Subject :	**SEHH2238 : Computer Networking**
Lab/Tutorial :	**Session 11 : Transport Protocols**

1. A client residing on a host with IP address 122.45.12.7 sends a message to the corresponding server residing on a host with IP address 200.112.45.90. If the well-known port is 161 and the temporary port is 51000, what are the pair of socket addresses used in the communication?

2. A client uses TCP to send data to a server. The data consist of 16 bytes. Calculate the efficiency of this transmission at the TCP level (ratio of useful bytes to total bytes).

3.
   (a) What is the minimum size of a UDP user datagram?
   (b) What is the maximum size of a UDP user datagram?
   (c) What is the minimum size of the application-layer payload data that can be encapsulated in a UDP user datagram?
   (d) What is the maximum size of the application-layer payload data that can be encapsulated in a UDP user datagram?

4. The following is a dump (contents) of a UDP header in hexadecimal format

   0045 DF00 0058 0000

   (a) What is the source port number?
   (b) What is the destination port number?
   (c) What is the total length of the user datagram?
   (d) What is the length of the data?
   (e) Is the packet directed from a client to a server or vice versa?
   (f) What is the application-layer protocol?

5. The following is a dump (contents) of a TCP header in hexadecimal format

   E293 0017 0000 0001 0000 0000 5002 07FF

   (a) What is the source port number?
   (b) What is the destination port number?
   (c) What is the sequence number?
   (d) What is the acknowledgement number?
   (e) What is the length of the header?
   (f) What is the window size?

6. (P24-29) An HTTP client opens a TCP connection using an initial sequence number (ISN) of 14,534 and the ephemeral (temporary) port number of 59,100. The server opens the connection with an ISN of 21,732. Show the three TCP segments during the connection establishment if the client defines the rwnd of 4000 and server defines the rwnd of 5000.