Q1. A picture containing application

Description automatically generated

a, 1k bytes vs 2 Mbps : cần phải chuyển từ bytes qua bit rồi chuyển 2mbps qua bits

Đổi quãng đường từ lớn sang nhỏ.

Transmission delay = L/R ( Transmission rate + Propagation delay)

Quãng đường chia vận tốc

1kbytes là quãng đường = L

2Mbps = 2,000,000 bps = R

Propagation delay = quãng đường chia vận tốc

= d/s - 2,500\*10^3 / 2,5 &10^8 = 0.01s

=10ms

Q3. Text

Description automatically generated

a, Cho data R1 = 500kbps, R2 = 2Mbps, and R3 = 1Mbps.

The throughput for the file transfer = min{R1,R2,R3}

= min{500kbps, 2Mbps, 1Mbps}

= 500 kbps

⇒ So, the throughput for the file transfer = 500 kbps.

b, The file size = 4 million bytes.

Convert million bytes to bits = 32000000 bits

From (a), the throughput for the file transfer = 500 kbps

= 500,000 bps

Dividing the file size by the throughput, roughly how long will it take to transfer the file to Host B:

= file size / throughput for the file transfer

= 32000000 / 500000

= 64 seconds

Q2. Graphical user interface, text, email

Description automatically generated

B1: Nhị phân → Thập phân

Cộng tất cả lại chia dư cho kết quả b0

Rồi chia dư tiếp cho kết quả b0.

Sau đó đổi dấu kết quả vừa tính ra đem chia dư cho kết quả b0 = 20301.

Trên máy casio, mode3, nhập 20301 rồi bấm BIN ( log) là ra binary.

So the Internet checkssum = 01001111 01001101

Q4. Graphical user interface, text, application

Description automatically generated

The polynominal expression of G is :

= $x^4 \* 1 + x^3 \* 0 + x^2 \* 0 + x^1 \* 1 + x^0 \* 1$

= $x^4 + x^1 + 1$

here, the degree of the expression is 4. So r = 4.

Thus, D + r becomes 10101010100000

Caculating the value of R:

**Q.1. (2 marks) Let g(x)=x3+x+1. Consider the information sequence 1001. Find the**

**codeword corresponding to the preceding information sequence. Using polynomial arithmetic we**

**obtain:**

Answer:

Step 1: Add 000 to data bits string. It will be 1001000

Step 2: Devide 1001000 to 1011 in modulo – 2 method.

1001000 1011

1011

01000

1011

00110

Codeword = 1001110

**Q2. (2 marks)**

Consider the 7-bit generator, G=10011, , and suppose that D has the value 1001010101.

What is the value of R? Show your all steps to have result.

Note: Explain your answer in details

Answer:

The value of D+r is 10010101010000 is taken by previous problem.

Consider the value, D=1001010101

Now dividing D+r with G the value of R is:

So, R value is 0000

**Q.3. (2 marks)**

Suppose two hosts, A and B, are separated by 20,000 kilometers and are connected by a

direct link of R = 2 Mbps. Suppose the propagation speed over the link is 2.5 x 108

meters/sec.

a. Calculate the bandwidth-delay product, R \_ dprop.

b. Consider sending a file of 800,000 bits from Host A to Host B. Suppose the file is sent

continuously as one large message. What is the maximum number of bits that will be in

the link at any given time?

Note: Explain your answer in details

Answer:

a)

The distance (Distance) between two hosts A and B = 20,000 km

Trasmission rate(R) of the direct link between A and B =2Mbps

Propagation Speed(S) of the link between A and B

Calculate the propagation delay:

Calculate the band-width delay product:

Therefore, band-with delay product is 160000bits

b)

Size of the file =800000 bits

Trasmission rate(R) of the direct link between A and B =2Mbps

The band-width delay product:

Therefore, the maximum number of bits at a given time will be 160000bits.

**Q.4. (2 marks)**

A packet switch receives a packet and determines the outbound link to which the packet

should be forwarded. When the packet arrives, one other packet is halfway done being

transmitted on this outbound link and four other packets are waiting to be transmitted.

Packets are transmitted in order of arrival.

Suppose all packets are 1,500 bytes and the link rate is 2 Mbps. What is the queuing delay

for the packet? More generally, what is the queuing delay when all packets have length L,

the transmission rate is R, x bits of the currently-being-transmitted packet have been

transmitted, and n packets are already in the queue?

Note: Explain your answer in details.

Answer:

**Q.5. (2 marks**) **A router has the following CIDR entries in its routing table:**

Address/mask Next hop

135.46.56.0/22 Interface 0

135.46.60.0/22 Interface 1

192.53.40.0/23 Router 1

default Router 2

(a) What does the router do if a packet with an IP address 135.46.63.10 arrives?

Answer:

Taking the first 22 bits of the above IP address as network address, we have

135.46.60.0.

It matches the network address of 135.46.60.0/22. So, the router will forward the

packet to Interface 1.

(b) What does the router do if a packet with an IP address 135.46.57.14 arrives?

**Answer:**

Taking the first 22 bits of the above IP address as network address, we have 135.46.56.0.

It matches the network address of 135.46.56.0/22. The packet will be forwarded to

Interface 0.

Note:

- Students have to follow the steps and complete the tasks in details in order to

have the results. If the students only write the result, that is, that result is not

marked or recorded.

- Students do examination on paper and answer by English