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| **National University of Computer and Emerging Sciences, Lahore Campus** | | | | |
| C:\Users\saif\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Word\final design.jpg | **Course Name:** | **Computer Networks** | **Course Code:** | **CS3001** |
| **Program:** | **BS(Data Science)** | **Semester:** | **Fall 2023** |
| **Duration** | **45 minutes** | **Total Marks:** | **50** |
| **Paper Date:** | **1-November-2023** | **Section:** | **7B** |
| **Exam Type:** | **Quiz 4 – Chapter 4** | **Page(s):** | **3** |
| **Name: Roll No. Section:** | | | | |

**Question 01: Answer the multiple-choice questions by choosing one option.**

1. The first 8 bits of IPv4 datagram will be ------- if all optional fields are included in header of datagram:
   1. 01001111
   2. 01000101
   3. 01001101
   4. 01001100
2. The NAT router -------- for all outgoing datagrams leaving the router.
   1. rewrites the source IP address and source port number
   2. rewrites the destination IP address and destination port number
   3. rewrites the both the source and destination IP addresses and the source and destination port numbers
   4. only modifies the TTL value
3. Which of the following is true about the DHCP.
   1. Allows reuse of addresses
   2. App layer protocol used by the Network Layer
   3. DHCP uses UDP at the Transport Layer
   4. All above
4. What is the problem with Dual Stack Approach
   1. Loss of packet into the sea during transmission
   2. Loss of packet header fields during transmission
   3. Loss of packet confidentiality is sniffed during transmission
   4. Loss of packet’s payload during transmission
5. What technique is used to divide range of addresses among divisions of a network?
   1. Sub netting
   2. Super netting
   3. Six netting
   4. Sarcastic netting

**Question 2:** Motu Patlu a popular Indian cartoon amuses children and sometimes adults too. In the cartoon, the Motu is shown dependent on samosas to revive its power to use in hard times. Suppose that Motu is studying in FAST NUCES and got poor marks in mid-terms in Computer Networks course, while Patlu has scored good marks and has got a repository of samosas. Motu is angry now and wants to score good in upcoming exams. For that he needs samosas which currently Patlu have. Since, they are located far enough so Patlu can only send images of samosas which will also help Motu revive its power. Also, Motu can accept images of samosas broke down into pieces whenever necessary. Now consider that the size of one samosa image is 4768 bytes (20 bytes of header and 4748 bytes of payload). There are two links between Motu and Patlu, L1 and L2. MTU of L1 is 2048 (20 bytes+2028 bytes), while of L2 is 1044 (20 bytes+1024 bytes). Now show up the fragmentation of samosa image along both links (you must show length, ID, frag flag, and offset for each fragmented samosa). **[20 points]**

**L1:**

1. **2044, x, 1, 0**
2. **2044, x, 1, 253**
3. **720, x, 0, 506**

**L2:**

1. **1044, x, 1, 0**
2. **1020, x, 0, 128**
3. **1044, x, 1, 253**
4. **1020, x, 0, 381**
5. **720, x, 0, 506**

**Question 3:** A certain organization has been assigned a network address block 201.180.128.0/23.

It has been determined that the organization needs:

* + - 1 network with at least 240 hosts
    - 1 network with at least 55 hosts
    - 1 network with at least 28 hosts
    - 2 networks with at least 15 hosts

Design the complete IP addressing scheme for this organization and **fill in the table below**. Show all your work with appropriate comments (if any). **[20 points]**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Network** | **Network Address** | **Subnet mask** | **First available host address** | **Last available host address** | **# of available**  **host addresses** |
| Network 1 | 201.180.128.0 | /24 | 201.180.128.1 | 201.180.128.254 | 254 |
| Network 2 | 201.180.129.0 | /26 | 201.180.129.1 | 201.180.129.62 | 62 |
| Network 3 | 201.180.129.64 | /27 | 201.180.129.65 | 201.180.129.94 | 30 |
| Network 4 | 201.180.129.96 | /27 | 201.180.129.97 | 201.180.129.126 | 30 |
| Network 5 | 201.1180.129.128 | /27 | 201.180.129.129 | 201.180.129.158 | 30 |

**Question 4:** How many subnets are there in the following image of a network: **[5 points]**

**Answer:**



**6**

**Explanation:**

**Isolated Subnets to routers are 3 while the routers connected to**

**each other (each router connected to any router is considered as**

**one subnet) are 3. Totally, 3+3=6**