. Write down the subnet mask IP address of this subnet.
2. How many different IP's under this subnet? 2^9 🡪 512
3. If this ISP wants to divide its IP addresses to 4 institutions, explain how that will be done and what will be the IP subnet address of each one?

(2)

For a sender and receiver hosts A and B (packets from A, acknowledgements from B).

Assume the pipeline window size is **4**. **Show the time diagram** for a sequence of **5** packets for both the “**GBN**” and "**SR**" pipelining protocols in the following cases:

(a) First packet only is lost

(b) Acknowledgement of first packet is lost.

(Work until all the 5 packets have been delivered and Acknowledged **assuming no further problems occurred in the system** **after each case**).

(3) For a TCP congestion control system, answer the following questions. **In all cases, provide a short discussion justifying your answer and show the figure:**

(i) The system starts transmission with ConWin=1MSS, and stays for 5 rounds without loss,

**Sketch and explain the congestion control system behavior.**

(ii) At round 5, a 3 duplicate Ack occurred. Explain (and draw) what will happen until the CongWin reaches 32MSS (what will be the round number *T* in this case?)

(iii) Assume that a time out occurred at this time *T*, explain what will happen until

the CongWin reaches 32MSS again.