Memory Tables Answer Key

Chapter 2

Table 2-2 Examples of Types of Ethernet

Speed	Common Name	Informal IEEE Standard Name	Formal IEEE Standard Name	Cable Type, Maximum Length
10 Mbps	Ethernet	10BASE-T	802.3	Copper, 100 m
100 Mbps	Fast Ethernet	100BASE-T	802.3u	Copper, 100 m
1000 Mbps	Gigabit Ethernet	1000BASE-LX	802.3z	Fiber, 5000 m
1000 Mbps	Gigabit Ethernet	1000BASE-T	802.3ab	Copper, 100 m
10 Gbps	10 Gig Ethernet	10GBASE-T	802.3an	Copper, 100 m

Table 2-3 10BASE-T and 100BASE-TX Pin Pairs Used

Transmits on Pins 1,2	Transmits on Pins 3,6
PC NICs	Hubs
Routers	Switches
Wireless access point (Ethernet interface)	—

Chapter 3

Table 3-3 Comparing HDLC Header Fields to Ethernet

HDLC Header or Trailer Field	Ethernet Equivalent	Description
Flag	Preamble	Lists a recognizable bit pattern so that the receiving nodes realize that a new frame is arriving
Address	Destination Address	Identifies the destination device
Type	Type	Identifies the type of Layer 3 packet encapsulated inside the frame
FCS	FCS	A field used by the error detection process; it is the only trailer field in this table

Chapter 4

Table 4-6 All Possible Valid Network Numbers

Class	First Octet Range	Valid Network Numbers
A	1 to 126	1.0.0.0 to 126.0.0.0
B	128 to 191	128.0.0.0 to 191.255.0.0
C	192 to 223	192.0.0.0 to 223.255.255.0

Chapter 5

Table 5-2 TCP/IP Transport Layer Features

Function	Description
Multiplexing using ports	Function that allows receiving hosts to choose the correct application for which the data is destined, based on the port number.
Error recovery (reliability)	Process of numbering and acknowledging data with Sequence and Acknowledgment header fields.
Flow control using windowing	Process that uses window sizes to protect buffer space and routing devices from being overloaded with traffic.
Connection establishment and termination	Process used to initialize port numbers and Sequence and Acknowledgment fields.
Ordered data transfer and data segmentation	Continuous stream of bytes from an upper-layer process that is “segmented” for transmission and delivered to upper-layer processes at the receiving device, with the bytes in the same order.

Table 5-3 Popular Applications and Their Well-Known Port Numbers

Port Number	Protocol	Application
20	TCP	FTP data
21	TCP	FTP control
22	TCP	SSH
23	TCP	Telnet
25	TCP	SMTP
53	UDP, TCP	DNS
67, 68	UDP	DHCP
69	UDP	TFTP
80	TCP	HTTP (WWW)
110	TCP	POP3
161	UDP	SNMP
443	TCP	SSL

Chapter 6

Table 6-2 Switch Internal Processing

Switching Method	Description
Store-and-forward	The switch fully receives all bits in the frame (store) before forwarding the frame (forward). This allows the switch to check the FCS before forwarding the frame.
Cut-through	The switch forwards the frame as soon as it can. This reduces latency but does not allow the switch to discard frames that fail the FCS check.
Fragment-free	The switch forwards the frame after receiving the first 64 bytes of the frame, thereby avoiding forwarding frames that were errored because of a collision.

Table 6-3 Benefits of Segmenting Ethernet Devices Using Hubs, Switches, and Routers

Feature	Hub	Switch	Router
Greater cabling distances are allowed	Yes	Yes	Yes
Creates multiple collision domains	No	Yes	Yes
Increases bandwidth	No	Yes	Yes
Creates multiple broadcast domains	No	No	Yes

Chapter 7

Table 7-5 Key Sequences for Command Edit and Recall

Keyboard Command	What Happens
Up arrow or Ctrl-P	This displays the most recently used command. If you press it again, the next most recent command appears, until the history buffer is exhausted. (The P stands for previous.)
Down arrow or Ctrl-N	If you have gone too far back into the history buffer, these keys take you forward to the more recently entered commands. (The N stands for next.)
Left arrow or Ctrl-B	This moves the cursor backward in the currently displayed command without deleting characters. (The B stands for back.)
Right arrow or Ctrl-F	This moves the cursor forward in the currently displayed command without deleting characters. (The F stands for forward.)
Backspace	This moves the cursor backward in the currently displayed command, deleting characters.
Ctrl-A	This moves the cursor directly to the first character of the currently displayed command.
Ctrl-E	This moves the cursor directly to the end of the currently displayed command.
Ctrl-R	This redisplays the command line with all characters. It's useful when messages clutter the screen.
Ctrl-D	This deletes a single character.
Ctrl-Shift-6	Interrupts the current command.

Table 7-6 Common Switch Configuration Modes

Prompt	Name of Mode	Context-Setting Command(s) to Reach This Mode
hostname(config)#	Global	None—first mode after **configure terminal**
hostname(config-line)#	Line	**line console 0** **line vty 0 15**
hostname(config-if)#	Interface	**interface** *type number*
hostname(vlan)#	VLAN	**vlan** *number*

Table 7-7 Names and Purposes of the Two Main Cisco IOS Configuration Files

Configuration Filename	Purpose	Where It Is Stored
Startup config	Stores the initial configuration used anytime the switch reloads Cisco IOS.	NVRAM
Running config	Stores the currently used configuration commands. This file changes dynamically when someone enters commands in configuration mode.	RAM

Chapter 8

Table 8-2 Banners and Their Use

Banner	Typical Use
Message of the Day (MOTD)	Shown before the login prompt. Used for temporary messages that can change from time to time, such as "Router1 down for maintenance at midnight."
Login	Shown before the login prompt but after the MOTD banner. Used for permanent messages such as "Unauthorized Access Prohibited."
Exec	Shown after the login prompt. Used to supply information that should be hidden from unauthorized users.

Table 8-3 Commands Related to the History Buffer

Command	Description
show history	Lists the commands currently held in the history buffer.
history size *x*	From console or vty line configuration mode, sets the default number of commands saved in the history buffer for the user(s) of the console or vty lines, respectively.
terminal history size *x*	From EXEC mode, this command allows a single user to set, just for this one login session, the size of his or her history buffer.

Table 8-4 Actions When Port Security Violation Occurs

Option on the switchport port-security violation Command	Protect	Restrict	Shutdown*
Discards offending traffic	Yes	Yes	Yes
Sends log and SNMP messages	No	Yes	Yes
Disables the interface, discarding all traffic	No	No	Yes

* **shutdown** is the default setting.

Chapter 9

Table 9-3 Expected Trunking Operational Mode Based on the Configured Administrative Modes

Administrative Mode	Access	Dynamic Auto	Trunk	Dynamic Desirable
access	Access	Access	Do Not Use[1]	Access
dynamic auto	Access	Access	Trunk	Trunk
trunk	Do Not Use[1]	Trunk	Trunk	Trunk
dynamic desirable	Access	Trunk	Trunk	Trunk

[1] When two switches configure a mode of "access" on one end and "trunk" on the other, problems occur. Avoid this combination.

Chapter 10

Table 10-4 LAN Switch Interface Status Codes

Line Status	Protocol Status	Interface Status	Typical Root Cause
Administratively Down	Down	disabled	The interface is configured with the **shutdown** command.
Down	Down	notconnect	No cable; bad cable; wrong cable pinouts; the speeds are mismatched on the two connected devices; the device on the other end of the cable is (a) powered off, (b) **shutdown**, or error disabled.
Up	Down	notconnect	An interface up/down state is not expected on LAN switch physical interfaces.
Down	Down (err-disabled)	err-disabled	Port security has disabled the interface.
Up	Up	connected	The interface is working.

Chapter 11

Table 11-2 RFC 1918 Private Address Space

Class of Networks	Private IP Networks	Number of Networks
A	10.0.0.0	1
B	172.16.0.0 through 172.31.0.0	16
C	192.168.0.0 through 192.168.255.0	256

Chapter 12

Table 12-2 IPv4 Address Classes Based on First Octet Values

Class	First Octet Values	Purpose
A	1–126	Unicast (large networks)
B	128–191	Unicast (medium-sized networks)
C	192–223	Unicast (small networks)
D	224–239	Multicast
E	240–255	Experimental

Table 12-3 Key Facts for Classes A, B, and C

	Class A	Class B	Class C
First octet range	1 – 126	128 – 191	192 – 223
Valid network numbers	1.0.0.0 – 126.0.0.0	128.0.0.0 – 191.255.0.0	192.0.0.0 – 223.255.255.0
Total networks	$2^7 - 2 = 126$	$2^{14} = 16{,}384$	$2^{21} = 2{,}097{,}152$
Hosts per network	$2^{24} - 2$	$2^{16} - 2$	$2^8 - 2$
Octets (bits) in network part	1 (8)	2 (16)	3 (24)
Octets (bits) in host part	3 (24)	2 (16)	1 (8)
Default mask	255.0.0.0	255.255.0.0	255.255.255.0

Chapter 13

Table 13-4 Nine Possible Values in One Octet of a Subnet Mask

Binary Mask Octet	Decimal Equivalent	Number of Binary 1s
00000000	0	0
10000000	128	1
11000000	192	2
11100000	224	3
11110000	240	4
11111000	248	5
11111100	252	6
11111110	254	7
11111111	255	8

Chapter 14

Table 14-2 Summary of Subnet ID Key Facts

Definition	Number that represents the subnet
Numeric Value	First (smallest) number in the subnet
Literal Synonyms	Subnet number, subnet address, prefix, resident subnet
Common-Use Synonyms	Network, network ID, network number, network address
Typically Seen In...	Routing tables, documentation

Chapter 15

Table 15-2 Interface Status Codes and Their Meanings

Name	Location	General Meaning
Line status	First status code	Refers to the Layer 1 status—for example, is the cable installed, is it the right/wrong cable, is the device on the other end powered on?
Protocol status	Second status code	Refers generally to the Layer 2 status. It is always down if the line status is down. If the line status is up, a protocol status of down is usually caused by a mismatched data link layer configuration.

Table 15-4 Key Commands to List Router Interface Status

Command	Lines of Output per Interface	IP Configuration Listed	Interface Status Listed?
show ip interface brief	1	Address	Yes
show protocols [*type number*]	1 or 2	Address/mask	Yes
show interfaces [*type number*]	Many	Address/mask	Yes

Chapter 16

Table 16-2 Comparisons of Packet Switching, Fast Switching, and CEF

Improves Routing Efficiency by…	Process Switching	Fast Switching	CEF
…saving data link headers used for encapsulating packets	No	Yes	Yes
…using other tables, with faster lookup time, before looking at the routing table	No	Yes	Yes
…organizing the tables using tree structures for very fast searches and less time to route packets	No	No	Yes

Chapter 17

Table 17-2 IP IGP Metrics

IGP	Metric	Description
RIP-2	Hop count	The number of routers (hops) between a router and the destination subnet.
OSPF	Cost	The sum of all interface cost settings for all links in a route, with the cost defaulting to be based on interface bandwidth.
EIGRP	Composite of bandwidth and delay	Calculated based on the route's slowest link and the cumulative delay associated with each interface in the route.

Table 17-3 Interior IP Routing Protocols Compared

Feature	RIP-1	RIP-2	EIGRP	OSPF	IS-IS
Classless/sends mask in updates/ supports VLSM	No	Yes	Yes	Yes	Yes
Algorithm (DV, advanced DV, LS)	DV	DV	advanced DV	LS	LS
Supports manual summarization	No	Yes	Yes	Yes	Yes
Cisco-proprietary	No	No	Yes[1]	No	No
Routing updates are sent to a multicast IP address	No	Yes	Yes	Yes	—
Convergence	Slow	Slow	Fast	Fast	Fast

1 Although Cisco created EIGRP, and has kept it as a proprietary protocol for many years, Cisco happened to choose to publish EIGRP as an informational RFC around the time this book was published in early 2013. This choice allows other vendors to implement EIGRP, while Cisco retains the rights to the protocol.

Table 17-4 Default Administrative Distances

Route Type	Administrative Distance
Connected	0
Static	1
BGP (external routes)	20
EIGRP (internal routes)	90
IGRP	100
OSPF	110
IS-IS	115
RIP	120
EIGRP (external routes)	170
BGP (internal routes)	200
Unusable	255

Table 17-5 Example OSPF **network** Commands on R3, with Expected Results

Command	Logic in Command	Matched Interfaces
network 10.1.0.0 0.0.255.255	Match interface IP addresses that begin with 10.1	G0/0.341 G0/0.342 S0/0/0
network 10.0.0.0 0.255.255.255	Match interface IP addresses that begin with 10.	G0/0.341 G0/0.342 S0/0/0
network 0.0.0.0 255.255.255.255	Match all interface IP addresses	G0/0.341 G0/0.342 S0/0/0
network 10.1.13.0 0.0.255.255	Match interface IP addresses that begin with 10.1.13	S0/0/0
network 10.1.3.1 0.0.0.0	Match one IP address: 10.1.3.1	G0/0.341

Chapter 20

Table 20-2 Classless and Classful Interior IP Routing Protocols

Routing Protocol	Is It Classless?	Sends Mask in Updates?	Supports VLSM?	Supports Manual Route Summarization?
RIP-1	No	No	No	No
IGRP	No	No	No	No
RIP-2	Yes	Yes	Yes	Yes
EIGRP	Yes	Yes	Yes	Yes
OSPF	Yes	Yes	Yes	Yes

Chapter 24

Table 24-2 RFC 1918 Private Address Space

Range of IP Addresses	Class of Networks	Number of Networks
10.0.0.0 to 10.255.255.255	A	1
172.16.0.0 to 172.31.255.255	B	16
192.168.0.0 to 192.168.255.255	C	256

Chapter 25

Table 25-3 Hexadecimal/Binary Conversion Chart

Hex	Binary	Hex	Binary
0	0000	8	1000
1	0001	9	1001
2	0010	A	1010
3	0011	B	1011
4	0100	C	1100
5	0101	D	1101
6	0110	E	1110
7	0111	F	1111

Chapter 26

Table 26-2 Some Types of IPv6 Addresses and Their First Hex Digit(s)

Address Type	First Hex Digits
Global Unicast	2 or 3 (originally); all not otherwise reserved (today)
Unique Local	FD
Multicast	FF
Link-Local	FE80

Chapter 27

Table 27-3 Key IPv6 Local-Scope Multicast Addresses

Short Name	Multicast Address	Meaning	IPv4 Equivalent
All-nodes	FF02::1	All-nodes (all interfaces that use IPv6 that are on the link)	A subnet broadcast address
All-routers	FF02::2	All-routers (all IPv6 router interfaces on the link)	None
All-OSPF, All-OSPF-DR	FF02::5, FF02::6	All OSPF routers and all OSPF designated routers, respectively	224.0.0.5, 224.0.0.6
EIGRPv6 Routers	FF02::A	All routers using EIGRP for IPv6 (EIGRPv6)	224.0.0.10

Chapter 28

Table 28-2 NDP Function Summary

Function	Protocol Messages	Who Discovers Info	Who Supplies Info	Info Supplied
Router discovery	RS and RA	Any IPv6 host	Any IPv6 router	Link-local IPv6 address of router
Prefix/length discovery	RS and RA	Any IPv6 host	Any IPv6 router	Prefix(es) and associated prefix lengths used on local link
Neighbor discovery	NS and NA	Any IPv6 host	Any IPv6 host	Link-layer address (for example, MAC address) used by a neighbor
Duplicate Address Detection	NS and NA	Any IPv6 host	Any IPv6 host	Simple confirmation whether a unicast address is already in use

Table 28-3 Comparison of Stateless and Stateful DHCPv6 Services

Feature	Stateful DHCP	Stateless DHCP
Remembers IPv6 address (state information) of clients that make requests	Yes	No
Leases IPv6 address to client	Yes	No
Supplies list of DNS server addresses	Yes	Yes
Commonly used with SLAAC	No	Yes

Chapter 29

Table 29-2 Summary of Version Terminology for Interior Routing Protocols

	RIP	OSPF	EIGRP
Latest version that supports IPv4 routes	RIP version 2 (RIPv2)	OSPF version 2 (OSPFv2)	EIGRP
Version that supports IPv6 routes	RIP Next Generation (RIPng)	OSPF version 3 (OSPFv3)	EIGRP for IPv6 (EIGRPv6)

Table 29-3 OSPFv2 and Matching OSPFv3 **show** Commands

To Display Details About...	OSPFv2	OSPFv3
OSPF process	**show ip ospf**	**show ipv6 ospf**
All sources of routing information	**show ip protocols**	**show ipv6 protocols**
Details about OSPF-enabled interfaces	**show ip ospf interface**	**show ipv6 ospf interface**
Concise info about OSPF-enabled interfaces	**show ip ospf interface brief**	**show ipv6 ospf interface brief**
List of neighbors	**show ip ospf neighbor**	**show ipv6 ospf neighbor**
Summary of LSDB	**show ip ospf database**	**show ipv6 ospf database**
OSPF-learned routes	**show ip route ospf**	**show ipv6 route ospf**