CHAPTER 6

Delivery, Forwarding, and Routing of IP Packets

Exercises

1. **Direct**; Both hosts are on the same network (same netid: **137.23**).

3. See Table 6.E3.

Table 6.E3 *Solution to Exercise 3*

Class	*Destination*	*Next Hop*	*Interface*
Class A	111.0.0.0	—	m1
Class B	145.80.0.0	111.25.19.20	m1
	170.14.0.0	111.25.19.20	m1
Class C	192.16.7.0	111.15.17.32	m1
Default	0	**default router**	m0

5. Destination address: **192.16.7.42**

   Binary: `11000000 00010000 00000111 00101010`
   Shift copy of address: `00000000 00000000 00000000 00001100` = $\mathbf{12}_{10}$
   Destination network: **Class C** Network address: **192.16.7.0**
   Next hop address: **111.15.17.32** → Interface: **m0**

7. Destination address: **147.26.50.30**

   Binary: `10010011 00011010 00110010 00011110`
   Shift copy of address: `00000000 00000000 00000000 00001001` = $\mathbf{9}_{10}$
   Destination network: **Class B** Network address: **147.26.0.0**
   Next hop address: **111.30.31.18** → Interface: **m0**

9. Destination address: **135.11.80.21**

   Mask: **/18** Network address: **135.11.64.0**
   Next hop address: **default** → Interface: **m4**

11. Destination address: **202.70.20.30**

Mask: /26	Result: **202.70.20.0**	**No match**
Mask: /25	Result: **202.70.20.0**	**No match**
Mask: /24	Result: **202.70.20.0**	**No match**
Mask: /22	Result: **202.70.20.0**	**No match**

Next hop address: **180.70.65.200 (default router)** → Interface: **m2**

13. A routing table for a LAN not connected to the Internet and with no subnets can have a routing table with host-specific addresses. There is no next-hop address since all packets remain within the network.

15. If the packet with destination address 140.24.7.194 arrives at R3, it gets sent to interface m0. If it arrives at R2, it gets sent to interface m1 and then to router R3. The only way R1 can receive the packet is if the packet comes from organization 1, 2, or 3; it goes to R1 and is sent out from interface m3.

17. See Table 6.E17.

Table 6.E17 *Solution to Exercise 17*

Mask	Network address	Next-hop address	Interface
/20	**120.14.64.0**	**—**	**m0**
/20	**120.14.96.0**	**—**	**m2**
/20	**120.14.112.0**	**—**	**m3**
/0	**0.0.0.0**	**default router**	**m4**

19. See Table 6.E19.

Table 6.E19 *Solution to Exercise 19*

Mask	Network address	Next-hop address	Interface
/22	**120.14.96.0**	**—**	**m0**
/22	**120.14.100.0**	**—**	**m1**
/22	**120.14.104.0**	**—**	**m2**
/22	**120.14.108.0**	**—**	**m3**
/0	**0.0.0.0**	**default router**	**m4**

21. See Table 6.E21.

Table 6.E21 *Solution to Exercise 21*

Mask	Network address	Next-hop address	Interface
/30	**120.14.64.0**	**—**	**m0**
/30	**120.14.64.4**	**—**	**m1**
/30	**120.14.64.8**	**—**	**m2**
/30	**120.14.64.12**	**—**	**m3**
…	…	…	…
/30	**120.14.65.252**	**—**	**m127**
/0	**0.0.0.0**	**default router**	**m128**