*I pledge to follow the Rules on Academic Honesty and understand that violations may lead to severe penalties. (*Signature) //////

Question 1:



Recommended physical medium - Fiber optic cable



|  |  |
| --- | --- |
| **Pros and cons of Fiber optic cable** | |
| **Pros** | **Cons** |
| High-speed with point-to-point transmission | High cost compares to twisted pair |
| Low error rate | Fiber optic cable is easy to be damaged |
| Capable for long distance |  |
| High carrying capacity |  |
| Low signal distortion |  |

Question 2:



|  |  |
| --- | --- |
| 2004 | 4218 |
| 0010 | 0B57 |
| A4B9 | **5604** |
| 5678 | 4146 |

|  |  |
| --- | --- |
| 4218 | 2004 |
| 0010 | C779 |
| 3315 | 6ED5 |
| **6680** | CDEF |



Method 1: Use TCP, TCP has congestion control in the protocol.

Method 2: Search for the bottleneck, the bottleneck will cause the congestion.

Question 3:



|  |  |  |
| --- | --- | --- |
| Subnet A | 167.97.181.0/25 | 128 addresses |
| Subnet B | 167.97.181.128/26 | 64 addresses |
| Subnet C | 167.97.180/24 | 256 addresses |
| Subnet D | 167.97.181.192/26 | 64 addresses |



Router 1:

|  |  |
| --- | --- |
| Longest prefix match | Outgoing interface |
| 10100111 01100001 10110101 0 | Subnet A |
| 10100111 01100001 10110101 10 | Subnet B |

Router 2:

|  |  |
| --- | --- |
| Longest prefix match | Outgoing interface |
| 10100111 01100001 10110100 | Subnet C |
| 10100111 01100001 10110101 11 | Subnet D |



|  |  |
| --- | --- |
| Source IP address | 111.111.111.112 |
| Destination IP address | 222.222.222.221 |
| Source MAC address | CC-49-DE-D0-AB-7D |
| Destination MAC address | E6-E9-00-17-BB-4B |



|  |  |
| --- | --- |
| Source IP address | 111.111.111.112 |
| Destination IP address | 222.222.222.221 |
| Source MAC address | 1A-23-F9-CD-06-9B |
| Destination MAC address | 88-B2-2F-54-1A-0F |

Question 4:



PPP is character-oriented version of HDLC while HDLC is bit-oriented.

PPP uses similar frame structure as HDLC, except for the protocol type field and the payload contains an integer number of bytes.

PPP and HDLC use the same flag, but PPP uses bytes stuffing.

HDLC has supervisory frame and unnumbered frame.

PPP is implemented by Point-to-point configuration, HDLC is implemented by Point-to-point configuration and also multiple dropping.



Host A sends the frame. When the frame received at the switch, the switch will record incoming link, MAC address of the sending host and index the switch table. As E’s location is unknow, the switch will forward the frame to all the interface except the arriving interface.

|  |  |  |
| --- | --- | --- |
| MAC address | Interface | TTL |
| A | 1 |  |



Host E responds. When the responds frame received at the switch, the switch will record incoming link, MAC address of the sending host and index the switch table. As A’s location is known, the switch will selectively send the frame to E.

|  |  |  |
| --- | --- | --- |
| MAC address | Interface | TTL |
| A | 1 |  |
| E | 5 |  |