CCNA: Routing and Switching Essentials
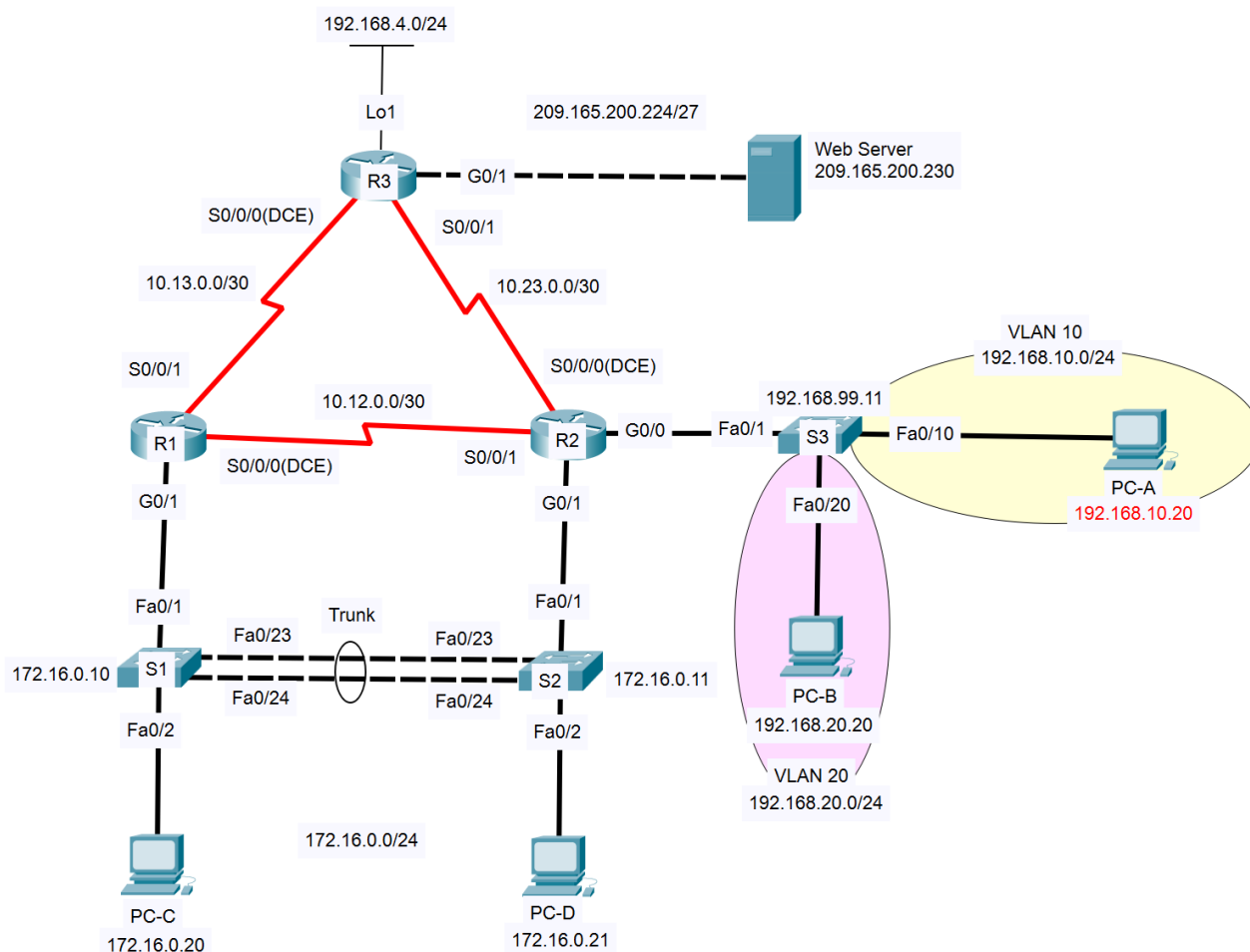
Skills Assessment (Score 85 points/120 minutes)

Name _____

ID. _____

Topology

VLAN Key		
VLAN	**IP Adress**	**Name**
10	192.168.10.0/24	Students
20	192.168.20.0/24	Faculties
99	192.168.99.0/24	Management

Addressing Table

Device	Interface	IP Address	Subnet Mask	Default Gateway
R1	G0/1	172.16.0.1	255.255.255.0	N/A
	S0/0/0 (DCE)	10.12.0.1	255.255.255.252	N/A
	S0/0/1	10.13.0.2	255.255.255.252	N/A
R2	G0/0.10	192.168.10.1	255.255.255.0	N/A
	G0/0.20	192.168.20.1	255.255.255.0	N/A
	G0/0.99	192.168.99.1	255.255.255.0	N/A
	G0/1	172.16.0.2	255.255.255.0	N/A
	S0/0/0 (DCE)	10.23.0.1	255.255.255.252	N/A
	S0/0/1	10.12.0.2	255.255.255.252	N/A
R3	G0/1	209.165.200.225	255.255.255.224	N/A
	S0/0/0 (DCE)	10.13.0.1	255.255.255.252	N/A
	S0/0/1	10.23.0.2	255.255.255.252	N/A
	Lo0	192.168.4.1	255.255.255.0	N/A
S1	VLAN 1	172.16.0.10	255.255.255.0	172.16.0.3
S2	VLAN 1	172.16.0.11	255.255.255.0	172.16.0.3
S3	VLAN 99	192.168.99.11	255.255.255.0	192.168.99.1
Web Server	NIC	209.165.200.230	255.255.255.224	209.165.200.225
PC-A	NIC	192.168.10.20	255.255.255.0	192.168.10.1
PC-B	NIC	192.168.20.20	255.255.255.0	192.168.20.1
PC-C	NIC	172.16.0.20	255.255.255.0	172.16.0.3
PC-D	NIC	172.16.0.21	255.255.255.0	172.16.0.3

Assessment Objectives

    Part 1: Configure Device Basic Settings (18 points, 30 minutes)

    Part 2: Configure EtherChannel (9 points, 10 minutes)

    Part 3: Configure HSRP (9 points, 10 minutes)

    Part 4: Configure VLANs and Inter-VLAN Routing (14 points, 20 minutes)

    Part 5: Configure OSPF Dynamic Routing Protocol and Default Route (23 points, 30 minutes)

    Part 6: Implement ACLS (12 points, 20 minutes)

Scenario

In this Skills Assessment (SA) you will configure a small network. You will configure routers, switches, and PCs to support IPv4 connectivity, VLANs, and inter VLAN routing. You will then configure the devices with EtherChannel, HSRP, OSPF and ACLs. You will test and document the network using common CLI commands throughout the assessment.

Required Resources

- 3 Routers (Cisco 1941 or comparable)
- 3 Switches (Cisco 2960 or comparable)
- 4 PCs
- 1 Server
- Ethernet and Serial cables as shown in the topology

Part 1:   Configure Device Basic Settings

    Total points: 18

    Time: 30 minutes

Step 1:   Create a network in accordance with the given topology above using Packet Tracer.

Step 2:   Setup the PCs and Server.

Configuration tasks for the Internet PC include the following (Refer to the address assigned in the Topology diagram):

Web Server

Configuration Item or Task	Specification	Points
IP Address	Use the address information given in the addressing table	(1/2 point)
Subnet Mask		
Default Gateway		

PC-A

Configuration Item or Task	Specification	Points
IP Address	Use the address information given in the addressing table	(1/2 point)
Subnet Mask		
Default Gateway		

PC-B

Configuration Item or Task	Specification	Points
IP Address	Use the address information given in the addressing table	(1/2 point)
Subnet Mask		
Default Gateway		

PC-C

Configuration Item or Task	Specification	Points
IP Address	Use the address information given in the addressing table	(1/2 point)
Subnet Mask		
Default Gateway		

PC-D

Configuration Item or Task	Specification	Points
IP Address	Use the address information given in the addressing table	(1/2 point)
Subnet Mask		
Default Gateway		

*** At this point, pinging between PC-A and PC-B fails. But pinging between PC-C and PC-D succeeds.

Step 3:   Configure R1.

Configuration tasks for R1 include the following:

Configuration Item or Task	Specification	Points
Router name	R1	(1/2 point)
Encrypted privileged exec password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Console access password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Telnet access password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Interface S0/0/0 (DCE)	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Set the clocking rate to 128000 Activate Interface	(1 point)
Interface S0/0/1	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Activate Interface	(1/2 point)
Interface G0/1	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Activate Interface	(1/2 point)

Step 4:   Configure R2.

Configuration tasks for R2 include the following:

Configuration Item or Task	Specification	Points
Router name	R2	(1/2 point)
Encrypted privileged exec password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Console access password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Telnet access password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Interface S0/0/0 (DCE)	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Set the clocking rate to 128000 Activate Interface	(1 point)
Interface S0/0/1	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Activate Interface	(1/2 point)
Interface G0/1	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Activate Interface	(1/2 point)

*** Do not configure G0/0 at this moment. ***

Configure R3.

Configuration tasks for R3 include the following:

Configuration Item or Task	Specification	Points
Router name	R3	(1/2 point)
Encrypted privileged exec password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Console access password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Telnet access password	uxxxxxxx *(Note: xxxxxxx is your id code)*	(1/2 point)
Interface S0/0/0 (DCE)	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Set the clocking rate to 128000 Activate Interface	(1 point)
Interface S0/0/1	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Activate Interface	(1/2 point)
Interface G0/1	Set the Layer 3 IPv4 address. Use address information given in the addressing table. Activate Interface	(1/2 point)
Interface Loopback 1 (Simulated the Internet)	Set the Layer 3 IPv4 address. Use address information given in the addressing table.	(1/2 point)

Step 5:   Configure S1 and S2.

Configuration tasks for S1 and S2 include the following:

Configuration Item or Task	Specification	Points
Switch name on S1	S1	(1/2 point)
Switch name on S2	S2	(1/2 point)
IP address and default gateway for S1		(1 point)
IP address and default gateway for S2		(1 point)

*** At this point, all devices' ports are up, except R2's G0/0 and one port between S1 and S2 due to STP. And devices on the same network segments can ping each other. ***

Points: _____ of 18

Part 2:   Configure EtherChannel on S1 and S2

Total points: 9

Time: 10 minutes

Configuration tasks for S1 include the following:

Configuration Item or Task	Specification	Points
Bundle Interface Fa0/23 and Fa0/24 into an EtherChannel	Assign Interface Fa0/23 and Fa0/24 into a port-channel (Po1) with PAgP auto mode. Activate the Po1 port.	(3 points)
Shutdown all unused ports		(1 point)

Configuration tasks for S2 include the following:

Configuration Item or Task	Specification	Points
Bundle Interface Fa0/23 and Fa0/24 into an EtherChannel	Assign Interface Fa0/23 and Fa0/24 into a port-channel (Po1) with PAgP desirable mode. Activate the Po1 port.	(3 points)
Shutdown all unused ports		(1 point)

Verify whether the EtherChannel has been setup properly. What is the command for verifying EtherChannel? _____. (1 point)

Points: _____ of <u>9</u>

Part 3: Configure HSRP on R1 and R2.

Total points: 9

Time: 10 minutes

Step 1:   Setup a virtual gateway for the network 172.16.0.0/24.

Configuration Item or Task	Specification	Points
Setup HSRP on R1 with the virtual gateway address of 172.16.0.3 and make sure that R1 will always be selected to be an active router when it is active.		(4 points)
Set up HSRP on R2 with the virtual gateway address of 172.16.0.3		(2 points)

Verify HSRP working properly on R1 and R3. Otherwise, troubleshooting is required.

What is the command used to verify HSRP? _____ (1 point)

Step 2:   Verify network connectivity.

Use the **ping** command to test connectivity between network devices.

Use the following table to methodically verify connectivity with each network device. Take corrective action to establish connectivity if a test fails:

From	To	IP Address	Ping Results	Points
PC-C	R1's virtual gateway			(1/2 point)
PC-D	R1's virtual gateway			(1/2 point)
S1	R1's virtual gateway			(1/2 point)
S2	R1's virtual gateway			(1/2 point)

Points: _____ of 9

Part 4: Configure VLANS and Inter VLAN Routing

Total points: 14

Time: 20 minutes

Step 1:   Configure S3.

Configuration tasks for S1 include the following:

Configuration Item or Task	Specification	Points
Switch name on S3	S3	(1/2 point)
Create the VLAN database	Use Topology VLAN Key table to create and name each of the listed VLANs.	(2 point)
Assign the management IP address.	Assign the Layer 3 IPv4 address to the Management VLAN. Use the IP address given in the addressing table.	(1/2 point)
Assign the default-gateway	Use the address given in the addressing table.	(1/2 point)
Force trunking on Interface F0/1	Use VLAN 1 as the native VLAN.	(1 point)
Configure all other ports as access ports	Use the interface range command.	(1 point)
Assign Fa0/10 to VLAN 10		(1 point)
Assign Fa0/20 to VLAN 20		(1 point)
Shutdown all unused ports.		(1/2 point)

Step 2:   Configure R2.

Configuration tasks for R2 include the following:

Configuration Item or Task	Specification	Points
Configure 802.1Q subinterface .10 on G0/0	Assign VLAN 10. Use the address given in the addressing table.	(1 point)
Configure 802.1Q subinterface .20 on G0/0	Assign VLAN 20. Use the address given in the addressing table.	(1 point)
Configure 802.1Q subinterface .99 on G0/0	Assign VLAN 99. Use the address given in the addressing table.	(1 point)
Activate Interface G0/0		(1/2 point)

Step 3:   Verify network connectivity.

Use the **ping** command to test connectivity between the switches and R1.

Use the following table to methodically verify connectivity with each network device. **Take corrective action to establish connectivity if a test fails:**

From	To	IP Address	Ping Results	Points
PC-A	R2, VLAN 10 address			(1/2 point)
PC-B	R2, VLAN 20 address			(1/2 point)
S3	R2, VLAN 99 address			(1/2 point)
S3	PC-A			(1/2 point)
S3	PC-B			(1/2 point)

Points: _____ of 14

Part 5:   Configure Single-Area OSPFv2 Dynamic Routing Protocol and a default route

Total points: 23

Time: 30 minutes

Step 1:   Configure OSPF on R1.

Configuration tasks for R1 include the following:

Configuration Item or Task	Specification	Points
Configure OSPF using the last 2 digits of your student ID as the process ID. *Ex. If your student ID is 6419999, the process ID will be 99.*		(1 point)
Configure a static router ID	1.1.1.1	(1 point)
Advertise all directly connected networks placing them in Area 0		(2 points)
Set all LAN interfaces as passive		(2 points)

Step 2: Configure OSPF on R2.

Configuration tasks for R2 include the following:

Configuration Item or Task	Specification	Points
Configure OSPF using the last 2 digits of your student ID as the process ID. *Ex. If your student ID is 6119999, the process ID will be 99.*		(1 point)
Configure a static router ID	2.2.2.2	(1 point)
Advertise directly connected networks placing them in Area 0		(2 points)
Set all LAN interfaces as passive		(2 points)

Step 3: Configure OSPF on R3.

Configuration tasks for R3 include the following:

Configuration Item or Task	Specification	Points
Configure OSPF using the last 2 digits of your student ID as the process ID. *Ex. If your student ID is 6419999, the process ID will be 99.*		(1 point)
Configure a static router ID	3.3.3.3	(1 point)
Advertise all directly connected networks placing them in Area 0, except the network (192.168.4.0/24) simulating the Internet.		(2 points)
Set all LAN interfaces as passive		(2 points)

Step 4: Verify OSPF information.

Verify that the routers have learned all internal networks as expected, **otherwise troubleshooting is needed**:

What command displays the routing table on a router? _____ (1 point)

Step 5: Configure a default route on R3 and advertise the default route information to other OSPF routers

Configuration tasks for R3 include the following:

Configuration Item or Task	Specification	Points
Create a default route using the Lo1 interface as the exit interface		(1 point)
Advertise the default route into OSPF		(1 point)

Step 6: Verify the advertised default route

Verify that R1 has successfully learned the default route through OSPF, **otherwise troubleshooting is needed.**

On R1

O*E2 0.0.0.0/0 [110/1] via 10.13.0.1, 00:00:06, Serial0/0/1

On R2

O*E2 0.0.0.0/0 [110/1] via 10.23.0.2, 00:00:25, Serial0/0/0

Step 7: Verify network connectivity.

Use the **ping** command to test connectivity between the devices.

Use the following table to methodically verify connectivity with each network device. **Take corrective action to establish connectivity if a test fails:**

From	To	IP Address	Ping Results	Points
PC-A	R3's Lo1			(1/2 point)
PC-B	Web Server			(1/2 point)
PC-C	R3's Lo1			(1/2 point)
PC-D	Web Server			(1/2 point)

Points: _____ of 23

Part 6: Implement ACLs.

Total points: 12

Time: 20 minutes

Step 1: Set up HTTP and HTTPS services on the Internet Server.

Enable HTTP and HTTPS services on the Web Server.

Verify that PC-A, PC-B, PC-C and PC-D can access the web services before implementing ACLs.

From	Protocol	Destination
PC-A	HTTP	209.165.200.230
PC-A	HTTPS	209.165.200.230
PC-B	HTTP	209.165.200.230
PC-C	HTTPS	209.165.200.230
PC-D	HTTP	209.165.200.230

If PCs are unable to access web services on the Web Server, **troubleshooting is required**.

Step 2:   Configure and Verify Access Control Lists.

Implement the following security policies:

Configuration Item or Task	Specification	Points
Policy 1: The network 172.16.0.0/24 is not allowed to access any destination using any web protocol (HTTP/HTTPS), expect PC-D. All other traffic is allowed.		(8 points)
Policy 2: The Students VLAN is not allowed to send ICMP echo-request to the web server. All other traffic is allowed.		(4 points)

Verity that the implemented ACLs can accomplish all required policies and do not block other traffics.
Corrective actions may be needed if the routers do not forward traffic properly.

Points: _____ of 12

*********************** End of The Examination ***********************