UNIT-4

IPV6 Addressing and Features

PART-A

MULTIPLE CHOICE QUESTIONS:

1. An IP V6 address is_____.
   a. 128 bits
   b. 64 bits
   c. 32 bits
   d. 8 bits
   ANSWER: a

2. To make addresses more readable, IPv6 specifies_____.
   a. colon hexadecimal notation
   b. dotted decimal notation
   c. hexa decimal notation
   d. decimal notation
   ANSWER: a

3. Two bytes in hexadecimal notation require _____ hexadecimal digits.
   a. 4
   b. 3
   c. 5
   d. 6
   ANSWER : a

4. Show the unabbreviated colon hex notation for the following IPv6 addresses:
   An address with 64 0s followed by 64 1s.
   a. 0000:0000:0000:0000:FFFF:FFFF:FFFF:FFFF
   b. 0000:0000:0000:0000:0000:0000:0000:0000
   c. FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF
   d. AAAA:AAAA:AAAA:AAAA:AAAA:AAAA:AAAA:AAAA
   ANSWER : a

5. Show the unabbreviated colon hex notation for the following IPv6 addresses:
   An address with 128 1s.
   a. 0000:0000:0000:0000:FFFF:FFFF:FFFF:FFFF
   b. 0000:0000:0000:0000:0000:0000:0000:0000
   c. FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF
   d. AAAA:AAAA:AAAA:AAAA:AAAA:AAAA:AAAA:AAAA
   ANSWER : c

6. Show abbreviations for the following address:
   0000:0000:FFFF:0000:0000:0000:0000:0000
   a. 0:0:FFFF::
   b. 1234:2346::1111
   c. 0:1::1200:1000
   d. ::FFFF:24.123.12.6
   ANSWER : a

7. Find the interface identifier if the physical address in the EUI is (F5-A9-23-EF-07-14-7A-D2)$_{16}$ using the format we defined for Ethernet addresses.

    a. F7A9:23EF:0714:7AD2
    b. F7:A9:23:EF:07:14:7A:D2
    c. F:7A9:2:3EF:0:714:7:AD2
    d. F7:A9:23EF:07:14:7AD2
    ANSWER: a

8. In an IPv6 header, the traffic class field is similar to which field in the IPv4 header?
    a) Fragmentation field
    b) Fast switching
    c) TOS field
    d) Option field

ANSWER: c

9. IPv6 does not use _____ type of address.
    a. Broadcast
    b. Multicast
    c. Any cast
    d. Unicast

ANSWER: a

10. What is disadvantage of NAT
    a. Conserves the legally registered addresses
    b. Loss of end to end IP traceability
    c. Eliminates address renumbering as network changes
    d. None of above

ANSWER: b

11. Which term is not related to NAT
    a. inside local
    b. outside local
    c. inside global
    d. external global

ANSWER: d

12. Meaning of Outside local
    a. Name of inside source address before translation
    b. Name of destination host before translation
    c. Name of inside host after translation
    d. Name of outside destination host after translation

ANSWER: b

13. Which of the following is true when describing a multicast address?
    a. Packets addressed to a unicast address are delivered to a single interface.
    b. Packets are delivered to all interfaces identified by the address. This is also called a one-to-many address.
    c. Identifies multiple interfaces and is only delivered to one address. This address can also be called one-to-one-of-many.
    d. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap

ANSWER: b

14. Which of the following is true when describing a global unicast address?
    a. Packets addressed to a unicast address are delivered to a single interface.

b. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.
c. These are like private addresses in IPv4 in that they are not meant to be routed.
d. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

ANSWER: b

15. Which of the following is true when describing a link-local address?
a. Packets addressed to a unicast address are delivered to a single interface.
b. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.
c. These are like private addresses in IPv4 in that they are not meant to be routed.
d. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

ANSWER: c

16. Which statement(s) about IPv4 and IPv6 addresses are true?
a. An IPv6 address is 32 bits long, represented in hexidecimal.
b. An IPv6 address is 128 bits long, represented in decimal.
c. An IPv4 address is 32 bits long, represented in decimal.
d. An IPv6 address is 128 bits long, represented in hexidecimal.

ANSWER:c

17. Which are considered the methods of NAT?
1. Static
2. IP NAT pool
3. Dynamic
4. NAT double-translation
5. Overload
a. 1 and 6
b. 3 only
c. 1, 3 and 5
d. All of the above

ANSWER:c

18. An organization is assigned the block 2000:1456:2474/48. What is the CIDR notation for the blocks in the first and second subnets in this organization.
a. 2000:1456:2474:0000/64 and 2000:1456:2474:0001/64
b. 2000:1456:2474:0000/64 and 2000:1456:2474:0002/64
c. 2000:1456:2474:0001/64 and 2000:1456:2474:0002/64
d. 2000:1456:2474:0000/64 and 2000:1456:2474:0000/48

ANSWER: a

19. Assume a host with Ethernet address (**F5-A9-23-11-9B-E2**)16 has joined the network. What would be its global unicast address if the global unicast prefix of the organization is 3A21:1216:2165 and the subnet identifier is A245:1232.
a. ::F5A9:23FF:FE11:9BE2
b. 3A21:1216:2165::F5A9:23FF:FE11:9BE2
c. 3A21:1216:2165:A245:1232:F7A9:23FF:FE11:9BE2
d. 3A21:1216:2165:A245:1232:F5A9:23FF:FE11:9BE2

ANSWER: c

20. Assume a host with Ethernet address (**F5-A9-23-11-9B-E2**)16 has joined the network. What would be its link local address ?
    a. FE80::F7A9:23FF:FE11:9BE2
    b. FE10::F7A9:23FF:FE11:9BE2
    c. FE00::F7A9:23FF:FE11:9BE2
    d. FE80::F5A9:23FF:FE11:9BE2

ANSWER: a

PART-B (4 Marks EACH)

1)An Internet Service Provider(ISP) has the following chunk of CIDR-based IP addresses available with it:245.248.128.0/20. The ISP wants to give half of this chunk of addresses to Organization A, and a quarter to Organization B, while retaining the remaining with itself. Which of the following is a valid allocation of addresses to A and B?

(A) 245.248.136.0/21 and 245.248.128.0/22
(B) 245.248.128.0/21 and 245.248.128.0/22
(C) 245.248.132.0/22 and 245.248.132.0/21
(D) 245.248.136.0/22 and 245.248.132.0/21

Answer (A)

Since <u>routing prefix</u> is 20, the ISP has 2^(32-20) or 2^12 addresses. Out of these 2^12 addresses, half (or 2^11) addresses have to be given to organization A and quarter (2^10) addresses have to be given to organization B. So routing prefix for organization A will be 21. For B, it will be 22. If we see all options given in question, only options (A) and (B) are left as only these options have same number of routing prefixes. Now we need to choose from option (A) and (B). To assign addresses to organization A, ISP needs to take first 20 bits from 245.248.128.0 and fix the 21st bit as 0 or 1. Similarly, ISP needs to fix 21st and 22nd bits for organization B. If we take a closer look at the options (A) and (B), we can see the 21st and 22nd bits for organization B are considered as 0 in both options. So 21st bit of organization A must be 1. Now take the first 20 bits from 245.248.128.0 and 21st bit as 1, we get addresses for organization A as 245.248.136.0/21

2) In the IPv4 addressing format, the number of networks allowed under Class C addresses is
(A) 2^14
(B) 2^7
(C) 2^21
(D) 2^24
Answer

In class C, 8 bits are reserved for Host Id and 24 bits are reserved for Network Id. Out of these 24 Network Id bits, the leading 3 bits are fixed as 110. So remaining 21 bits can be used for different networks. See <u>this </u>for more details.

3) Which of the following is true when describing a multicast address?

A. Packets addressed to a unicast address are delivered to a single interface.

B. Packets are delivered to all interfaces identified by the address. This is also called a one-to-many address.

C. Identifies multiple interfaces and is only delivered to one address. This address can also be called one-to-one-of-many.

D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **B**
Explanation:
Packets addressed to a multicast address are delivered to all interfaces identified by the multicast address, the same as in IPv4. It is also called a one-to-many address. You can always tell a multicast address in IPv6 because multicast addresses always start with *FF*.

4) Which of the following is true when describing a unicast address?

A. Packets addressed to a unicast address are delivered to a single interface.

B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

C. These are like private addresses in IPv4 in that they are not meant to be routed.

D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **A**
Explanation:
Packets addressed to a unicast address are delivered to a single interface. For load balancing, multiple interfaces can use the same address
.
5) Which of the following is true when describing a link-local address?

A. Packets addressed to a unicast address are delivered to a single interface.

B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

C. These are like private addresses in IPv4 in that they are not meant to be routed.

D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **C**
Explanation:
Link-local addresses are meant for throwing together a temporary LAN for meetings or a small LAN that is not going to be routed but needs to share and access files and services locally.

6) Which of the following is true when describing a link-local address?

A. Packets addressed to a unicast address are delivered to a single interface.

B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

C. These are like private addresses in IPv4 in that they are not meant to be routed.

D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **C**
Explanation:
Link-local addresses are meant for throwing together a temporary LAN for meetings or a small LAN that is not going to be routed but needs to share and access files and services locally.

7) Which of the following is true when describing a link-local address?

A. Packets addressed to a unicast address are delivered to a single interface.

B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

C. These are like private addresses in IPv4 in that they are not meant to be routed.

D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **C**
Explanation:
Link-local addresses are meant for throwing together a temporary LAN for meetings or a small LAN that is not going to be routed but needs to share and access files and services locally.

8)Which of the following is true when describing a link-local address?

A. Packets addressed to a unicast address are delivered to a single interface.

B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

C. These are like private addresses in IPv4 in that they are not meant to be routed.

D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **C**
Explanation:
Link-local addresses are meant for throwing together a temporary LAN for meetings or a small LAN that is not going to be routed but needs to share and access files and services locally.

9) Which of the following is true when describing a link-local address?

 A. Packets addressed to a unicast address are delivered to a single interface.

 B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

 C. These are like private addresses in IPv4 in that they are not meant to be routed.

 D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **C**
Explanation:
Link-local addresses are meant for throwing together a temporary LAN for meetings or a small LAN that is not going to be routed but needs to share and access files and services locally.

10)Which of the following is true when describing a link-local address?

 A. Packets addressed to a unicast address are delivered to a single interface.

 B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

 C. These are like private addresses in IPv4 in that they are not meant to be routed.

 D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **C**
Explanation:
Link-local addresses are meant for throwing together a temporary LAN for meetings or a small LAN that is not going to be routed but needs to share and access files and services locally.

PART-C (12 Marks)

 1a) Which of the following is true when describing a link-local address?

 A. Packets addressed to a unicast address are delivered to a single interface.

 B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

 C. These are like private addresses in IPv4 in that they are not meant to be routed.

 D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **C**
Explanation:

Link-local addresses are meant for throwing together a temporary LAN for meetings or a small LAN that is not going to be routed but needs to share and access files and services locally.

1b)
Which of the following is true when describing a link-local address?

A. Packets addressed to a unicast address are delivered to a single interface.

B. These are your typical publicly routable addresses, just like a regular publicly routable address in IPv4.

C. These are like private addresses in IPv4 in that they are not meant to be routed.

D. These addresses are meant for nonrouting purposes, but they are almost globally unique so it is unlikely they will have an address overlap.

Answer: Option **C**
Explanation:
Link-local addresses are meant for throwing together a temporary LAN for meetings or a small LAN that is not going to be routed but needs to share and access files and services locally.

1c) Dynamic NAT _____.

A. always maps a private IP address to a public IP address

B. provides an automated mapping of inside local to inside global IP addresses

C. provides a mapping of internal host names to IP addresses

D. dynamically provides IP addressing to internal hosts

2a) What is the LLMNR multicast destination addresses for IPv6?
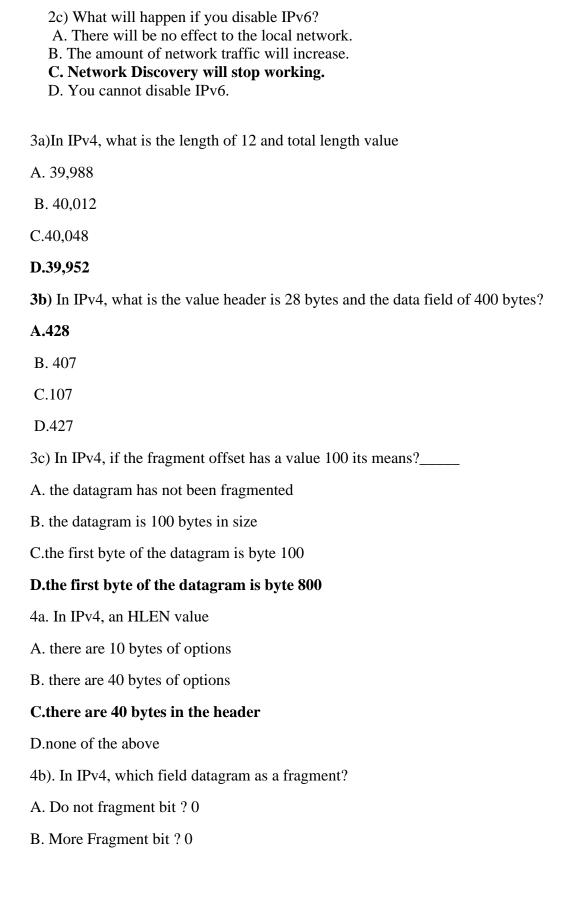 A. fe80::01
B. ff00:ffff
C. ffff::0001
D. ff01::3:1

2b)What is the LLMNR multicast destination address for IPv4?
A. 224.0.0.252
B. 255.0.0.127
C. 127.0.0.255
D. 255.255.255.255

2c) What will happen if you disable IPv6?
 A. There will be no effect to the local network.
 B. The amount of network traffic will increase.
 C. Network Discovery will stop working.
 D. You cannot disable IPv6.

3a)In IPv4, what is the length of 12 and total length value

A. 39,988

 B. 40,012

C.40,048

D.39,952

3b) In IPv4, what is the value header is 28 bytes and the data field of 400 bytes?

A.428

 B. 407

 C.107

 D.427

3c) In IPv4, if the fragment offset has a value 100 its means?_____

A. the datagram has not been fragmented

B. the datagram is 100 bytes in size

C.the first byte of the datagram is byte 100

D.the first byte of the datagram is byte 800

4a. In IPv4, an HLEN value

A. there are 10 bytes of options

B. there are 40 bytes of options

C.there are 40 bytes in the header

D.none of the above

4b). In IPv4, which field datagram as a fragment?

A. Do not fragment bit ? 0

B. More Fragment bit ? 0

C.Fragment offset = 1000

D.none of the above

4c). The IPv4 header size

A. is 20 to 60 bytes long

B. is 20 bytes long

C.is 60 bytes long

D.none of the above

5a). In IPv4, when a datagram size of the datagram must

A. MUT

B. MAT

C.MTU

D.none of the above

5b)You want to ping the loopback address of your local host(with IPv6). What will you type?

  A. *ping 127.0.0.1*

  B. *ping 0.0.0.0*

  C. *ping ::1*

  D. *trace 0.0.::1*

Answer: Option **C**
Explanation:
The loopback address with IPv4 is *127.0.0.1*. With IPv6, that address is *::1*.

5c)Which statement(s) about IPv6 addresses are true?

1. Leading zeros are required.
2. Two colons (::) are used to represent successive hexadecimal fields of zeros.
3. Two colons (::) are used to separate fields.
4. A single interface will have multiple IPv6 addresses of different types.

  A. 1 and 3

  B. 2 and 4

  C. 1, 3 and 4

D. All of the above

Answer: Option **B**
Explanation:
In order to shorten the written length of an IPv6 address, successive fields of zeros may be replaced by double colons. In trying to shorten the address further, leading zeros may also be removed. Just as with IPv4, a single device's interface can have more than one address; with IPv6 there are more types of addresses and the same rule applies. There can be link-local, global unicast, and multicast addresses all assigned to the same interface.

6a) Which command will show you all the translations active on your router
A. **show ip nat translations**
B. show ip nat statistics
C. debug ip nat
D. clear ip nat translations
6b) Which command would you place on the interface on a private network

A. ip nat inside
B. ip nat outside
C. ip outside global
D. ip inside local
6c) Meaning of Outside local
A. Name of inside source address before translation
B. **Name of destination host before translation**
C. Name of inside host after translation
D. Name of outside destination host after translation