

JK Lakshmipat University Jaipur
INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination, May 2022

B. Tech. (CSE), Semester VI, 2021-22

Roll number

CS1111: Computer Networks and Distributed Systems Time: 3:00 Hours Max. Marks: 40 + 15

Read the following instructions carefully:

- There are 7 questions printed on both sides.
- If in doubt, state your assumption(s) and continue.
- No marks unless justification and/or derivation accompanies the answer.

1. Draw diagrams and discuss why end to end reliability is not same as point to point reliability. Note: Focus more on explaining through the diagrams rather than the text.

4 Marks, CO1, CO3, CO4

2. In the characteristics of Internet Architecture, we had mentioned the hourglass nature of protocol graph in which IP is the only protocol at layer 3 (Fig. 1). Justify. Name two link layer and two application layer protocols that are not mentioned in the figure. Note: HTTPS doesn't count.

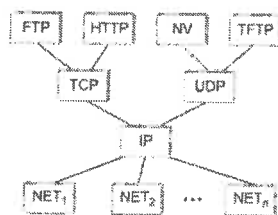


Figure 1: Internet Protocol Graph

2+2 Marks, CO1

3. TCP header is provided to you in the paper.

- (a) Draw UDP header. Why is it short with respect to TCP?
- (b) Window size may be of 16 bits but sequence numbers are 32 bits long. Why?
- (c) Draw and explain the handshake to establish a TCP connection.
- (d) The header doesn't provide the value of congestion window. How does the sender guess the congestion window?
- (e) Justify TCP saw-tooth pattern.

2+2+2+2+2 Marks, CO4

4. IP header is provided to you in the paper.

- (a) Compute the size of the header (without using options) from the provided image.
- (b) Assume that a packet has starting making loops (for whatever reasons) in the network. What will happen to such a packet?
- (c) Why IP does not use CRC for error detection but rather a checksum that too limited to just header?

2+2+2 Marks, CO3

5. (a) Explain Manchester encoding with the help of a neat and clean diagram.

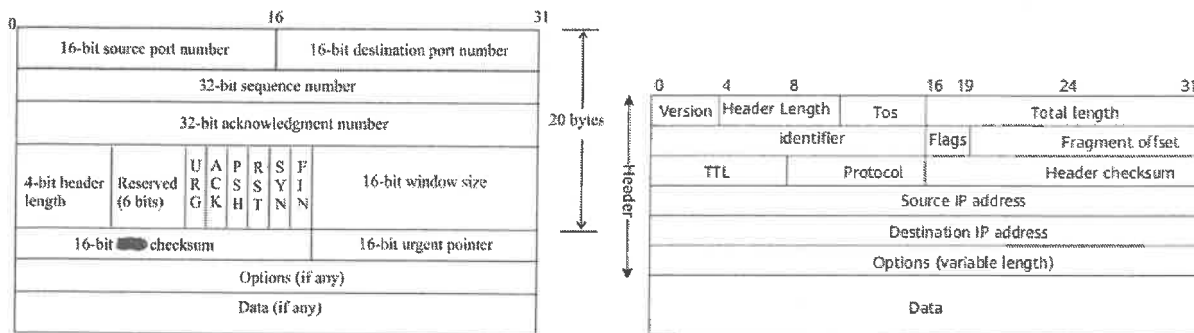


Figure 2: Headers.

- (b) Differentiate between flow control and congestion control.
- (c) Show the impact of out of order delivery on receiver TCP buffer with the help of a diagram.
- (d) Source and destination are connected via two routers between them. Show all the encapsulations and decapsulations.
- (e) What is the significance of latency $\times$ bandwidth?
- (f) In sliding window protocol, if 3 bits are used for sequence numbering. Show that the sender window size must be at most 4.

6*2 Marks, CO1, CO3, CO4

6. Explain the hidden node problem with the help of a suitable diagram. Why is this problem not there in the Ethernet?

2+2 Marks, CO1

7. (a) Write a C program to declare a pointer and point it to a variable.
- (b) Write a short note on utility of wireshark.
- (c) Write a short note on the utility of packet tracer.
- (d) Draw a diagram to show the communication that takes place between the server and the client when they use TCP sockets. You need to show the flow using all the system calls. Explain the `bind()`, `listen()`, and `accept()` system calls in brief.

3+3+3+(3+3) Marks, CO2, CO4