CHAPTER 31

Next Generation

31.1 MULTIPLE-CHOICE QUESTIONS

1. d	3. b	5. c	7. c	9. a
11. b	13. b	15. a	17. b	19. c
21. a	23. b	25. a	27. d	29. b
31. b	33. d	35. d	37. d	39. a

31.2 EXERCISES

41.

a. 0000:0000:0000:0000:0000:0000:0000:0000

b. 0000:00AA:0000:0000:0000:0000:0000:0000

c. 0000:1234:0000:0000:0000:0000:0000:0003

d. 0123:0000:0000:0000:0000:0000:0001:0002

43.

a. Unspecified address

b. Mapped address of the IPv4.

c. Provider based address with the address registered through INTERNIC (North American registry).

d. Provider based address with the address registered through RIPNIC (European registry).

e. Provider based address with the address registered through APNIC (Asian/Pacific registry).

45. 0000:0000:0000:0000:0000:0000::8106:0C22 or 0::8106:C22

47. 0000:0000:0000:0000:0000:0000:0000:0001 or 0::1

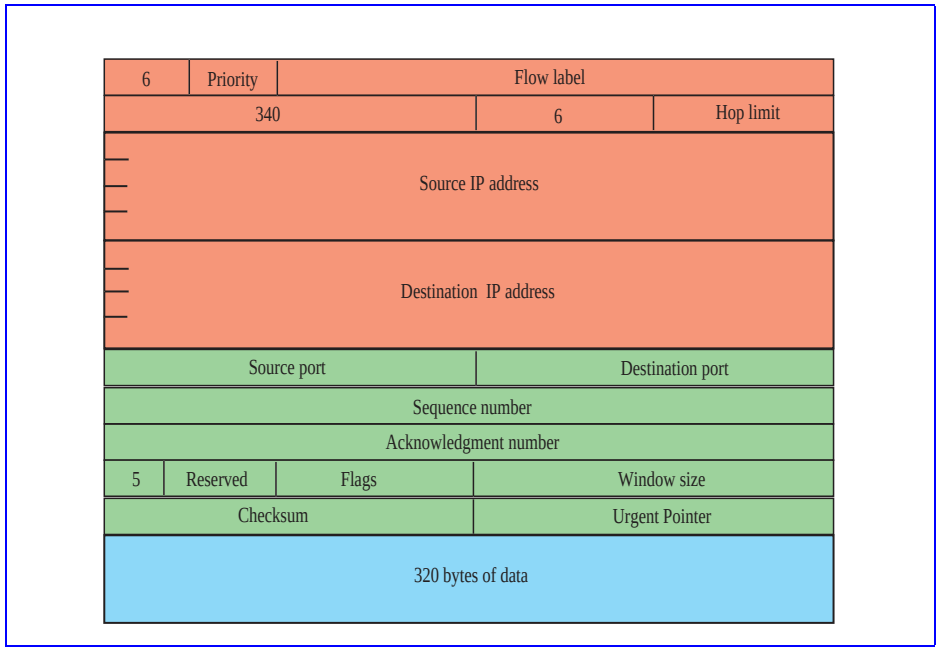
49. FEC0:0000:0000:0000:0000:0000:0000:0123 or FEC0::123

51. FF01: Permanent node local

FF02: Permanent link local
FF05: Permanent site local
FF08: Permanent organization local
FF0E: Permanent global
FF11: Transient node local
FF12: Transient link local
FF15: Transient site local
FF18: Transient organization local
FF1E: Transient global

53. 581E:14
55. See Figure 31.1.

Figure 31.1 *Exercise 55*



57. The types of ICMP messages that contain part of the original IP datagram are all 5 of the error reporting types (destination unreachable, packet too big, time exceeded, parameter problem, and redirection). The IP header and first 8 bytes of data are included because this data contains all of the information needed for the source of the datagram to identify the packet in question, including the destination address and the source and destination port addresses.
59. The time exceeded message for IPv6 is identical to that of IPv4 except that the type is now type 3 instead of type11 for IPv4.

61. In the redirection message, the type changes from type 5 in IPv4 to type 137 in IPv6, there is only code 0 in IPv6, the address section has been expanded to accommodate the size of the larger addresses and to include the original destination address, and an extension header has been added to inform the source of the physical address of the target router.

63. In the router solicitation message, the type is 10 in IPv4 and 133 in IPv6. The code and checksum fields are unchanged, the identifier and sequence number fields of IPv4 have been eliminated, and an option to inform the responding router of the host's physical address has been added in IPv6. In the router advertisement message, the type of 9 was used in IPv4 while the type of 134 is used in IPv6. In IPv6, the router only announces itself instead of all of the routers on the network, so the number of addresses field and the address entry size field have been eliminated. Options have been added that allow the router to advertise its physical address, its MTU size, and its valid and preferred lifetime.

65. The version field of IGMP was eliminated. IGMP had 2 possible types: type 1 for a query and type 2 for a report. ICMPv6 uses type 130 for a query, type 131 for a report, with a third type added, type 132, for a termination message. ICMPv6 messages have a code field that is always 0. The query message in ICMPv6 has a maximum response delay field and a larger address field to accommodate the longer addresses of IPv6.

67. 0000:0000:0000:0000:0000:0000:77FE:FEFE or 0::77FE:FEFE

69. $(2^{128} - 2^{32})$ more addresses