1. Determine the following statements are true or false. (Use enough reasons and explanation to support your answer)

A) If two UDP or TCP segments have different source IP addresses and/or source port numbers, but have the same *destination* IP address and *destination* port number, then the two segments will be directed to the same destination process via the same destination socket.

B) If client and server use non-persistent HTTP, then a new TCP connection is created and closed for every request/response.

C) When the DNS application in a host wants to make a query, it constructs a DNS query message and passes the message to UDP, If it doesn't receive a reply either it tries sending the query to another name server or it informs the invoking application that it can't get a reply.

D) Using TCP protocol we would have finer application level control over the data which is sent and when.

E) UDP does not maintain connection state and does not track any of these parameters. For this reason, a server devoted to a particular application can typically support many more active clients when the application runs over UDP rather than TCP.

F) An application could have reliable data transfer while using UDP protocol.

G) The length field in each UDP segment specifies the number of bytes in the UDP headers.

H) In GBN approach if the window is full, the sender simply discards the data.

I) With the SR protocol, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.

J) With GBN, it is possible for the sender to receive an ACK for a packet that falls outside of its current window.

K) The alternating-bit protocol is the same as the SR protocol with a sender and receiver window size of 1.

L)The alternating-bit protocol is the same as the GBN protocol with a sender and receiver window size of 1.

2. Answer the following questions:

a) Enumerate and explain the benefits of using UDP compared to TCP.

b) What is the reason for providing checksum fields in TCP while checksum has also been provided in underlying layers such as link layer.

3. Consider below UDP-segment on the client side.

1110011001100110	**1101010101010101**
0110011001100000	**Checksum field**
01010101010101011000111100001100	

a) Determine the number in the checksum field.

b) Specify whether any error has been occurred or not, assuming below UDP-segment is received at the receiver. (Support your answer by performing exact calculations)

1110011001100110	**1101010101010101**
0110011001100000	**Checksum field**
0101010101010101100011110010110 0	

4. Give an FSM description for selective repeat approach. (On both, server and client side and also assume that a timer is used for each transmitted packet)

5. What should be the relation between the window size and sequence number in GBN approach to make it able to perform properly? (Hint: consider the case in which N packets have been sent and received properly at the receiver but all their ACKs has been lost)