SSN COLLEGE OF ENGINEERING, KALAVAKKAM
Department of Computer Science and Engineering
B.E. (CSE) V semester UNIT TEST – III
CS2302 - Computer Networks
Answer Key

Part A **[5 * 2 = 10]**

1. You say that ARP does not provide a service to the network layer, it is part of the network layer and helps provide a service to the transport layer. The issue of IP addressing does not occur in the data link layer. Data link layer protocols are like protocols 1 through 6 in Chap. 3, HDLC, PPP, etc. They move bits from one end of a line to the other.

2. An error in the header is much more serious than an error in the data. A bad address, for example, could result in a packet being delivered to the wrong host. Many hosts do not check to see if a packet delivered to them is in fact really for them. They assume the network will never give them packets intended for another host. Data is sometimes not checksummed because doing so is expensive, and upper layers often do it anyway, making it redundant here.

3. Conceptually, there are no changes. Technically, the IP addresses requested are now bigger, so bigger fields are needed.

4. The Internet Group Management Protocol (IGMP) is a communications protocol used by hosts and adjacent routers on IP networks to establish multicast group memberships.

   IGMP is an integral part of the IP multicast specification. It is analogous to ICMP for unicast connections. IGMP can be used for online streaming video and gaming, and allows more efficient use of resources when supporting these types of applications.

5. Classless Inter-Domain Routing (CIDR) is a method for allocating IP addresses and routing Internet Protocol packets. CIDR replace the previous addressing architecture of classful network design in the Internet. Their goal was to slow the growth of routing tables on routers across the Internet, and to help slow the rapid exhaustion of IPv4 addresses.

Part B **[8 + 16 + 16]**

1. Phases of DHCP (Explanation in Detail)
   - Discover Phase
   - Offer Phase
   - Request Phase

- Acknowledgement Phase
- Release Phase

2. A)Open Shortest Path Function

- Initial state : similar to distance vector i.e., state of link to neighbors known.
- Goal: To find the path of least cost to destination.
- Basic Idea -- Every node knows how to reach its neighbors. If this info is dissemination (broadcast) to every node, every node ultimately has the information to build the complete map of the network.
- Two mechanisms:
- Reliable dissemination of link state information -- process is called Reliable flooding.
- Calculation of routes using the collected information -- the computation is based on Dijkstra's algorithm
- Reliable Flooding
    - Store most recent LSP from each node
    - Forward LSP to all nodes but one that sent it
    - Generate new LSP periodically; increment SEQNO
    - Start SEQNO at 0 when reboot
    - Decrement TTL of each stored LSP; discard when TTL=0
- Dijkstra's Algorithm
    - Initialize the **Confirmed** list with an entry for myself; this entry has a cost of 0
    - For the node just added to the **Confirmed** list in the previous step, call it node **Next**, select its LSP
    - For each neighbor (Neighbor) of **Next**, calculate the cost (Cost) to reach this Neighbor as the sum of the cost from myself to Next and from Next to Neighbor
    - If Neighbor is currently on neither the **Confirmed** nor the **Tentative** list, then add (Neighbor, Cost, Nexthop) to the **Tentative** list, where Nexthop is the direction I go to reach Next
    - If Neighbor is currently on the **Tentative** list, and the Cost is less than the currently listed cost for the Neighbor, then replace the current entry with (Neighbor, Cost, Nexthop) where Nexthop is the direction I go to reach Next
    - If the **Tentative** list is empty, stop. Otherwise, pick the entry from the **Tentative** list with the lowest cost, move it to the **Confirmed** list, and return to Step 2.

b) Problem

(or)

3. A) 147.65.0.0
   Subnets are
   147.65.0.0
   147.65.16.0
   147.65.32.0
   147.65.64.0
   147.65.128.0
   Etc…

b) Queuing Disciplines followed in Routers (Explanation in detail)

- FIFO queuing
- Priority Queuing
- Fair Queuing

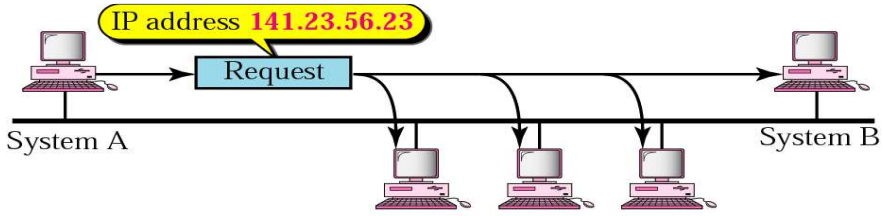
4. A) ICMP Error and Control Messages (Explanation in detail)

0 - Echo Reply
3 - Destination Unreachable
4 - Source Quench
5 - Redirect
8 - Echo
11 - Time Exceeded
12 - Parameter Problem
13 - Timestamp
14 - Timestamp Reply
15 - Information Request
16 - Information Reply
17 - Address Mask Request
18 - Address Mask Reply

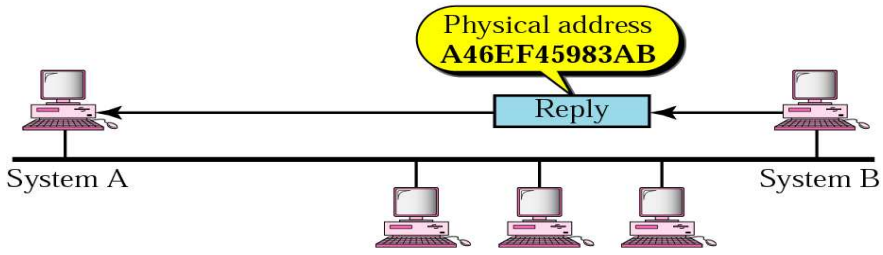
B)
Multicasting (Explanation in detail)

(Or)

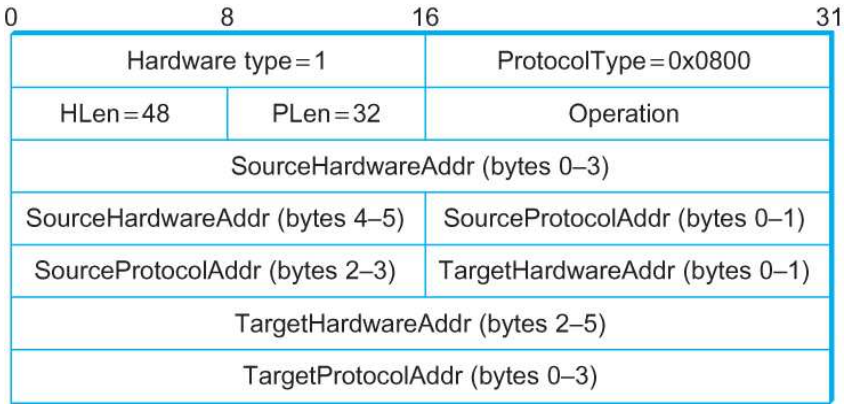
5. a) ARP and RARP. (Explanation in detail)



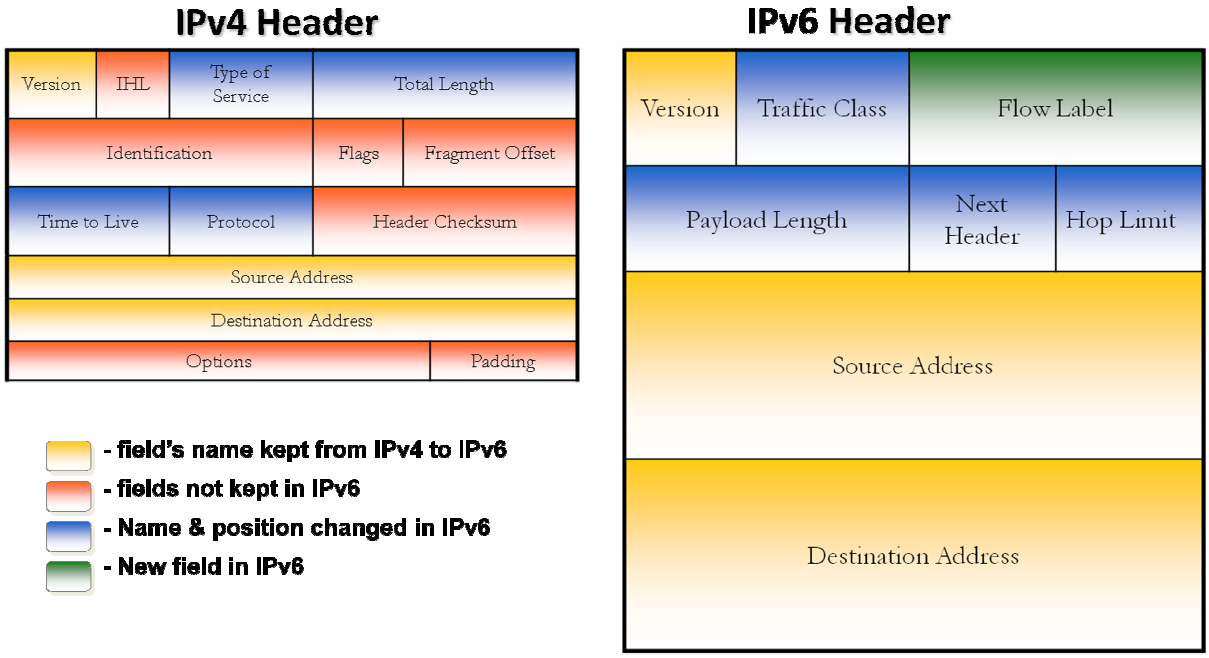
a. ARP request is broadcast



b. ARP reply is unicast


0
8
16
31
Hardware type = 1
ProtocolType = 0x0800
HLen = 48
PLen = 32
Operation
SourceHardwareAddr (bytes 0–3)
SourceHardwareAddr (bytes 4–5)
SourceProtocolAddr (bytes 0–1)
SourceProtocolAddr (bytes 2–3)
TargetHardwareAddr (bytes 0–1)
TargetHardwareAddr (bytes 2–5)
TargetProtocolAddr (bytes 0–3)

b)


IPv4 Header
Version
IHL
Type of Service
Total Length
Identification
Flags
Fragment Offset
Time to Live
Protocol
Header Checksum
Source Address
Destination Address
Options
Padding
- field's name kept from IPv4 to IPv6
- fields not kept in IPv6
- Name & position changed in IPv6
- New field in IPv6
IPv6 Header
Version
Traffic Class
Flow Label
Payload Length
Next Header
Hop Limit
Source Address
Destination Address