Câu 1:

Information bit: 110111

g1(x)=x+1 => 11

=>Bit string: 1101110

1101110|11

11 100101

0011

11

010

11

1 =>codeword: 1101111

g2(x)=x^3+x^2+1 =>1101

=>Bit string: 110111000

110111000|1101

1101 10001

001100

1101

010 =>codeword: 110111010

Câu 2:

G=10111

D=1010100001

Thêm 0000 vào sau D => Bit string: 10101000010000

10101000010000|10111

10111 1001011001

010000

10111

11101

10111

10100

10111

011000

10111

1111 =>R=1111

Câu 3:

Iteration	N	V	X	W	Y	z	
Initial	U	2	1	5	Vocung	vocung	
1	U,X	2	-	5	2	vocung	
2	U,X,v	-	-	5	2	vocung	
3	U,x,v,y	-	-	5	-	5	
4	U,c,v,y,w	-	-	-	-	5	
5	U,c,v,y,w,z	-	-	-	-	-	

Câu 4:

a. IP: 135.46.63.10
   Convert to binary notation: 10000111.00101110.00111111.00001010
   Take 22 bits and set remain bit to 0
   =>10000111.00101110.001111**00**.00000000
   Convert to decimal notation: 135.46.60.0=>Interface 1
b. IP:135.46.57.14
   Convert to binary notation: 10000111.00101110.00111001.00001110
   Take 22 bits and set remain bit to 0
   =>10000111.00101110.001110**00**.00000000
   Convert to decimal notation: 135.46.56.0 => interface 0

Câu 5:

distance=30000$km = 3.10^7 m$

$R = 3Mbps = 3.10^6 bps$

$speed = 2,5.10^8 m/s$

a. Bandwith delay product =R*d_prop

$$d\_prop = \frac{dis\tan ce}{speed} = \frac{3.10^7}{2,5.10^8} = \frac{3}{25}.10^{-1} = 0.012(\sec)$$

=>Result=3.10^6.0.012= 36000 bits

b. Maximum number of bit that will be in the link at any given time: 36000 bits

Câu 6:

$g(x) = x^3 + x + 1$

$1011 => x^3 + x + 1$

$=> (x^3 + x + 1) * x^3 = x^6 + x^4 + x^3$

$x^6 + x^4 + x^3 \mid x^3 + x + 1$

$x^6 + x^4 + x^3$ $\quad$ x^3

0

Codeword: $x^6+x^4+x^3$

Câu 7:

Packet length L=2500 bytes

Transmission rate R=3Mbps=3.10^6bps

Transmited bits: x=2500/2=1750

Waiting queue: n=4 packets

(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.)

$queueing$ delay= $\frac{nL + (L - x)}{R}$

=> result = 0.0036s

Câu 8:

Header:

11111111 11111110 => 65534 (2^16 -2)

11111111 00000000 =>65280 (2^16 – 2^8)

11110000 11110000=>61680

11000000 11000001=>49345

=> x= -(65534+65280+61680+49345) modulo 65535 =-241839 modulo 65535

=20301

Checksum : 01001111 01001101

Câu 9:

Packet length: L=2000 bytes=16000bits

Distance: d=3500km=3,5.10^6m

Speed: v=2,5.10^8m/s

Transmission rate: R=2Mbps=2.10^6bps

a. Packet propagation = transmission delay + propagation delay
   Result= L/R + d/v= 0.022s
b. Propagation don't depend on packet length and transmission rate (depend on distance and speed)

Câu 10:

a. No other traffic =>Throughput = min{R1,R2,R3}=R1 =250kbps
b. File size = 4.10^6bytes=32.10^6bits
   Throughput=250kbps=250000bps
   Dividing file by throughput => time to transfer =(32.10^6)/(250000)=128s

Câu 11:

Update thêm 58bytes vào message length L

Percentage =L(original)/L(update)

Câu 12:Uncompressed text file =1MB=10^6B=8Mb=8.10^6bits

a. Speed download: 35kilobit/second
   Time=(8.10^6bits)/(35.10^3)=228.57s

b. Speed download : 1Mb/s

   Time=8s

c. Compressed file with ratio 1:6
   => size file=1/6MB=(10^6)/6B=(4/3)Mb =(4/3).10^6bits
   Speed =35kilobit/s => time= time(a) / 6=38
   Speed =1MB/s=>time= time(b) /6=4/3s

Câu 13:

Câu 14:

Information bit: 100111010011110

Bits string: 10110

Add 4 0s in inforamtion bits => 1001110100111100000

1001110100111100000 | 10110

10110 1010000010100010

10110

10110

010011

10110

10111

10110

10000

10110

1100 => CRC: 1100

Bit string will be transmitted: 1001110100111101100