**Assignment 3 Theory Questions**

1. A 4480 octet datagram will include a 20 octet header and a 4460 octet data field. Since the frame can take a payload of 1500 octets, it is possible to have 4 fragments. The fragments should be divisible by 8, so we will have 3 fragments of 1480 octets and a last fragment of 40 octets (20 for data field and 20 for IP header).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Total Length | 1500 | 1500 | 1500 | 40 |
| Flag | 1 | 1 | 1 | 0 |
| Offset | 0 | 185 | 370 | 555 |

1. A)

|  |  |
| --- | --- |
| **Prefix Match** | **Link Interface** |
| 11100000 00 | 0 |
| 11100000 01000000 | 1 |
| 1110000 | 2 |
| 11100001 10 | 3 |
| Otherwise | 3 |

B)

|  |  |
| --- | --- |
| **Address** | **Link** |
| 11001000 10010001 01010001 01010101 | 3 (otherwise) |
| 11100001 01000000 11000011 00111100 | 2 |
| 11100001 10000000 00010001 01110111 | 3 |



|  |  |  |
| --- | --- | --- |
| **Destination Address Range** | **Link Interface** | **# of addresses** |
| **00**000000 – **00**111111 | 0 | 26 = 64 |
| **010**00000 – **010**11111 | 1 | 25 = 32 |
| **011**00000 – **011**11111 | 2 | 25 = 32 |
| **10**000000 – **10**111111 | 2 | 26 = 64 |
| **11**000000 – **11**111111 | 3 | 26 = 64 |

|  |  |
| --- | --- |
| **Prefix Match** | **Link Interface** |
| 200.23.16/21 | 0 |
| 200.23.24/24 | 1 |
| 200.23.24/21 | 2 |
| Otherwise | 3 |

1. 01010011 10111001 Ones compliment = 11010001

+01100110 +01110100

10111001 00101110

**1st + 2nd 8-bit result + 3rd 8-bit**

Therefore, the internet Checksum is 11010001.