Homework 3

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Answer 1

(a) $2MB = 2000KB$. Segments double with each RTT. $ceil(log_2(2000)) = 11$. It will take 12 RTT

(b) $11RTT$ to send $2^12KB = 4096KB = 4MB$. We still have to send 12MB at 2MB per RTT, so $12 + (12/2) = 18RTT$

(c) $18RTT * 200ms = 3600ms$ This is a throughput of $16MB/3.6s = 4.44MB/s$ Link uilizaion is 3.56% (4.44MB/s * 8 / 1Gbps)

Answer 2

Next hop table A

Dest	Dist	Next Hop
A	0	A
B	7	D
C	6	D
D	3	D
E	5	D
F	12	D

Next hop table B

Dest	Dist	Next Hop
A	7	E
B	0	B
C	3	E
D	4	E
E	2	E
F	9	E

Next hop table C

Dest	Dist	Next Hop
A	6	E
B	3	E
C	0	C
D	3	E
E	1	E
F	6	F

Answer 3

Dest	Dist	Next Hop
Net 1	0	direct
Net 2	0	direct
Net 5	8	Router L
Net 17	6	Router M
Net 22	9	Router J
Net 24	6	Router J
Net 30	2	Router Q
Net 42	4	Router J

Answer 4

size of 1 cost vector $= 8bits * 60 = 480bits$
Each node sends $480 * 2 = 960bits$ per second
Each link sends $960 * 2 = 1920bits$ per second
If we assume that each link has C capacity, then the capacity consumed is $1920/C$

Answer 5

Yes fragmentation takes place because we have 2000 bytes, but can only send 262 bytes in a frame $ceil(2000/242) = 9$ fragments would be sent with 242 bytes as the payload and 20 bytes as the header

Answer 6

(a) Network address: 145.98.0.0
Subnet number: 145.98.128.0
host number: 145.98.224.99

(b) 145.98.128.0/17

(c) There are 2^{11} addresses ranged 214.13.192.0 - 214.13.199.255

Answer 7

(a)

Prefix	Next Hop
PA	C1.B3.0.0/16
PB	C1.A0.0.0/12
Q	C2.0.0.0/8

(b)

Prefix	Next Hop
PA	C1.B3.0.0/16
Q	C1.A0.0.0/12
Q	C2.0.0.0/8
R	C2.0B.10.0/20