Consider an Ethernet segment with a transmission speed of 10^8 bits/sec and a maximum segment length of 500 meters. If the speed of propagation of the signal in the medium is 2×10^8 meters/sec, then the minimum frame size (in bits) required for collision detection is _____

A 400

B 450

C 500

D 550

Consider a network path $\mathrm{P} - \mathrm{Q} - \mathrm{R}$ between nodes P and R via router Q. Node P sends a file of size 10^6 bytes to R via this path by splitting the file into chunks of 10^3 bytes each. Node P sends these chunks one after the other without any wait time between the successive chunk transmissions. Assume that the size of extra headers added to these chunks is negligible, and that the chunk size is less than the MTU. Each of the links $\mathrm{P} - \mathrm{Q}$ and $\mathrm{Q} - \mathrm{R}$ has a bandwidth of $10^6 \mathrm{bits/sec}$, and negligible propagation latency. Router Q immediately transmits every packet it receives from P to R, with negligible processing and queueing delays. Router Q can simultaneously receive on link $P - Q$ and transmit on $\mathrm{link}\, Q - R$.
Assume P starts transmitting the chunks at time $t = 0$. Which one of the following options gives the time (in seconds, rounded off to 3 decimal places) at which R receives all the chunks of the file?

A 8

B 8.008

C 15.992

D 16

Suppose two hosts are connected by a point-to-point link and they are configured to use Stop-and-Wait protocol for reliable data transfer. Identify in which one of the following scenarios, the utilization of the link is the lowest.

A Longer link length and lower transmission rate

B Longer link length and higher transmission rate

C Shorter link length and lower transmission rate

D Shorter link length and higher transmission rate

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Consider a binary code that consists of only four valid code words as given below:
00000,01011,10101,11110
Let the minimum Hamming distance of the code be p and the maximum number of erroneous bits that can be corrected by the code be q.
Then the values of p and q are

A p = 3 and q = 1

B p = 3 and q = 2

C p = 4 and q = 2

D p = 4 and q = 1

The hamming distance between the octets of 0xAA and 0x55 is

A 7

B 5

C 8

D 6

The network protocol which is used to get MAC address of a node by providing IP address is

A SMTP

B ARP

C RIP

D BOOTP

Which one of the following CIDR prefixes exactly represents the range of IP addresses 10.12.2.0 to 10.12.3.255?

A 10.12.2.0/23

B 10.12.2.0/24

C 10.12.0.0/22

D 10.12.2.0/22

Which of the following fields of an IP header is/are always modified by any router before it forwards the IP packet?

A Source IP Address

B Protocol

C Time to Live (TTL)

D Header Checksum

Consider the entries shown below in the forwarding table of an $\mathbb{P}$ router. Each entry consists of an IP prefix and the corresponding next hop router for packets whose destination IP address matches the prefix. The notation "/N" in a prefix indicates a subnet mask with the most significant N bits set to 1.

Prefix	*Next hop router*
10.1.1.0/24	*R1*
10.1.1.128/25	*R2*
10.1.1.64/26	*R3*
10.1.1.192/26	*R4*

This router forwards 20 packets each to 5 hosts. The IP addresses of the hosts are 10.1.1.16, 10.1.1.72, 10.1.1.132, 10.1.1.191, and 10.1.1.205. The number of packets forwarded via the next hop router *R2* is

A 40

B 20

C 10

D 5

Node X has a TCP connection open to node Y. The packets from X to Y go through an intermediate IP router R. Ethernet switch S is the first switch on the network path between X and R. Consider a packet sent from X to Y over this connection.
Which of the following statements is/are TRUE about the destination IP and MAC addresses on this packet at the time it leaves X?

A The destination IP address is the IP address of R

B The destination IP address is the IP address of Y

C The destination MAC address is the MAC address of S

D The destination MAC address is the MAC address of Y

A bit-stuffing based framing protocol uses an 8-bit delimiter pattern of 01111110. If the output bit-string after stuffing is 01111100101, then the input bit-string is

A 0111110100

B 0111110101

C 0111111101

D 0111111111

Consider a TCP connection operating at a point of time with the congestion window of size 12 MSS (Maximum Segment Size), when a timeout occurs due to packet loss. Assuming that all the segments transmitted in the next two RTTs (Round Trip Time) are acknowledged correctly, the congestion window size (in MSS) during the third RTT will be _____

A 2

B 4

C 8

D 16