AUTUMN MID SEMESTER EXAMINATION-2022

School of Computer Engineering
Kalinga Institute of Industrial Technology, Deemed to be University
Computer Network
[IT-3005]

Time: 1 1/2 Hours   Full Mark: 20

Answer any four Questions including Q.No.1 which is Compulsory.
The figures in the margin indicate full marks. Candidates are required to give their answers in their own
words as far as practicable and all parts of a question should be answered at one place only.

1.   Answer all the questions.   [1 x 5]

   a) Station B needs to send a message consisting of 9 packets to Station C using a sliding window (window size 3) and go-back-n error control strategy. All packets are ready and immediately available for transmission. If every 5th packet that B transmits gets lost (but no acks from C ever get lost), then what is the number of packets that B will transmit for sending the message to C?

   b) What are the minimum functionality should be implemented by a transport protocol over and above the network protocol?

   c) A client uses UDP to send data to a server. The data is 16 bytes long. Calculate the efficiency of transmission at the UDP level.

   d) What would be the type of resource record (RR) that contains the canonical name of the host?

   e) In a client-server architecture, why is it necessary to keep the server always on where as the client can be on or off from time to time.

2.   [2.5+2.5]

(a) Explain the different fields of a TCP header along with a header diagram. If the size of a TCP segment is 1KB and header length value is 6, the sequence number = 3500. Given that URG flag = 1 and URG pointer = 45. Then how many of them are urgent data, Give the sequence numbers of urgent data.

(b) Using caching, the response time of downloading a object can be reduced. However, it may introduce a stale cache problem. Describe how HTTP handle this problem.

3.   [2.5+2.5]

(a) DNS can use either UDP or TCP as a transport layer protocol. Explain, in what circumstance UDP is preferred over TCP and vice-versa.

(b) Following are the information for a TCP Client and a Server:

– The MSS (Maximum Segment Size) in both directions is 1000 bytes.

– The ISN (Initial Sequence Number) for Client is 50 and for Server is 81.

The Client sends 2000 bytes to the Server and the Server sends 3000 bytes to the client. Give the complete TCP message exchange between client and server. For each segment draw a vector showing the value of the SYN, ACK and FIN bits, with the value of the SEQ (Sequence Number) and the ACK (Acknowledgement Number). Assume no packets are lost and the application consumes the data as soon as it is received.

3.   [2.5+2.5]

(a) Explain the flow diagram of stop and wait protocol with both packet lost and acknowledgment lost scenario.

(b) Assume that, in a Stop-and-Wait system, the bandwidth of the line is 1 Mbps, and 1 bit takes 20 milliseconds to make a round trip. What is the bandwidth-delay product? If the system data packets are 1,000 bits in length, what is the utilization percentage of the link?

4.   Short note on any **two**   [2.5+2.5]

(a) Circuit-switching vs packet switching.

(b) Multiplexing vs de-multiplexing.

(c) Slow start vs additive increase in congestion control.

*** Best of Luck ***