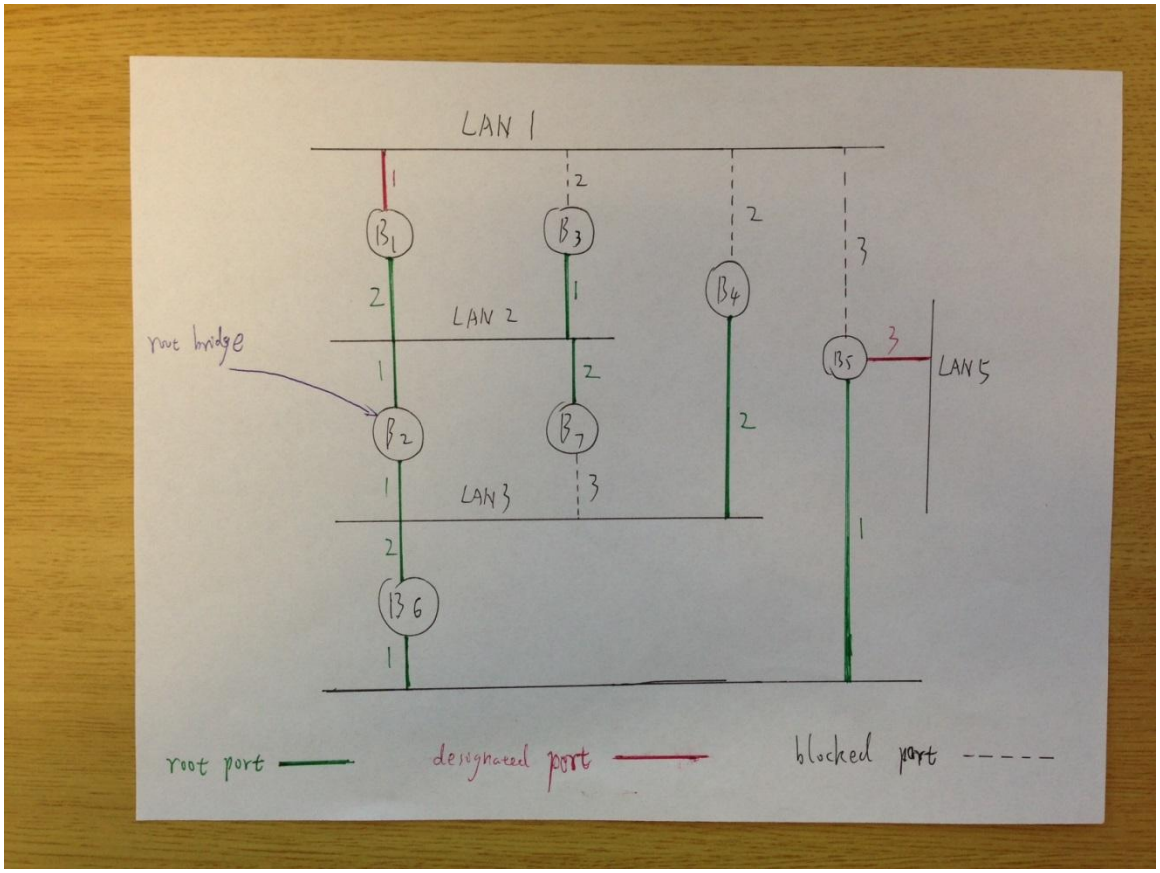
HW5 solutions

1. The B1 and B2 Tables are as follows:

B1		B2	
G	2	G	1
D	4	D	3
A	1	A	1
P	4	P	2
J	4	J	4
C	3	C	1

2. The spanning tree is as follows:



3. d_trans_frame = 1500*8 bits/1 Mbps = 12ms
   d_R = d_prop + N*d_proc = 1 Km/ 5 (Km/ms) + 100*1 bit/ 1Mbps = 0.3 ms < 12ms

   Therefore, we can not use Model II, but we can use Model I.

   Throughput = Data_length/(d_R + d_trans_frame + d_trans_token + d_R/N)
   =1500*8 bits/(0.3ms + 12 ms + 0ms + 0.3ms/100)
   =975.4 Kbps

4. d_trans_data = 1500*8 bits/11 Mbps = 1.09 ms
   d_trans_control = 256 bits/11Mbps = 0.023 ms
   d_total = d_DIFS +3*d_SIFS + 4*d_prop + d_trans_data +3*d_trans_control
   = 10.9*d_prop + 1.16 ms

5.

5) Checksum Error Detection:

Data Message → (013A, 58BE, ABCD, E450)

a)

Checksum calculation

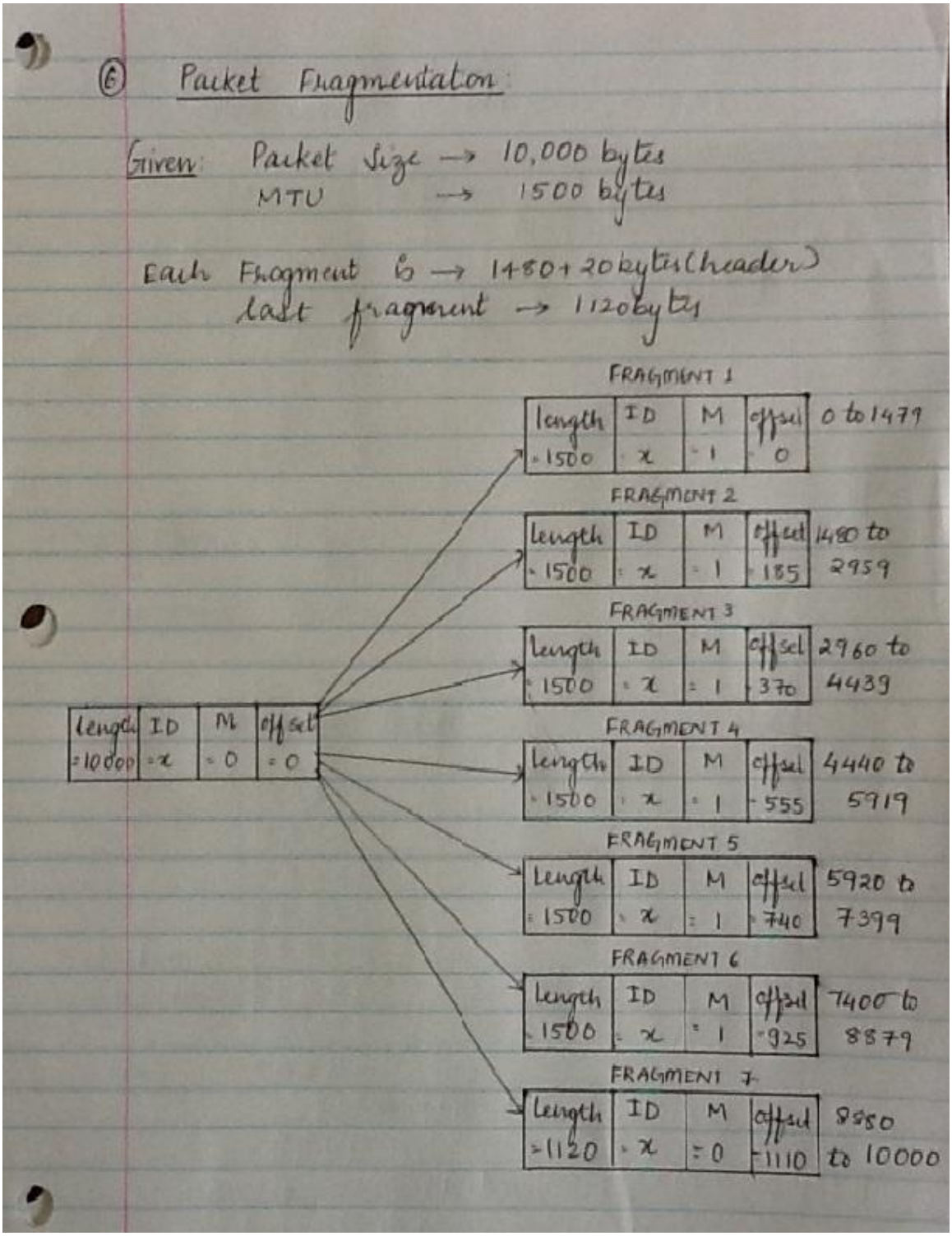
	013A
	58BE
	ABCD
	E450
	0000
	EA15
	→ 1
Wrapped Sum	EA16
	↓ 1's compliment
Checksum	15E9

b) Checksum Validation

	013A
	58BE
	ABCD
	E450
Checksum	15E9
partial sum	FFFE
	→ 1
sum	FFFF
	↓ 1's compliment
	0000

As the new checksum is 0000 valiadtion @ B is positive

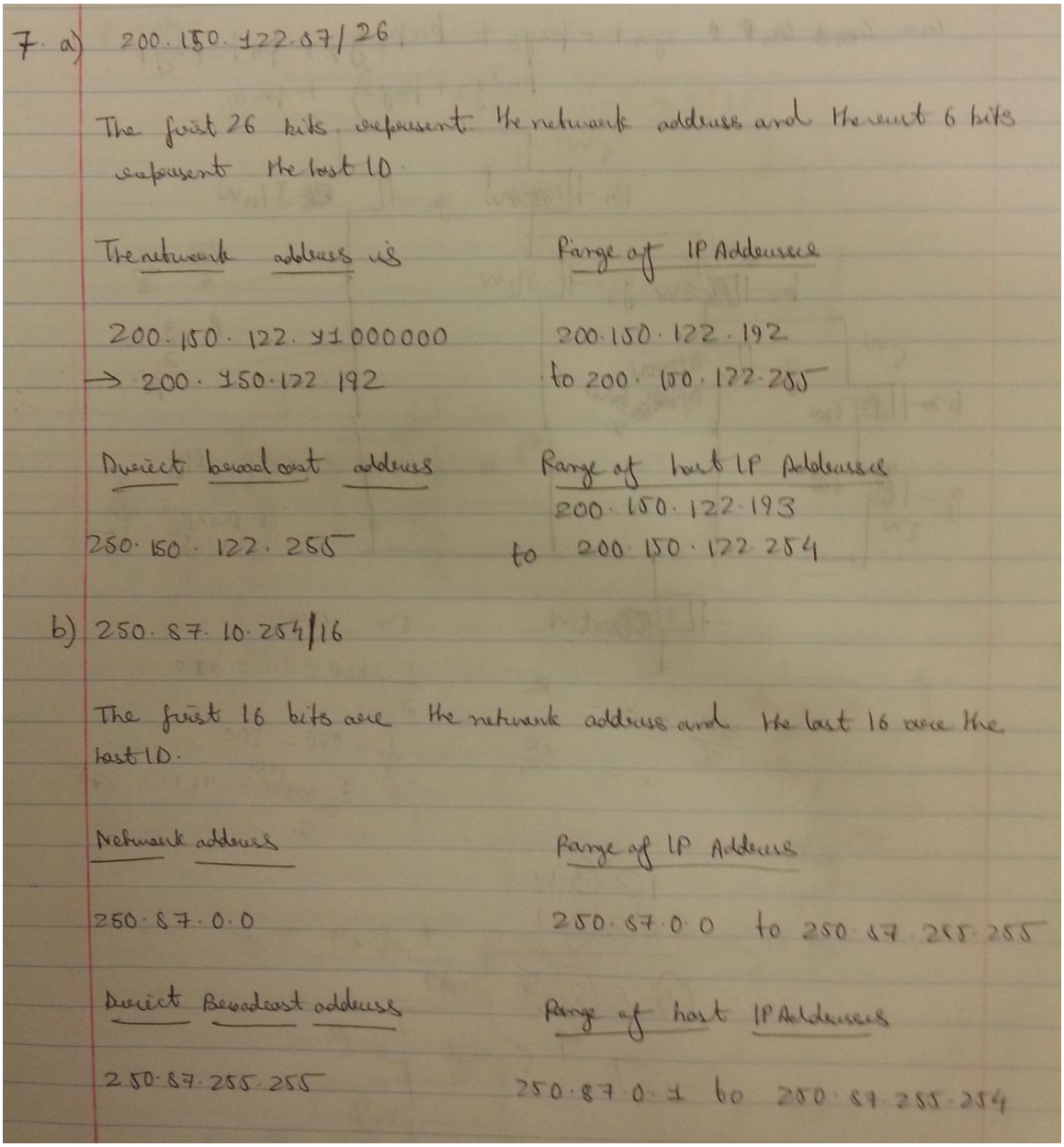
6.


⑥ Packet Fragmentation
Given: Packet Size → 10,000 bytes
MTU → 1500 bytes
Each Fragment is → 1480+20 bytes (header)
last fragment → 1120 bytes
length = 10000 | ID = x | M = 0 | offset = 0
FRAGMENT 1
length = 1500 | ID = x | M = 1 | offset = 0 | 0 to 1479
FRAGMENT 2
length = 1500 | ID = x | M = 1 | offset = 185 | 1480 to 2959
FRAGMENT 3
length = 1500 | ID = x | M = 1 | offset = 370 | 2960 to 4439
FRAGMENT 4
length = 1500 | ID = x | M = 1 | offset = 555 | 4440 to 5919
FRAGMENT 5
length = 1500 | ID = x | M = 1 | offset = 740 | 5920 to 7399
FRAGMENT 6
length = 1500 | ID = x | M = 1 | offset = 925 | 7400 to 8879
FRAGMENT 7
length = 1120 | ID = x | M = 0 | offset = 1110 | 8880 to 10000

7. a)

The correct solution to part a) is as follows:

Network address: 200:150:122:64
Direct broadcast address: 200:150:122:127
IP range: 200:150:122:64 to 200:150:122:127
host IP range: 200:150:122:65 to 200:150:122:126



8..

8. There are 2048 subnets. So, number of bits for subnets = 11.

The subnets are as follows —

Subnet 0 : 128.125.0.0
Subnet 1 : 128.125.0.32
Subnet 2 : 128.125.0.64
⋮ ⋮
Subnet 2046 : 128.125.255.192
Subnet 2047 : 128.125.255.224

For each subnet, there will be 32 IP addresses including the network address and the broadcast address.

Subnet 85

Network address : 128.125.4.96
Broadcast address : 128.125.4.127
Range of IP addresses : 128.125.4.96 to 128.125.4.127
Host Addresses : 128.125.4.97 to 128.125.4.126

Subnet 798

Network address : 128.125.99.192
Broadcast address : 128.125.99.223
Range of IP address : 128.125.99.192 to 128.125.99.223
Host IDs : 128.125.99.193 to 128.125.99.222

Subnet 2031

Network address : 128.125.253.224
Broadcast address : 128.125.253.255
Range of IP address : 128.125.253.224 to 128.125.253.255
Host IDs : 128.125.253.225 to 128.125.253.254