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CCNA 3 (v5.0.3 + v6.0) Chapter 10 Answers Full

1. **Which two parameters must match between neighboring OSPF routers in order to form an adjacency? (Choose two.)**
   - router ID
   - IP address
   - process ID
   - cost
   - **hello / dead timers***
   - **network types***

   To form a neighbor relationship between OSPF speaking routers, the routers should reside on the same network and have the same hello and dead intervals. Others criteria that must match are area ID and network type.

2. **Which command can be used to view the OSPF hello and dead time intervals?**
   - show ip protocols
   - **show ip ospf interface***
   - show ip ospf neighbor
   - show ip ospf route

   The OSPF hello and dead timers can be configured per interface. Hence, the correct command used to view the timers is the show ip ospf interface command. Adding the interface name and number to the command displays output for a specific interface.

3. **A network administrator is troubleshooting an OSPFv3 configuration on an IPv6 network. The administrator issues the show ipv6 protocols command. What is the purpose for this command?**
   - to verify that the router has formed an adjacency with its neighboring routers
   - to display the OSPFv3 parameters configured on an interface
   - to display the OSPFv3 learned routes in the routing table
   - **to verify OSPFv3 configuration information***

   There are various show commands to help troubleshoot or verify OSPFv3, including these:
   show ipv6 protocols – used to verify configuration information
   show ipv6 ospf neighbor – used to verify that the router has formed an adjacency with its neighboring routers
   show ipv6 ospf interface – used to display the OSPFv3 parameters configured on an interface
   show ipv6 route ospf – used to display only the OSPFv3 learned routes in the routing table

4. **A network administrator has just changed the router ID on a router that is working in an OSPFv2 environment. What should the administrator do to reset the adjacencies and use the new router ID?**
   - **Issue the clear ip ospf process privileged mode command.***
   - Configure the network statements.

- Change the interface priority.
- Change the OSPFv2 process ID.

5. **The graphic shows some partial output of the show ipv6 route command:**
   Refer to the exhibit. What two conclusions can be drawn based on the output of the show ipv6 route command? (Choose two.)

```
R2# show ipv6 route
<output omitted>
OE2 ::/0 [110/1]
      via FE80::200:CFF:FE3B:7501, GigabitEthernet0/0
O    2001:DB8:CAFE:1::/64 [110/2]
      via FE80::200:CFF:FE3B:7501, GigabitEthernet0/0
C    2001:DB8:CAFE:2::/64 [0/0]
      via GigabitEthernet0/1, directly connected
L    2001:DB8:CAFE:2::1/128 [0/0]
      via GigabitEthernet0/1, receive
O    2001:DB8:CAFE:3::/64 [110/2]
      via FE80::260:3EFF:FE02:EE01, GigabitEthernet0/0
OI   2001:DB8:CAFE:4::/64 [110/3]
      via FE80::200:CFF:FE3B:7501, GigabitEthernet0/0
C    2001:DB8:CAFE:A001::/64 [0/0]
      via GigabitEthernet0/0, directly connected
L    2001:DB8:CAFE:A001::2/128 [0/0]
      via GigabitEthernet0/0, receive
OI   2001:DB8:CAFE:B001::/64 [110/2]
      via FE80::200:CFF:FE3B:7501, GigabitEthernet0/0
```

- Route 2001:DB8:CAFE:4::/64 is an external route advertised by an ASBR.
- **R2 receives default route information from another router.***
- **Route 2001:DB8:CAFE:B001::/64 is a route advertised by an ABR.***
- Routes 2001:DB8:CAFE:1::/64 and 2001:DB8:CAFE:3::/64 are advertised from the same router.
- Route 2001:DB8:CAFE:4::/64 is advertised by a router three hops away.

The default route ::/0 is learned from another router (signified by OE2) with the link-local address of FE80::200:CFF:FE3B:7501. The symbol OI indicates that a route is learned from an ABR. Routes 2001:DB8:CAFE:1::/64 and 2001:DB8:CAFE:3::/64 are learned from different link-local addresses and therefore are not from the same router.

6. **Refer to the exhibit. What three conclusions can be drawn from the displayed output? (Choose three.)**

```
R3# show ip ospf interface GigabitEthernet 0/0
GigabitEthernet0/0 is up, line protocol is up
  Internet Address 192.168.1.3/28, Area 0, Attached via Network Statement
  Process ID 10, Router ID 3.3.3.3, Network Type BROADCAST, Cost: 1
  Topology-MTID    Cost    Disabled    Shutdown       Topology Name
       0            1         no          no               Base
  Transmit Delay is 1 sec, State DROTHER, Priority 0
  Designated Router (ID) 1.1.1.1, Interface address 192.168.1.1
  Backup Designated router (ID) 2.2.2.2, Interface address 192.168.1.2
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
    oob-resync timeout 40
    Hello due in 00:00:01

<output omitted>
```

- **The DR can be reached through the GigabitEthernet 0/0 interface.***
- **There have been 9 seconds since the last hello packet sent.***
- This interface is using the default priority.
- **The router ID values were not the criteria used to select the DR and the BDR.***
- The router ID on the DR router is 3.3.3.3
- The BDR has three neighbors.

7. **A network engineer has manually configured the hello interval to 15 seconds on an interface of a router that is running OSPFv2. By default, how will the dead interval on the interface be affected?**

- **The dead interval will now be 60 seconds.***
- The dead interval will now be 30 seconds.
- The dead interval will not change from the default value.
- The dead interval will now be 15 seconds.

8. **Refer to the exhibit. What are three resulting DR and BDR elections for the given topology? (Choose three.)**
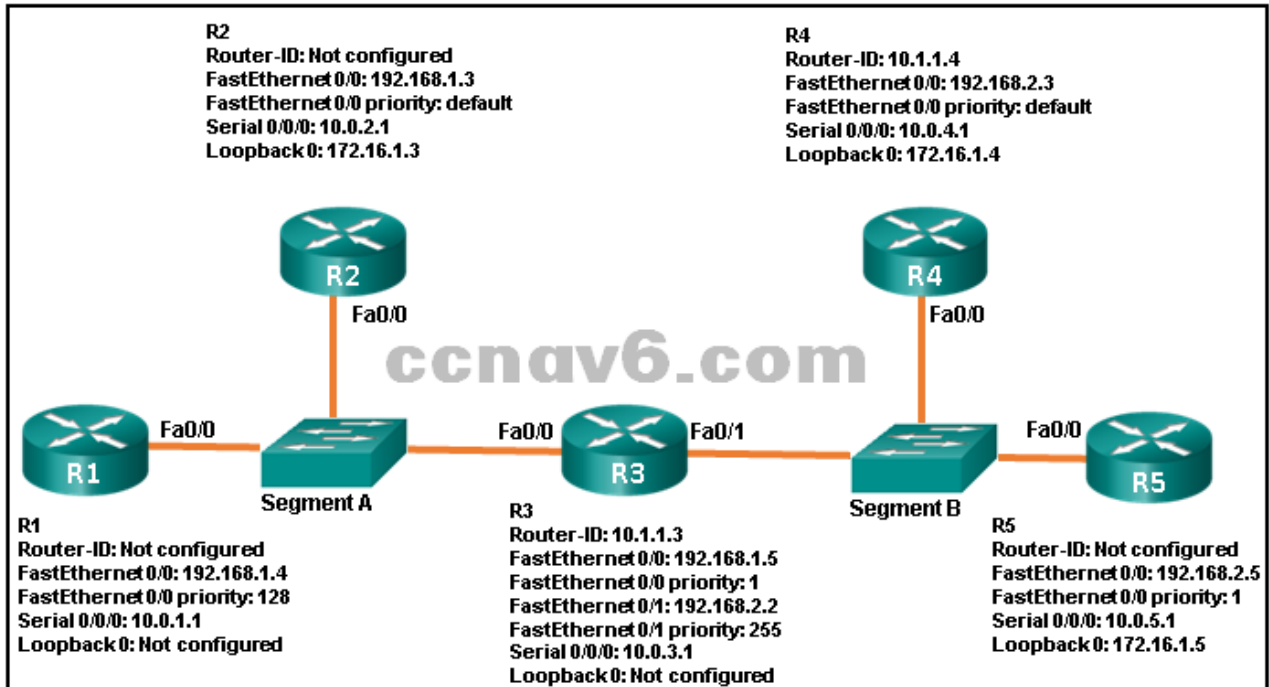
- R4 is BDR for segment B.
- **R1 is DR for segment A.***
- **R2 is BDR for segment A.***
- R3 is DR for segment A.
- **R5 is BDR for segment B.***
- R3 is BDR for segment A.

For segment A, R1 becomes DR because of the priority of 128 of the FastEthernet 0/0 interface. R2 becomes BDR because of the Loopback 0 interface IPv4 address.
For segment B, R3 becomes DR because of the FastEthernet 0/0 interface priority of 255. R5 becomes BDR because of the IPv4 address on the Loopback 0 interface.

9. **Refer to the exhibit. What the amount of time that has elapsed since the router received a hello packet?**

```
<output omitted>
FastEthernet0/0 is up, line protocol is up
   Internet Address 10.15.0.20/24, Area 0
   Process ID 1, Router ID 10.15.0.1, Network Type BROADCAST,
Cost: 1
   Transmit Delay is 1 sec, State DR, Priority 1
   Designated Router (ID) 10.15.0.1, Interface address 10.15.0.20
   No backup designated router on this network
   Timer intervals configured, Hello 10, Dead 40, Wait 40,
Retransmit 5     ccnav6.com
      oob-resync timeout 40
      Hello due in 00:00:06
   Supports Link-local Signaling (LLS)
   Cisco NSF helper support enabled
   IETF NSF helper support enabled
   Index 3/3, flood queue length 0
   Next 0x0(0)/0x0(0)
   Last flood scan length is 0, maximum is 0
```

- 40 seconds
- **4 seconds***
- 10 seconds
- 6 seconds

The show ip ospf interface command is used to display the OSPF parameters configured on an interface like the process ID; router ID; area, and so forth. In the exhibit the router has a default hello interval of 10 seconds. It also displays that the next hello is due in 6 seconds. Hence, the time elapsed is 4 seconds.
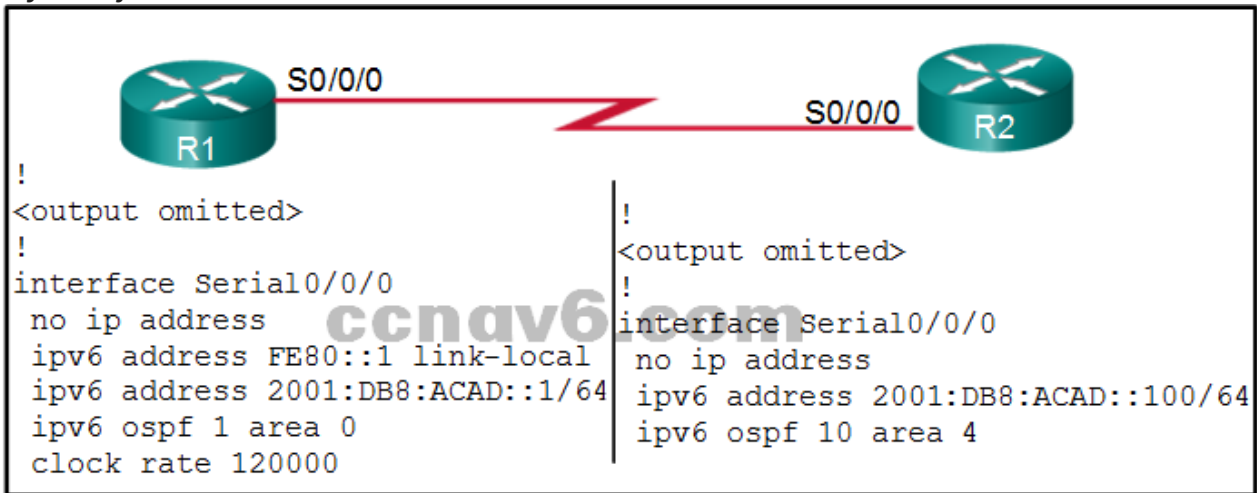
10. **Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.**
A network administrator is configuring multiarea OSPFv3 on the routers. The routing design requires that the router RT1 is a DROTHER for the network in Area 0 and the DR for the network in Area 1. Check the settings and status of the routers. What can the administrator do to ensure that RT1 will meet the design requirement after all routers restart?
- Use the ipv6 ospf priority 0 command on the interface g0/0 of RT1.
- **Use the ipv6 ospf priority 10 command on the interface g0/2 of RT1.***
- Configure the loopback 0 interface with 6.6.6.6.
- Restart all routers except for RT1.
- Change the router ID to 5.5.5.5 on RT1.

In a multiarea OSPF network, if the interface priority is the same for all routers, then the router with highest router ID becomes the DR and the router with second highest router ID becomes BDR. Changing the router ID can influence the DR/BDR election. However, for an ABR, the same router ID will be used for DR/BDR elections for multiple areas. In this case, it is better to use the interface priority value to manage the DR/BDR election for different areas, because this value is interface specific.
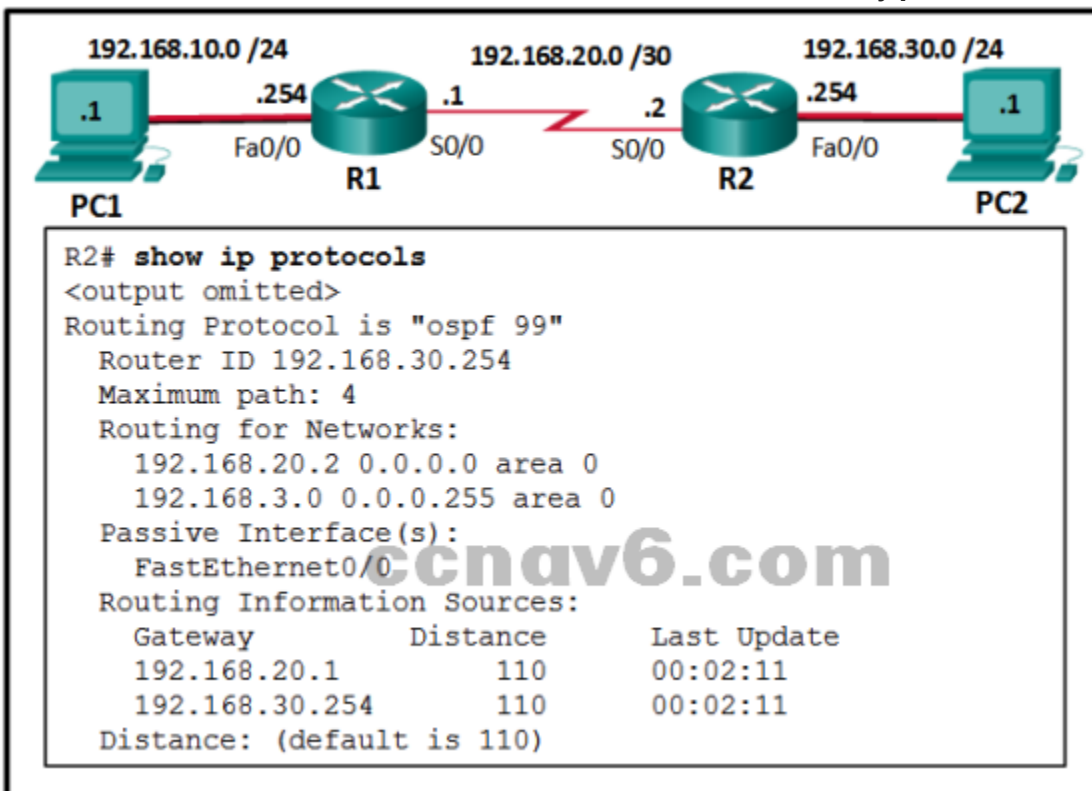
11. **Refer to the exhibit. A network administrator is configuring OSPF for R1 and R2, but the adjacency cannot be established. What is the cause of the issue?**


```
!
<output omitted>
!
interface Serial0/0/0
 no ip address
 ipv6 address FE80::1 link-local
 ipv6 address 2001:DB8:ACAD::1/64
 ipv6 ospf 1 area 0
 clock rate 120000
```

```
!
<output omitted>
!
interface Serial0/0/0
 no ip address
 ipv6 address 2001:DB8:ACAD::100/64
 ipv6 ospf 10 area 4
```

- The interface s0/0/0 on router R2 is missing a link-local address.
- The process ID is misconfigured.
- The IP address on router R2 is misconfigured.
- **The area ID is misconfigured.***

To form a neighbor relationship between OSPF speaking routers, the routers should reside on the same network and have the same Hello and dead intervals. Others criteria that must match are area ID and network type. In the topology displayed, the two routers are in two different areas, thus causing an area mismatch error.

12. **Refer to the exhibit. A network administrator has configured OSPFv2 on the two Cisco routers but PC1 is unable to connect to PC2. What is the most likely problem?**


```
R2# show ip protocols
<output omitted>
Routing Protocol is "ospf 99"
  Router ID 192.168.30.254
  Maximum path: 4
  Routing for Networks:
    192.168.20.2 0.0.0.0 area 0
    192.168.3.0 0.0.0.255 area 0
  Passive Interface(s):
    FastEthernet0/0
  Routing Information Sources:
    Gateway          Distance      Last Update
    192.168.20.1        110        00:02:11
    192.168.30.254      110        00:02:11
  Distance: (default is 110)
```

- Interface Fa0/0 is configured as a passive-interface on router R2.
- Interface S0/0 is configured as a passive-interface on router R2.
- **Interface Fa0/0 has not been activated for OSPFv2 on router R2.***
- Interface s0/0 has not been activated for OSPFv2 on router R2.

If a LAN network is not advertised using OSPFv2, a remote network will not be reachable. The output displays a successful neighbor adjacency between router R1 and R2 on the interface S0/0 of both routers.

13. **What three states are transient OPSF neighbor states that indicate a stable adjacency is not yet formed between two routers? (Choose three.)**
- established
- **loading***
- 2way
- **exstart***
- full
- **exchange***

Only the full and 2way states indicate that a stable adjacency is formed. The loading, exstart, and exchange states are transitory states between the 2way and full states.

14. **An administrator is troubleshooting OSPFv3 adjacency issues. Which command would the administrator use to confirm that OSPFv3 hello and dead intervals are matching between routers?**

    show ipv6 ospf interface*
    show ipv6 ospf
    show ipv6 ospf neighbor
    show ipv6 protocols

15. **When checking a routing table, a network technician notices the following entry:**
O*E2 0.0.0.0/0 [110/1] via 192.168.16.3, 00:20:22, Serial0/0/0
What information can be gathered from this output?
- The route is located two hops away.
- The metric for this route is 110.
- The edge of the OSPF area 0 is the interface that is addressed 192.168.16.3.
- **This route is a propagated default route.***

The metric towards this external route is one and 192.168.16.3 is the address of the next interface towards the destination.

16. **Refer to the exhibit. R1 and R2 are connected to the same LAN segment and are configured to run OSPFv3. They are not forming a neighbor adjacency. What is the cause of the**

problem?

```
R1# show ipv6 ospf interface fa0/0
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::21E:BEFF:FEF4:55C8, Interface ID 4
  Area 0, Process ID 10, Instance ID 0, Router ID 1.1.1.1
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 1.1.1.1, local address FE80::21E:BEFF:FEF4:55C8
  No backup designated router on this network
  Timer intervals configured, Hello 1, Dead 4, Wait 4, Retransmit 5
  <output omitted>

R2# show ipv6 ospf interface fa0/0
FastEthernet0/0 is up, line protocol is up
  Link Local Address FE80::21E:7AFF:FE5F:6650, Interface ID 4
  Area 0, Process ID 1, Instance ID 0, Router ID 2.2.2.2
  Network Type BROADCAST, Cost: 1
  Transmit Delay is 1 sec, State DR, Priority 1
  Designated Router (ID) 2.2.2.2, local address FE80::21E:7AFF:FE5F:6650
  No backup designated router on this network
  Timer intervals configured, Hello 10, Dead 40, Wait 40, Retransmit 5
  <output omitted>
```

- The IPv6 addresses of R1 and R2 are not in the same subnet.
- The priority value of both R1 and R2 is 1.
- **The timer intervals of R1 and R2 do not match.***
- The OSPFv3 process IDs of R1 and R2 are different.

There is a mismatch between the timer intervals of R1 and R2. In OSPF the timers must match on two routers before they will become neighbors. The IPv6 addresses that are used by OSPFv3 are link-local, and are in the same subnet. The OSPFv3 process ID is locally significant, and does not have to match between routers. The default OSPF interface priority value is 1, and does not prevent neighbor relationships from forming.

17. **Refer to the exhibit. Directly connected networks configured on router R1 are not being shared with neighboring routers through OSPFv3. What is the cause of the issue?**

```
R1# show running-config
<output omitted>

ipv6 unicast-routing
!
interface GigabitEthernet0/0
 no ip address
 ipv6 address 2001:DB8:CAFE:A001::1/64
 ipv6 ospf 10 area 0
!
interface GigabitEthernet0/1
 no ip address
 ipv6 address 2001:DB8:CAFE:1::1/64
 ipv6 ospf 10 area 0
!
ipv6 router ospf 1
 router-id 1.1.1.1
 log-adjacency-changes
```

- There are no network statements for the routes in the OSPF configuration.
- The no shutdown command is missing on the interfaces.
- IPv6 OSPF routing is not enabled.
- **There is a mismatch of OSPF process ID in commands.***

Unlike OSPFv2, OSPFV3 does not use the network command to advertise directly attached networks. OSPFv3 is enabled directly on the interface. These networks will be included in advertisements once the command ipv6 ospf process_id area area_id is entered on the interface. The OSPF process_id must match with the ipv6 router ospf command.

18. **Open the PT Activity. Perform the tasks in the activity instructions and then answer the question.**
   Which routers are the DR and BDR in this topology?
   - DR:R6 BDR:R5
   - DR:R1 BDR:R2
   - DR:R5 BDR:R3
   - DR:R3 BDR:R6
   - **DR:R3 BDR:R5***
   - DR:R4 BDR:R1

   Once OSPF neighbor adjacencies have formed, use the show ip ospf neighbors command to determine which router was elected the DR and which router was elected the BDR. In this scenario, R3 was elected the DR because it had the highest priority (10). R5 was elected the BDR because it had the highest router ID among eligible routers (5.5.5.5). R6 was not eligible to become the BDR because its priority was set to 0.

19. **Refer to the exhibit. Which conclusion can be drawn from this OSPF multiaccess network?**
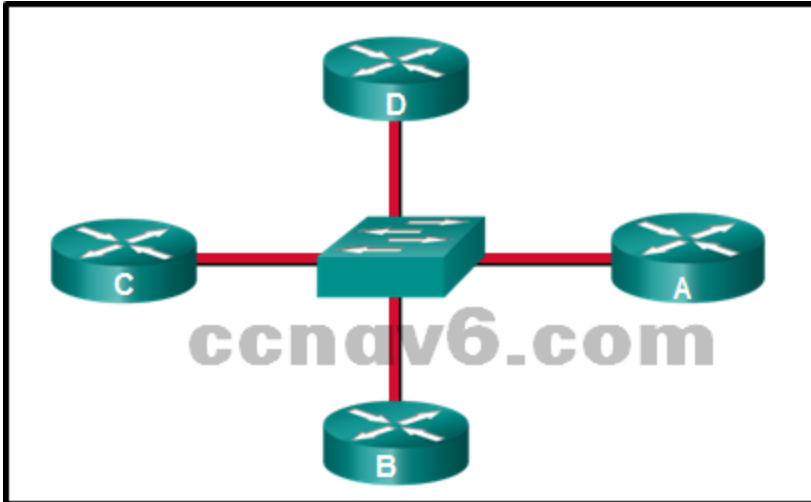
- If the DR stops producing Hello packets, a BDR will be elected, and then it promotes itself to assume the role of DR.
- **With an election of the DR, the number of adjacencies is reduced from 6 to 3.***

- When a DR is elected all other non-DR routers become DROTHER.

- All DROTHER routers will send LSAs to the DR and BDR to multicast 224.0.0.5.

On OSPF multiaccess networks, a DR is elected to be the collection and distribution point for LSAs sent and received. A BDR is also elected in case the DR fails. All other non-DR or BDR routers become DROTHER. Instead of flooding LSAs to all routers in the network, DROTHERs only send their LSAs to the DR and BDR using the multicast address 224.0.0.6. If there is no DR/BDR election, the number of required adjacencies is n(n-1)/2 = > 4(4-1)/2 = 6. With the election, this number is reduced to 3.

20. **Which command will a network engineer issue to verify the configured hello and dead timer intervals on a point-to-point WAN link between two routers that are running OSPFv2?**
- show ipv6 ospf interface serial 0/0/0
- show ip ospf neighbor
- show ip ospf interface fastethernet 0/1
- **show ip ospf interface serial 0/0/0***

The show ip ospf interface serial 0/0/0 command will display the configured hello and dead timer intervals on a point-to-point serial WAN link between two OSPFv2 routers. The show ipv6 ospf interface serial 0/0/0 command will display the configured hello and dead timer intervals on a point-to-point serial link between two OSPFv3 routers. The show ip ospf interface fastethernet 0/1 command will display the configured hello and dead timer intervals on a multiaccess link between two (or more) OSPFv2 routers. The show ip ospf neighbor command will display the dead interval elapsed time since the last hello message was received, but does not show the configured value of the timer.

21. **Question as presented:**

Match each OSPF election criterion to its sequential order for the OSPF DR and BDR election process. (Not all options are used.)

first	Elect the router with the highest IPv4 address on loopback interfaces.
second	Elect the router with the highest manually configured router ID.
third	Elect the router with the highest routing process ID.
fourth	Elect the router with the highest interface priority.
	Elect the router with the highest active IPv4 address on physical interfaces.

Match each OSPF election criterion to its sequential order for the OSPF DR and BDR election process. (Not all options are used.)

During the DR and BDR election process, the DR will be the one with the highest interface priority. If the priority is not manually configured, there will be a tie on the default value of 1, so the router with the highest router ID will be selected. The router ID is chosen depending on what is configured on the router. A manually configured router ID is preferred, with the highest IPv4 address on a loopback interface being preferred next, followed by the highest IPv4 address on a physical interface.

22. **Which OSPF feature allows a remote OSPF area to participate in OSPF routing when it cannot connect directly to OSPF Area 0?**
   - **virtual link***
   - NBMA
   - point-to-point connectivity
   - DR/BDR

23. **A network engineer suspects that OSPFv3 routers are not forming neighbor adjacencies because there are interface timer mismatches. Which two commands can be issued on the interface of each OSFPv3 router to resolve all timer mismatches? (Choose two.)**
   - **no ipv6 ospf dead-interval***
   - ip ospf hello-interval 10
   - no ipv6 router ospf 10
   - no ipv6 ospf cost 10
   - **no ipv6 ospf hello-interval***
   - ip ospf dead-interval 40

The no ipv6 ospf hello-interval and no ipv6 ospf dead-interval commands issued on each OSPFv3 interface will reset the intervals to the respective default periods. This ensures that the timers on all routers now match and, providing other appropriate configurations are correct, the routers will form adjacencies. The ip ospf hello-interval 10 and ip ospf dead-interval 40 commands are OPSFv2 commands that are used for IPv4 routing. If the ipv6 ospf hello-interval and ipv6 ospf dead-interval commands are used, then the interval has to be specified in seconds. The parameter default is not valid in these commands.

24. **Match each OSPF election criterion to its sequential order for the OSPF DR and BDR election process. (Not all options are used.)**
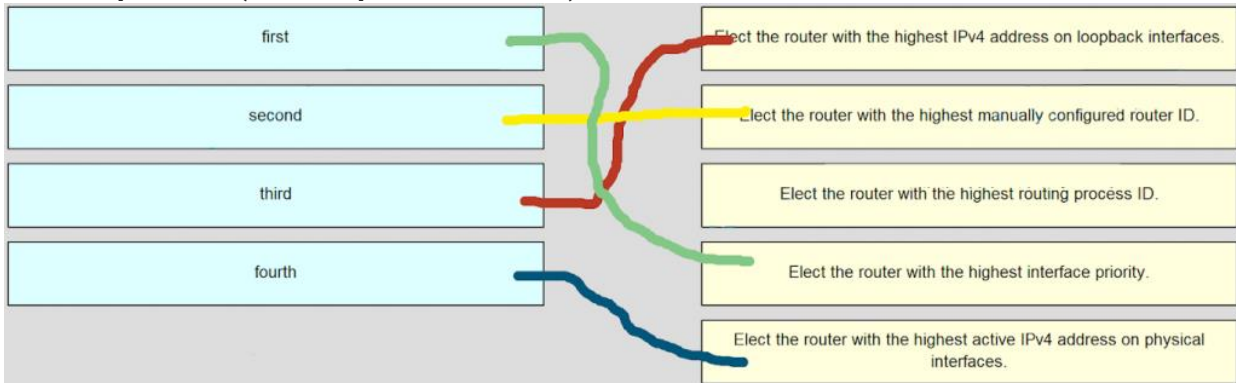
- first ~~> **4.Elect the router with the highest interface priority.***
- second ~~> **2.Elect the router with the highest manually configured router ID.***
- third ~~> **1.Elect the router with the highest IPv4 address on loopback interfaces.***
- fourth ~~> **5.Elect the router with the highest active IPv4 address on physical interfaces.***