P2. A. No because only one packet can be transmitted at a time over a shared bus.

B. No because only one memory read/write can be done at a time.

C. No because only one packet can be sent over any given bus at a time so one will have to wait at the input.

P5. A.

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

B. The first address matches the 5th entry: Interface 3. The second address matches the 3rd entry: Interface 2. The third address matches the 4th entry” Interface 3.

P.6 The destination addresses 00000000 – 00111111 gives a range link interface of 0. The destination addresses 01000000 – 01011111 gives a range link interface of 1. The destination addresses 01100000 – 01111111 gives a range link interface of 2. The destination addresses 10000000 – 10111111 gives a range link interface of 2. The destination addresses 11000000 – 11111111 gives a range link interface of 3. The number of addresses for interface 0 = 26­ = 64. The number of addresses for interface 1 = 25­ = 32. The number of addresses for interface 2 = 25­ + 26 = 32 + 64 = 96. The number of addresses for interface 3 = 26­ = 64. The available host address = number of addresses – 2 since one IP address is reserved for the network and the other for the broadcast.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Prefix Match** | **Interface** | **Destination Address Range** | **Available IP Address** | **Hosts** |
| 00 | 0 | 00000000 – 00111111 | 64 | 62 |
| 010 | 1 | 01000000 – 01011111 | 32 | 30 |
| 011 | 2 | 01100000 – 01111111 | 32 | 30 |
| 10 | 2 | 10000000 – 10111111 | 64 | 62 |
| 11 | 3 | 11000000 – 11111111 | 64 | 62 |

P8. Given that, subnet 1 has 60 interfaces. To represent 60 interfaces, we need 6 bits (64 = 26). So its addresses can be from **223.1.17.0/26 to 223.1.17.59/26**. Subnet 2 has 90 interfaces. 90 interfaces can be accommodated using 7 bits up to 127 host addresses can represented using 7 bits (127 = 27) and hence, the addresses may be from **223.1.17.60/25 to 223.1.17.141/25**. Subnet 3 has 16 interfaces. 4 bits are needed for 16 interfaces (16 = 24). So the network addresses may range from **223.1.17.142/28 to 223.1.17.157/28**.

P9. For first prefix: 11001000 00010111 00010 = 200.23.2 with 21 bits so 200.23.2.0/21

For second prefix: 11001000 00010111 00011000 = 200.23.24 with 24 bits so 200.23.24.0/24

For third prefix: 11001000 00010111 00011 = 200.23.3 with 21 bits so 200.23.3.0/21

|  |  |
| --- | --- |
| **Prefix Match** | **Link Interface** |
| 200.23.2.0/21 | 0 |
| 200.23.24.0/24 | 1 |
| 200.23.3.0/21 | 2 |
| Otherwise | 3 |

P11. IP addresses range is 128.119.40.128 – 128.119.40.191. Giving these four subnets: 128.119.40.64/28, 128.119.40.80/28, 128.119.40.96/28, and 128.119.40.112/28.

P14. Since the IP header is 20 bytes, the max size of data field in each fragment is 700 – 20 = 680. This means that the number of required fragments is (2400 – 20) / 680 = 4 (3.5 rounded up). Each fragment will have the 422 identification number. The last fragment will be of size 700 bytes. The last datagram will be of size 360 bytes. The offsets of the 4 fragments will be 0, 85, 170, 255. The first 3 fragments will have flag = 1 and the last fragment will have flag = 0.

P16. A. The addresses to all interfaces are: 192.168.1.1, 192.168.1.2, 192.168.1.3, and 192.168.1.4.

B.

|  |  |
| --- | --- |
| **NAT Translation Table** | |
| **WAN Side** | **LAN Side** |
| 24.34.112.235,4000 | 192.168.1.1,3345 |
| 24.34.112.235,4001 | 192.168.1.1,3346 |
| 24.34.112.235,4002 | 192.168.1.2,3445 |
| 24.34.112.235,4003 | 192.168.1.2,3446 |
| 24.34.112.235,4004 | 192.168.1.3,3545 |
| 24.34.112.235,4005 | 192.168.1.3,3546 |

P.19

|  |  |
| --- | --- |
| S2 Flow Table | |
| Match | Action |
| Ingress Port = 1; IP Src = 10.3.\*.\*; IP Dst = 10.1.\*.\* | Forward (2) |
| Ingress Port = 2; IP Src = 10.1.\*.\*; IP Dst = 10.3.\*.\* | Forward (1) |
| Ingress Port = 1; IP Dst = 10.2.0.3  Ingress Port = 2; IP Dst = 10.2.0.3  Ingress Port = 1; IP Dst = 10.2.0.4  Ingress Port = 2; IP Dst = 10.2.0.4 | Forward (3)  Forward (3)  Forward (4)  Forward (4) |
| Ingress Port = 4  Ingress Port = 3 | Forward (3)  Forward (4) |