Reg.										

Manipal Institute of Technology

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SIXTH SEMESTER BTech (CS&E) I SESSIONAL

SUBJECT:NETWORK PROTOCOLS– (CSE-304)

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1. i) _______________ is the limited broadcasting address in a network with a address 150.50.0.0/16

a. 127.0.0.1/16 **b. 255.255.255.255/16** c. 150.50.255.255/16 d. 255.255.0.0/16

ii) _______________ information of destination IP Address is used to forward the packets from one network to another

a. Network Mask b. **Network ID** c. Host ID d. None of the Above.

iii) Which of the following is a valid subnet mask?

a. 176.0.0.0 b. 96.0.0.0 c. 127.192.0.0 d. **255.128.0.0**

iv) If the value of the HLEN in an IP packet is 7, then _______ option bytes are present.

a. 12 b. 56 **c. 8** d. 24

v) It can be determined that an IP packet is carrying data from ICMP, if the value of the protocol field in the IP datagram is ______

a. 2 **b. 1** c. 6 d. 17 **(1x5=5)**

2a.Explain the principle of two level addressing in IPV4 classless addressing.

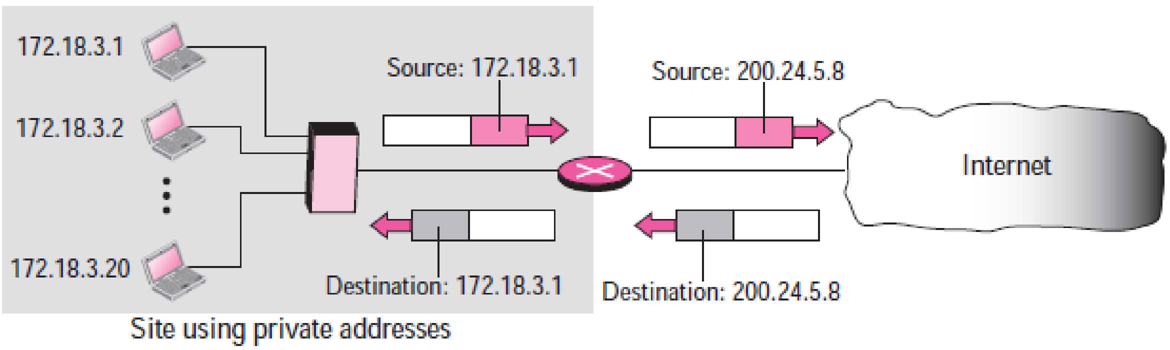
Two-Level Addressing

In classful addressing, two-level addressing was provided by dividing an address into *netid* and *hostid*. The netid defined the network; the hostid defined the host in the network. The same idea can be applied in classless addressing. When an organization is granted a block of addresses, the block is actually divided into two parts, the **prefix** and the **suffix.** The prefix plays the same role as the netid; the suffix plays the same role as the hostid. All addresses in the block have the same prefix; each address has a different suffix.

2b.With a suitable example ,Explain how Network Address Translation is used to map Public and Private addresses in IPv4?

Address Translation

All of the outgoing packets go through the NAT router, which replaces the *source address* in the packet with the global NAT address. All incoming packets also pass through the NAT router, which replaces the *destination address* in the packet (the NAT router global address) with the appropriate private address. Figure shows an example of address translation. 1Mark



1Mark

Translation Table

Translating the source addresses for an outgoing packet is straightforward. But how does the NAT router know the destination address for a packet coming from the Internet? There may be tens or hundreds of private IP addresses, each belonging to one specific host. The problem is solved if the NAT router has a **translation table.** In its simplest form, a translation table has only two columns: the private address and the external address (destination address of the packet). When the router translates the source address of the outgoing packet, it also makes note of the destination address— where the packet is going. When the response comes back from the destination, the router uses the source address of the packet (as the external address) to find the private address of the packet. 1Mark.

3a. An organization is granted the block 130.56.0.0/16. The administrator wants to create 1024 subnets. Find a) the subnet mask b) the number of addresses in each subnet c) the first and last address of the first subnet d) the first and last address of the last subnet.

Soln:

(a) Subet Mask= /26 or 255.255.255.192

(b) Number of addresses in each subnet =64

(c) For First Subnet

First Address : 130.56.0.0 /26

Last Address : 130.56.0.63/26

Note : First Address: 130.56.0.64 and Last Address 130.56.0.127 is also considered as First Subnet and Marks to be awarded.

(d) For Last Subnet

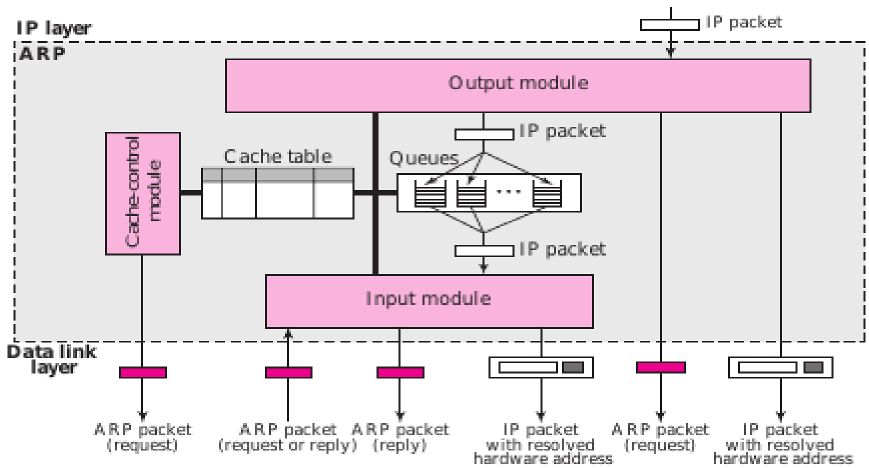
First Address: 130.56.255.192

Last Address: 130.56.255.255

(0.5 X 4 = 02 Marks)

3b. Draw block diagram of ARP package and explain Cache-Control module.

Block Diagram of ARP PACKAGE



(1.5 Marks)

Cache-Control Module

The cache-control module is responsible for maintaining the cache table. It periodically (for example, every 5 s) checks the cache table, entry by entry. If the state of the entry is FREE, it continues to the next entry. If the state is PENDING, the module increments the value of the attempts field by 1. It then checks the value of the attempts field. If this value is greater than the maximum number of attempts allowed, the state is changed to FREE and the corresponding queue is destroyed. However, if the number of attempts is less than the maximum, the module creates and sends another ARP request. If the state of the entry is RESOLVED, the module decrements the value of the time-out field by the amount of time elapsed since the last check. If this value is less than or equal to zero, the state is changed to FREE and the queue is destroyed. Table 8.4 shows the cache-control module in pseudocode.

Table 8.4 *Cache-Control Module*

```
ARP_Cache_Control_Module ( )
{
    Sleep until the periodic timer matures.
    Repeat for every entry in the cache table
    {
       If (the state is FREE)
       {
          Continue.
       }//end if
        If (the state is PENDING)
        {
          Increment the value of attempts by 1.
          If (attempts greater than maximum)
          {
               Change the state to FREE.
               Destroy the corresponding queue.
          }// end if
          else
          {
             Send an ARP request.
           }//end else
          continue.
        }//end if
        If (the state is RESOLVED)
        {
            Decrement the value of time-out.
            If (time-out less than or equal 0)
            {
               Change the state to FREE.
               Destroy the corresponding queue.
            }//end if
        }//end if
     }//end repeat
     Return.
  }//end module
```

(1.5 Marks)

4a.In a datagram, the M bit is set to zero, the value of the HLEN is 5, the value of the total length field is 200 and the offset value is 200. What is the number of the first byte and the number of the last byte in this datagram? Is this the first, the middle or the last fragment?

If M bit is 0, it means there are no more fragments. Therefore this is the last fragment

(.5M)

First Byte Number = offset value * 8
= 200 * 8
= 1600 (.5M)
Given Total length = 200 Bytes
Given HLEN = 5 *4 = 20 Bytes
Therefore, 200-20 = 180 Bytes in this datagrams (.5M)
Last Byte Number = First Byte + bytes in the datagram
= 1600+179(0 to 179=180)
= 1779 (.5M)

4b.With formats, explain Source Quench and Redirection ICMP messages.

Source Quench Message

Figure 9.7 *Source-quench format*

Type: 4	Code: 0	Checksum
Unused (All 0s)		
Part of the received IP datagram including IP header plus the first 8 bytes of datagram data		

Format**(1M)**

The **source-quench message** in ICMP was designed to add a kind of flow control and congestion control to the IP. When a router or host discards a datagram due to congestion, it sends a source-quench message to the sender of the datagram. This message has two purposes. First, it informs the source that the datagram has been discarded. Second, it warns the source that there is congestion somewhere in the path and that the source should slow down (quench) the sending process. The source-quench format is shown in Figure 9.7.

(.5M)

Redirection ICMP message

Figure 9.11 *Redirection message format*

Type: 5	Code: 0 to 3	Checksum
IP address of the target router		
Part of the received IP datagram including IP header plus the first 8 bytes of datagram data		

Format (1M)
Explanation with code description(.5M)