Q1. Please encircle the correct answer. [15 marks]

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| **Computer Networks** |
| **Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Roll No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |
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1. In a TCP connection, the size of cwnd is 3000 bytes and the size of rwnd is 4000. The host has sent 2000 bytes which has not been acknowledged now. How many more bytes the sender can be sent? [1point]
   1. 3000 b. 2000 c. 1000 d. 5000
2. The value of the rwnd variable is usually fixed at the start of a connection establishment stage and never change throughout the duration of the same connection. [1 point]
   1. True b. False
3. The typical default size of RcvBuffer in TCP set via socket options is
   1. 4096 bits b. 4096 bytes c. 0 bytes d. none
4. What will be the size of rwnd in TCP? If RcvBuffer is 5000 bytes while LastByteRcvd (from network layer) is 3000 and LastByteRead (by application layer) is 1000.
   1. 2000 bytes b. 3000 bytes c. 1000 d. 4000
5. If a RcvBuffer is 3000 bytes for a TCP connection, then what will be the initial value of rwnd set by receiver?
   1. 0 bytes b. 1000 bytes c. 2000 bytes d. 3000 bytes
6. Suppose host A sends five TCP segment to host B over TCP connection. The first segment has sequence number 80; and the second has sequence number 120; the third segment has sequence number 160; the fourth segment has sequence number 200 and it carries 40 bytes of data.
   1. How much data is in the first segment? Please justify your answer. [2.5 points]

40 Bytes Justification: 120 -80=40

1. How much data is in the second segment? Please justify your answer. [2.5 points]

40 Bytes Justification: 120+40=160

1. Suppose that the second segment is lost but the third, fourth and fifth segment arrive at B. In the Acknowledgement that host B sends to host A, what will be the acknowledgement numbers for third, fourth, fifth segment after the loss of the second segment? [3 points]

120, 120, 120

1. What will happen to the out of order segments? Justify your answer. [2 points]

It depends on the implementer choice for Go-back-in and Selective Repeat.