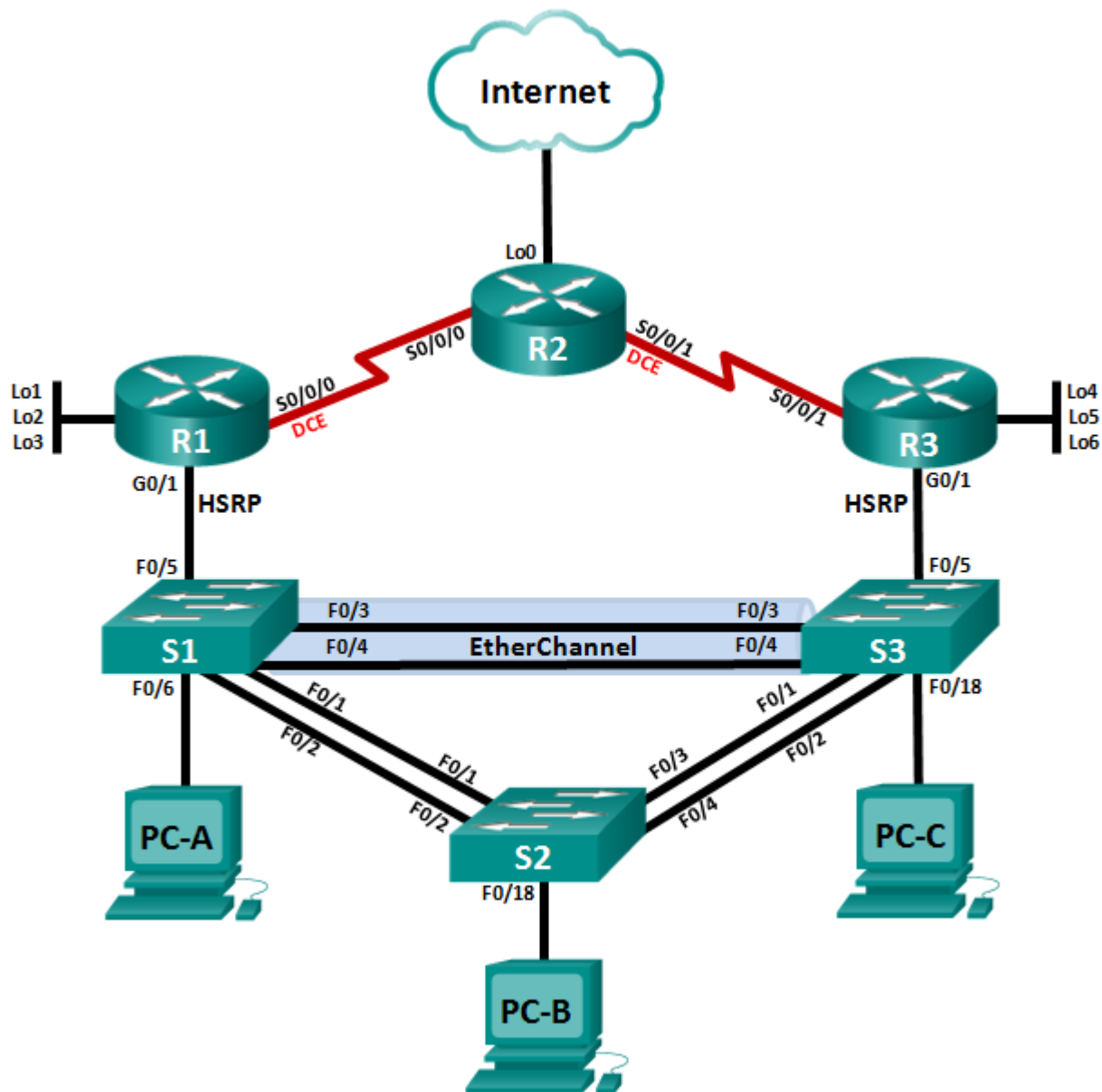


## CCNA: Scaling Networks

# Skills Assessment (EIGRP) – Student Training Exam

### Topology



## Addressing Table

| Device | Interface | IP Address      | Subnet Mask     | Default Gateway |
|--------|-----------|-----------------|-----------------|-----------------|
| R1     | G0/1      | 172.27.0.1      | 255.255.255.0   | N/A             |
|        | S0/0/0    | 172.27.123.1    | 255.255.255.252 | N/A             |
|        | Lo1       | 172.27.1.1      | 255.255.255.0   | N/A             |
|        | Lo2       | 172.27.2.1      | 255.255.255.0   | N/A             |
|        | Lo3       | 172.27.3.1      | 255.255.255.0   | N/A             |
| R2     | S0/0/0    | 172.27.123.2    | 255.255.255.252 | N/A             |
|        | S0/0/1    | 172.27.123.5    | 255.255.255.252 | N/A             |
|        | Lo0       | 209.165.200.225 | 255.255.255.248 | N/A             |
| R3     | G0/1      | 172.27.0.3      | 255.255.255.0   | N/A             |
|        | S0/0/1    | 172.27.123.6    | 255.255.255.252 | N/A             |
|        | Lo4       | 172.27.4.1      | 255.255.255.0   | N/A             |
|        | Lo5       | 172.27.5.1      | 255.255.255.0   | N/A             |
|        | Lo6       | 172.27.6.1      | 255.255.255.0   | N/A             |
| S1     | VLAN 1    | 172.27.0.11     | 255.255.255.0   | 172.27.0.2      |
| S2     | VLAN 1    | 172.27.0.12     | 255.255.255.0   | 172.27.0.2      |
| S3     | VLAN 1    | 172.27.0.13     | 255.255.255.0   | 172.27.0.2      |
| PC-A   | NIC       | 172.27.0.21     | 255.255.255.0   | 172.27.0.2      |
| PC-B   | NIC       | 172.27.0.22     | 255.255.255.0   | 172.27.0.2      |
| PC-C   | NIC       | 172.27.0.23     | 255.255.255.0   | 172.27.0.2      |

## Assessment Objectives

**Part 1: Initialize Devices** (10 points, 5 minutes)

**Part 2: Configure Device Basic Settings** (45 points, 30 minutes)

**Part 3: Configure LAN Redundancy and Link Aggregation** (28 points, 25 minutes)

**Part 4: Configure EIGRP for IPv4 Dynamic Routing Protocol** (51 points, 30 minutes)

**Part 5: Verify Network Connectivity and HSRP Configuration** (10 points, 15 minutes)

**Part 6: Display IOS Image and License Information** (6 points, 5 minutes)

## Scenario

In this Skills Assessment (SA), you will create a small network. You must connect the network devices, and configure those devices to support IPv4 connectivity, LAN redundancy, and link aggregation. You will then configure EIGRP for IPv4 on the network and verify connectivity and HSRP. Finally, you will demonstrate your knowledge of IOS images and licensing.

## Required Resources

- 3 Routers (Cisco 1941 with Cisco IOS Release 15.2(4)M3 universal image or comparable)
- 3 Switches (Cisco 2960 with Cisco IOS Release 15.0(2) lanbasek9 image or comparable)
- 3 PCs (Windows 7, Vista, or XP with terminal emulation program, such as Tera Term)
- Console cable to configure the Cisco IOS devices via the console ports
- Ethernet and Serial cables as shown in the topology

## Part 1: Initialize Devices

**Total points: 10**

**Time: 5 minutes**

### Step 1: Initialize and reload the routers and switches.

Erase the startup configurations and reload the devices.

Before proceeding, have your instructor verify device initializations.

| Task  | IOS Command | Points     |
|---|-------------|------------|
| Erase the startup-config file on all routers.                                   |             | (2 points) |
| Reload all routers.   |             | (2 points) |
| Erase the startup-config file on all switches and remove the old VLAN database. |             | (2 points) |
| Reload all switches.  |             | (2 points) |
| Verify VLAN database is absent from flash on all switches.                      |             | (2 points) |

**Instructor Sign-off Part 1:** \_\_\_\_\_

**Points:** \_\_\_\_\_ of 10

## Part 2: Configure Device Basic Settings

**Total points: 45**

**Time: 30 minutes**

### Step 1: Configure R1.

Configuration tasks for R1 include the following:

| Configuration Item or Task         | Specification  | Points      |
|------------------------------------|--|-------------|
| Disable DNS lookup                 |  | (1/2 point) |
| Router name                        | R1   | (1/2 point) |
| Encrypted privileged EXEC password | class  | (1/2 point) |
| Console access password            | cisco  | (1/2 point) |
| Telnet access password             | cisco  | (1/2 point) |
| Encrypt the plain text passwords.  |  | (1/2 point) |
| MOTD banner                        | Unauthorized Access is Prohibited!   | (1/2 point) |
| Interface G0/1                     | Set the description<br>Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.<br>Activate interface                                   | (1 point)   |
| Interface S0/0/0                   | Set the description<br>Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.<br>Set a clocking rate of 128000.<br>Activate interface | (1 points)  |
| Interface Loopback 1 (LAN)         | Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.  | (1/2 point) |
| Interface Loopback 2 (LAN)         | Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.  | (1/2 point) |
| Interface Loopback 3 (LAN)         | Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.  | (1/2 point) |

**Step 2: Configure R2.**

Configuration tasks for R2 include the following:

| Configuration Item or Task                           | Specification  | Points      |
|--|--|-------------|
| Disable DNS lookup                                   |  | (1/2 point) |
| Router name  | R2   | (1/2 point) |
| Encrypted privileged EXEC password                   | class  | (1/2 point) |
| Console access password                              | cisco  | (1/2 point) |
| Telnet access password                               | cisco  | (1/2 point) |
| Encrypt the plain text passwords.                    |  | (1/2 point) |
| MOTD banner  | Unauthorized Access is Prohibited!   | (1/2 point) |
| Interface S0/0/0                                     | Set the description<br>Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.<br>Activate interface                                   | (1 point)   |
| Interface S0/0/1                                     | Set the description<br>Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.<br>Set a clocking rate of 128000.<br>Activate interface | (1 point)   |
| Interface Loopback 0 (Simulated Internet connection) | Set the description.<br>Set the Layer 3 IPv4 address to 209.165.200.225/29.  | (1 point)   |
| Default route  | Configure a default route out Lo0.   | (1/2 point) |

**Step 3: Configure R3.**

Configuration tasks for R3 include the following:

| Configuration Item or Task         | Specification  | Points      |
|------------------------------------|--|-------------|
| Disable DNS lookup                 |  | (1/2 point) |
| Router name                        | R3   | (1/2 point) |
| Encrypted privileged EXEC password | class  | (1/2 point) |
| Console access password            | cisco  | (1/2 point) |
| Telnet access password             | cisco  | (1/2 point) |
| Encrypt the plain text passwords.  |  | (1/2 point) |
| MOTD banner                        | Unauthorized Access is Prohibited!   | (1/2 point) |
| Interface G0/1                     | Set the description<br>Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.<br>Activate interface | (1 point)   |
| Interface S0/0/1                   | Set the description<br>Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.<br>Activate interface | (1 point)   |
| Interface Loopback 4 (LAN)         | Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.  | (1/2 point) |
| Interface Loopback 5 (LAN)         | Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.  | (1/2 point) |
| Interface Loopback 6 (LAN)         | Set the Layer 3 IPv4 address. Refer to the Addressing Table for IPv4 address information.  | (1/2 point) |

**Step 4: Configure S1.**

Configuration tasks for S1 include the following:

| Configuration Item or Task                                      | Specification   | Points      |
|---|---|-------------|
| Disable DNS lookup  |   | (1/2 point) |
| Switch name   | S1  | (1/2 point) |
| Encrypted privileged EXEC password                              | class   | (1/2 point) |
| Console access password   | cisco   | (1/2 point) |
| Telnet access password  | cisco   | (1/2 point) |
| Encrypt the plain text passwords.                               |   | (1/2 point) |
| MOTD banner   | Unauthorized Access is Prohibited!                          | (1/2 point) |
| Assign an IPv4 address to the default SVI.                      | Refer to the Addressing Table for IPv4 address information. | (1/2 point) |
| Assign the default-gateway.                                     | Refer to the Addressing Table.                              | (1/2 point) |
| Force trunking on Interfaces connected to S2 and S3.            | Use VLAN 1 as the native VLAN.                              | (1 point)   |
| Disable the Dynamic Trunking Protocol (DTP) on all other ports. | Make sure ports are configured as access ports.             | (1 point)   |
| Shutdown all unused ports.                                      |   | (1 point)   |

**Step 5: Configure S2.**

Configuration tasks for S2 include the following:

| Configuration Item or Task                                      | Specification   | Points      |
|---|---|-------------|
| Disable DNS lookup  |   | (1/2 point) |
| Switch name   | S2  | (1/2 point) |
| Encrypted privileged exec password                              | class   | (1/2 point) |
| Console access password   | cisco   | (1/2 point) |
| Telnet access password  | cisco   | (1/2 point) |
| Encrypt the clear text passwords.                               |   | (1/2 point) |
| MOTD banner   | Unauthorized Access is Prohibited!                          | (1/2 point) |
| Assign an IPv4 address to the default SVI.                      | Refer to the Addressing Table for IPv4 address information. | (1/2 point) |
| Assign the default-gateway.                                     | Refer to the Addressing Table.                              | (1/2 point) |
| Force trunking on Interfaces connected to S1 and S3.            | Use VLAN 1 as the native VLAN.                              | (1 point)   |
| Disable the Dynamic Trunking Protocol (DTP) on all other ports. | Make sure ports are configured as access ports.             | (1 point)   |
| Shutdown all unused ports.                                      |   | (1 point)   |

**Step 6: Configure S3**

Configuration tasks for S3 include the following:



| Configuration Item or Task                                      | Specification   | Points      |
|---|---|-------------|
| Disable DNS lookup  |   | (1/2 point) |
| Switch name   | S3  | (1/2 point) |
| Encrypted privileged EXEC password                              | class   | (1/2 point) |
| Console access password   | cisco   | (1/2 point) |
| Telnet access password  | cisco   | (1/2 point) |
| Encrypt the plain text passwords.                               |   | (1/2 point) |
| MOTD banner   | Unauthorized Access is Prohibited!                          | (1/2 point) |
| Assign an IPv4 address to the default SVI.                      | Refer to the Addressing Table for IPv4 address information. | (1/2 point) |
| Assign the default-gateway.                                     | Refer to the Addressing Table.                              | (1/2 point) |
| Force trunking on Interfaces connected to S1 and S2.            | Use VLAN 1 as the native VLAN.                              | (1 point)   |
| Disable the Dynamic Trunking Protocol (DTP) on all other ports. | Make sure ports are configured as access ports.             | (1 point)   |
| Shutdown all unused ports.                                      |   | (1 point)   |

### Step 7: Configure IPv4 addresses on PCs.

| Configuration Item or Task                         | Specification   | Points      |
|--|---|-------------|
| Configure static IPv4 address information on PC-A. | Refer to Addressing Table for IPv4 address information. | (1/2 point) |
| Configure static IPv4 address information on PC-B. | Refer to Addressing Table for IPv4 address information. | (1/2 point) |
| Configure static IPv4 address information on PC-C. | Refer to Addressing Table for IPv4 address information. | (1/2 point) |

Instructor Sign-off Part 2: \_\_\_\_\_

Points: \_\_\_\_\_ of 45

## Part 3: Configure LAN Redundancy and Link Aggregation

Total points: 28

Time: 25 minutes

### Step 1: Configure Spanning Tree on S1.

Configuration tasks for S1 include the following:

| Configuration Item or Task  | Specification | Points     |
|---|---------------|------------|
| Configure Rapid PVST+.  |               | (2 points) |
| Configure as primary root bridge for VLAN 1.                          |               | (2 points) |
| Configure PortFast and BPDU Guard on the interface connected to PC-A. |               | (2 points) |

**Step 2: Configure Spanning Tree on S2.**

Configuration tasks for S2 include the following:

| Configuration Item or Task  | Specification | Points     |
|---|---------------|------------|
| Configure Rapid PVST+.  |               | (2 points) |
| Configure PortFast and BPDU Guard on the interface connected to PC-B. |               | (2 points) |

**Step 3: Configure Spanning Tree on S3.**

Configuration tasks for S3 include the following:

| Configuration Item or Task  | Specification | Points     |
|---|---------------|------------|
| Configure Rapid PVST+.  |               | (2 points) |
| Configure as secondary root bridge for VLAN 1.                        |               | (2 points) |
| Configure PortFast and BPDU Guard on the interface connected to PC-C. |               | (2 points) |

**Step 4: Configure HSRP on R1.**

Configuration tasks for R1 include the following:

| Configuration Item or Task  | Specification                              | Points     |
|---|--|------------|
| Configure the HSRP virtual IP address on interface G0/1.              | Group: 1<br>Virtual IP address: 172.27.0.2 | (2 points) |
| Make this the primary HSRP router.                                    |  | (2 points) |
| Configure so this router becomes the primary HSRP router on a reboot. |  | (2 points) |

**Step 5: Configure HSRP on R3.**

Configuration tasks for R3 include the following:

| Configuration Item or Task                               | Specification                              | Points     |
|--|--|------------|
| Configure the HSRP virtual IP address on interface G0/1. | Group: 1<br>Virtual IP address: 172.27.0.2 | (2 points) |

**Step 6: Configure an LACP EtherChannel between S1 and S3.**

Configuration tasks include the following:

| Configuration Item or Task   | Specification  | Points     |
|--|--|------------|
| On S1, configure an LACP EtherChannel on interfaces connected to S3. | Use group 1 and enable LACP unconditionally.                   | (2 points) |
| On S3, configure an LACP EtherChannel on interfaces connected to S1. | Use group 1 and enable LACP only if a LACP device is detected. | (2 points) |

**Instructor Sign-off Part 4:** \_\_\_\_\_

**Points:** \_\_\_\_\_ of **28**

**Part 4: Configure EIGRP for IPv4 Dynamic Routing Protocol**

**Total points: 51**

**Time: 30 minutes**

**Step 1: Configure EIGRP on R1.**

Configuration tasks for R1 include the following:

| Configuration Item or Task  | Specification                    | Points     |
|---|----------------------------------|------------|
| Autonomous System (AS) number   | 1                                | (1 point)  |
| Router ID   | 1.1.1.1                          | (1 point)  |
| Advertise directly connected networks.  | Use classless network addresses. | (2 points) |
| Set all LAN interfaces as passive.  |                                  | (2 points) |
| Manually disable automatic summarization.   |                                  | (1 point)  |
| Apply a manual summary route for the Loopback interface networks.                           |                                  | (1 point)  |
| Set the bandwidth on S0/0/0   | 128 Kb/s                         | (1 point)  |
| Change the hello-interval on S0/0/0.  | 30 seconds                       | (1 point)  |
| Change the hold-time on S0/0/0.   | 90 seconds                       | (1 point)  |
| Change bandwidth percentage available to EIGRP  | 70%                              | (1 point)  |
| Configure a key chain named EIGRP-KEY with 1 key-string.                                    | Key-string: <b>cisco</b>         | (2 points) |
| Configure MD5 authentication on S0/0/0 using the key chain configured in the previous task. |                                  | (2 points) |

**Step 2: Configure EIGRP on R2.**

Configuration tasks for R2 include the following:

| Configuration Item or Task   | Specification                    | Points     |
|--|----------------------------------|------------|
| Autonomous System number   | 1                                | (1 point)  |
| Router ID  | 2.2.2.2                          | (1 point)  |
| Advertise directly connected Networks.   | Use classless network addresses. | (2 points) |
| Manually disable automatic summarization.  |                                  | (1 point)  |
| Propagate the default route to all other EIGRP routers.  |                                  | (2 points) |
| Set the bandwidth on both serial interfaces.   | 128 Kb/s                         | (1 point)  |
| Change the hello-interval on serial interfaces.  | 30 seconds                       | (1 point)  |
| Change the hold-time on serial interfaces.   | 90 seconds                       | (1 point)  |
| Change bandwidth percentage available to EIGRP.  | 70%                              | (1 point)  |
| Configure a key chain named EIGRP-KEY with 1 key-string.   | Key-string: <b>cisco</b>         | (2 points) |
| Configure MD5 authentication on serial interfaces using the key chain configured in the previous step. |                                  | (2 points) |

### Step 3: Configure EIGRP on R3.

Configuration tasks for R3 include the following:

| Configuration Item or Task  | Specification                    | Points     |
|---|----------------------------------|------------|
| Autonomous System number  | 1                                | (1 point)  |
| Router ID   | 3.3.3.3                          | (1 point)  |
| Advertise directly connected Networks.  | Use classless network addresses. | (2 points) |
| Set all LAN interfaces as passive.  |                                  | (2 points) |
| Manually disable automatic summarization.   |                                  | (1 point)  |
| Set the serial interface bandwidth.   | 128 Kb/s                         | (1 point)  |
| Apply a manual summary route for the Loopback interface networks.                       |                                  | (1 point)  |
| Change the hello-interval on S0/0/1.  | 30 seconds                       | (1 point)  |
| Change the hold-time on S0/0/1.   | 90 seconds                       | (1 point)  |
| Change bandwidth percentage available to EIGRP.   | 70%                              | (1 point)  |
| Configure a key chain named EIGRP-KEY with 1 key-string.                                | Key-string: <b>cisco</b>         | (2 points) |
| Configure MD5 authentication on S0/0/1 using the key chain configured in previous task. |                                  | (2 points) |

**Step 4: Verify network connectivity.**

Verify that EIGRP is functioning as expected. Enter the appropriate CLI command to discover the following information:

| Question  | Response | Points    |
|---|----------|-----------|
| What command will display all connected EIGRP routers?  |          | (1 point) |
| What command displays EIGRP hello-interval, hold-time, bandwidth percentage, and authentication mode for all EIGRP interfaces on a router?                    |          | (1 point) |
| What command displays the EIGRP Autonomous System number, router ID, address summarizations, routing networks, and passive interfaces configured on a router? |          | (1 point) |
| What command displays only EIGRP routes?  |          | (1 point) |

**Instructor Sign-off Part 4:** \_\_\_\_\_

**Points:** \_\_\_\_\_ of 51

**Part 5: Verify Network Connectivity and HSRP Configuration**

**Total points:** 10

**Time:** 15 minutes

Use the listed command to verify that network is working as expected.

**Step 1: Verify end-to-end connectivity.**

Take corrective action if results are other than expected.

| From | Command | To              | Expected Results               | Points    |
|------|---------|-----------------|--------------------------------|-----------|
| PC-A | ping    | PC-C            | Ping should be successful.     | (1 point) |
| PC-B | ping    | PC-A            | Ping should be successful.     | (1 point) |
| PC-B | ping    | PC-C            | Ping should be successful.     | (1 point) |
| PC-B | ping    | Default Gateway | Ping should be successful.     | (1 point) |
| PC-B | ping    | 209.165.200.225 | Ping should be successful.     | (1 point) |
| PC-B | tracert | 209.165.200.225 | Trace should route through R1. | (1 point) |

**Note:** It may be necessary to disable the PC firewall for pings to be successful

**Step 2: Verify HSRP is working as expected.**

Issue the **shutdown** command on R1 G0/1, and then re-issue the following commands to verify that HSRP is working as expected:

| From | Command | To              | Expected Results                      | Points    |
|------|---------|-----------------|---------------------------------------|-----------|
| PC-B | ping    | 172.27.0.1      | Ping should <b>not</b> be successful. | (1 point) |
| PC-B | ping    | Default Gateway | Ping should be successful.            | (1 point) |
| PC-B | ping    | 209.165.200.225 | Ping should be successful.            | (1 point) |
| PC-B | tracert | 209.165.200.225 | Trace should route through R3.        | (1 point) |

**Note:** Wait a few seconds before testing after shutting down the interface on R1.

**Instructor Sign-off Part 5:** \_\_\_\_\_

**Points:** \_\_\_\_\_ of 10

## Part 6: Display IOS Image and License Information

**Total points:** 6

**Time:** 5 minutes

Enter the appropriate CLI command to discover the following information:

| Question   | Response | Points    |
|--|----------|-----------|
| What command displays the IOS image that is currently being used by the network device?  |          | (1 point) |
| What command displays the size of an IOS image loaded on a network device?   |          | (1 point) |
| What command displays a summary list of the Technology Package licenses on an ISR-G2 device that includes the current the state of each of those licenses? |          | (1 point) |
| What command displays the amount of space available to install an additional IOS image to a network device?  |          | (1 point) |
| What command displays a list of all the licenses on an ISR-G2 device?  |          | (1 point) |
| What command would you use to accept the end user license agreement?   |          | (1 point) |

**Instructor Sign-off Part 6:** \_\_\_\_\_

**Points:** \_\_\_\_\_ of 6

## Part 7: Cleanup

**NOTE: DO NOT PROCEED WITH CLEANUP UNTIL YOUR INSTRUCTOR HAS GRADED YOUR SKILLS EXAM AND HAS INFORMED YOU THAT YOU MAY BEGIN CLEANUP.**

Before turning off power to the routers, remove the NVRAM configuration files (if saved) from all devices.

## Router Interface Summary Table

| Router Interface Summary   |                             |                             |                       |                       |
|--|-----------------------------|-----------------------------|-----------------------|-----------------------|
| Router Model   | Ethernet Interface #1       | Ethernet Interface #2       | Serial Interface #1   | Serial Interface #2   |
| 1800   | Fast Ethernet 0/0 (F0/0)    | Fast Ethernet 0/1 (F0/1)    | Serial 0/0/0 (S0/0/0) | Serial 0/0/1 (S0/0/1) |
| 1900   | Gigabit Ethernet 0/0 (G0/0) | Gigabit Ethernet 0/1 (G0/1) | Serial 0/0/0 (S0/0/0) | Serial 0/0/1 (S0/0/1) |
| 2801   | Fast Ethernet 0/0 (F0/0)    | Fast Ethernet 0/1 (F0/1)    | Serial 0/1/0 (S0/1/0) | Serial 0/1/1 (S0/0/1) |
| 2811   | Fast Ethernet 0/0 (F0/0)    | Fast Ethernet 0/1 (F0/1)    | Serial 0/0/0 (S0/0/0) | Serial 0/0/1 (S0/0/1) |
| 2900   | Gigabit Ethernet 0/0 (G0/0) | Gigabit Ethernet 0/1 (G0/1) | Serial 0/0/0 (S0/0/0) | Serial 0/0/1 (S0/0/1) |
| <b>Note:</b> To find out how the router is configured, look at the interfaces to identify the type of router and how many interfaces the router has. There is no way to effectively list all the combinations of configurations for each router class. This table includes identifiers for the possible combinations of Ethernet and Serial interfaces in the device. The table does not include any other type of interface, even though a specific router may contain one. An example of this might be an ISDN BRI interface. The string in parenthesis is the legal abbreviation that can be used in Cisco IOS commands to represent the interface. |                             |                             |                       |                       |