

Nokia OSPF Routing Protocol

(exam number: 4A0-113)

The following questions will test your knowledge and prepare you for the Nokia OSPF Routing Protocol written exam. Compare your responses with the Answer Key at the end of the document.

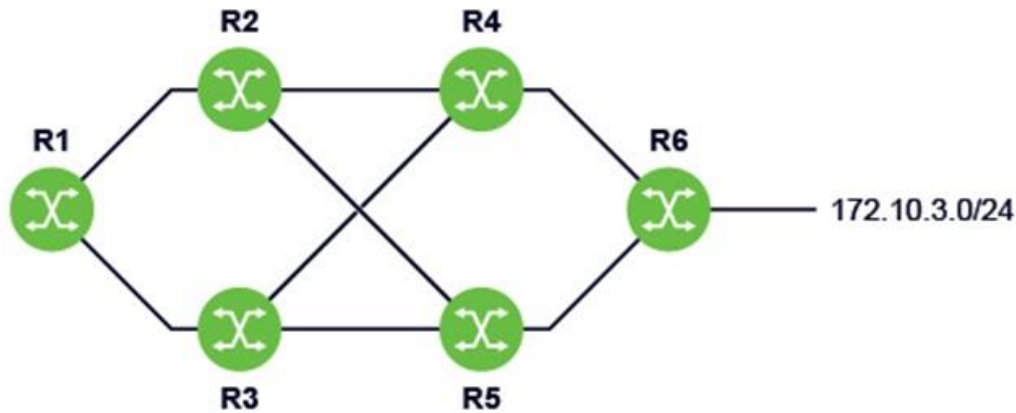
1. Consider the exhibit. Which of the following statements about the output shown is FALSE?

```
(ex)[configure router "Base"]
A:admin@R1# /show router interface
```

Interface Table (Router: Base)				
Interface-Name IP-Address	Adm	Opr (v4/v6)	Mode	Port/SapId PfxState
system	Up	Up/Up	Network	system
10.10.10.1/32				n/a
2001:db8:1:100::1/128				PREFERRED
toR2	Up	Down/Up	Network	1/1/2
2001:db8:1:101::1/64				PREFERRED
fe80::5054:ff:fee9:8fb0/64				PREFERRED
toR3	Up	Up/Up	Network	1/1/3
10.1.3.1/27				n/a
fe80::225:baff:fe30:7908/64				PREFERRED
Interfaces : 3				

- A. The system interface is configured with IPv6 address 2001:db8:1:100::1/128.
- B. All interfaces are configured for IPv4 and IPv6.
- C. Interface "toR2" is configured with a global unicast IPv6 address.
- D. Interface "toR3" is not configured with a global unicast IPv6 address.

2. Consider the exhibit. Router R6 advertises the prefix 172.10.3.0/24 using a routing protocol that supports ECMP. All routers are configured with an ECMP value of 4. All links shown in the exhibit have the same cost. How many entries with a destination prefix of 172.10.3.0/24 are in router R1's routing table?



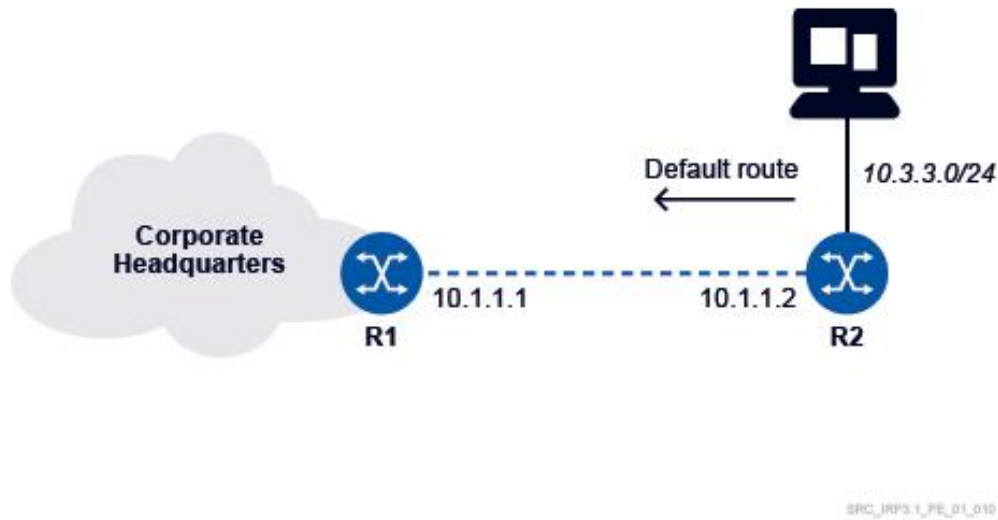
- A. 1
B. 2
C. 3
D. 4
3. Which of the following is NOT a convention used to represent IPv6 addresses?
- A. An IPv6 address is expressed as eight groups of hex digits separated by colons.
 - B. Each group represents 16 bits of the total 128 bits that make up the IPv6 address.
 - C. One or more consecutive groups of zeros can be omitted and replaced by two colons.
 - D. At most, two instances of double colons can exist in the shortened address expression.
 - E. Leading zeroes in each hex group can be omitted.
4. What is the destination address of the Neighbor Discovery message sent by a router to resolve an IPv6 address to a MAC address?
- A. The IPv6 address to resolve
 - B. The solicited-node multicast address
 - C. The link-local multicast address
 - D. The broadcast IPv6 address

5. Which of the following statements about an indirect static route is FALSE?
- A. It requires that the target subnet is directly connected to the router where it is configured.
 - B. It is only valid if the configured in direct address matches a valid entry in the route table.
 - C. Its configured indirect address cannot be resolved through another static route.
 - D. It imposes no overhead on the router's link bandwidth or on its CPU.
6. Consider the exhibit. A static route is configured on router R1 to reach the PC at 139.120.121.2. What needs to be the next-hop IP address of the configured route?



- A. 172.31.1.1
- B. 172.31.1.2
- C. 139.120.121.1
- D. 139.120.121.2

7. Consider the exhibit. Router R2 is a Nokia 7750 SR. What is the correct command to configure a default route on router R2 to reach the corporate headquarters?



- A. Configure router default-route route-type unicast next-hop 10.1.1.1 admin-state enable
 - B. Configure router default-route route-type unicast next-hop 10.1.1.2 admin-state enable
 - C. Configure router static-routes route 0.0.0.0/0 route-type unicast next-hop 10.1.1.1 admin-state enable
 - D. Configure router static-routes route 0.0.0.0/0 route-type unicast next-hop 10.1.1.2 admin-state enable
8. Which database is used by a link-state protocol to perform the SPF calculation that creates the shortest-path tree?
- A. Adjacency database
 - B. Link-state database
 - C. Forwarding database
 - D. Metric database

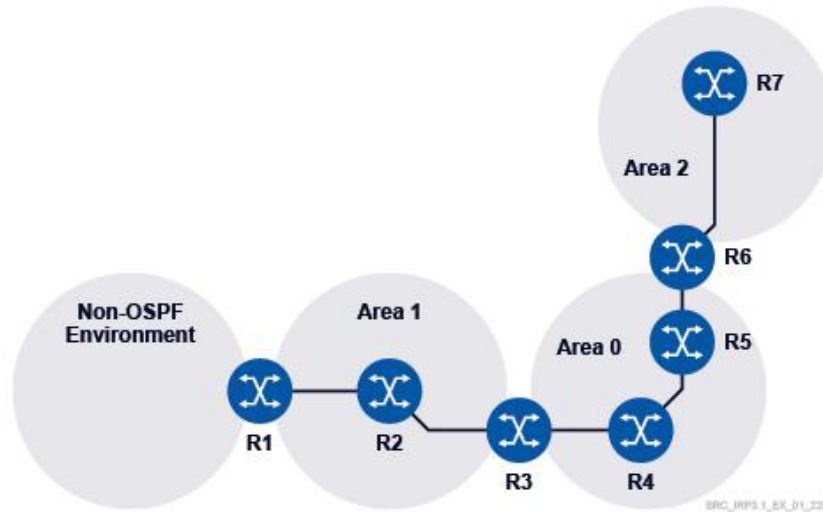
9. A router receives a copy of a link state advertisement that is already in the local link-state database (LSDB), but the newly received copy has a sequence number higher than the one in the LSDB. Which of the following actions is NOT performed by the router?
- A. The router updates its link state database.
 - B. The router transmits an acknowledgement to the sender.
 - C. The router increases the sequence number of the received link state advertisement.
 - D. The router floods the new link state advertisement to its neighbors.
 - E. The router runs the SPF algorithm against the new link state database.
10. In the process of moving data packets from source to destination, which of the following statements about addressing is FALSE?
- A. Ethernet MAC addresses identify the devices connected to the same local-area network or subnet.
 - B. A public IP address identifies a device worldwide.
 - C. If two hosts are in the same subnet, the sender does not need to use an IP address to identify the intended destination of the data.
 - D. If two hosts are in different subnets of a layer-3 domain, the sender needs to use both a MAC address and an IP address to ensure that the data is properly forwarded.
11. Assume that a router receives an IP packet and finds multiple entries in the routing table that match the destination IP address. Which of the following statements is TRUE?
- A. The packet is forwarded to all the next-hop routers, pointed to by the matching routing table entries.
 - B. The packet is dropped and an ICMP destination unreachable message is sent back to the source.
 - C. The router sends an ICMP echo request message to all the next-hop routers, pointed to by the matching routing table entries to confirm if they can properly forward the packet.
 - D. If multiple routing protocols include the same IP prefix in their forwarding databases, only the one generated by the routing protocol with the best preference will become active.
12. Which of the following statements about IP packet forwarding on a Nokia 7750 SR is FALSE?
- A. Each active routing protocol builds its own forwarding database, but not all entries from all protocols are necessarily active.
 - B. There is an active forwarding database that is built by the routing table manager (RTM) from the contributions of multiple routing protocols.
 - C. If multiple routing protocols include overlapping IP prefixes in their forwarding databases, only the prefix with the longest subnet mask will become active.
 - D. The packet is forwarded to the next-hop router, pointed to by the routing table entry with the longest prefix match.

13. Which of the following statements about route redistribution and route filtering is TRUE?
- A. Route redistribution means redirecting packets to an intermediate point before allowing them to go to their intended destination.
 - B. Route filtering implies controlling which route advertisements received from routing peers are accepted and/or deciding which locally known prefixes are advertised to routing peers.
 - C. Route redistribution is the exchange of information among routers to establish the best paths to forward packets to all the known subnetworks.
 - D. Route filtering means deciding in real time which packets are forwarded, and which ones are dropped.
14. Which of the following is NOT a function of the CPM card in a Nokia 7750 SR?
- A. Running dynamic routing protocols.
 - B. Populating the routing table.
 - C. Re-establishing routing paths in case of failure.
 - D. Performing a route-table lookup on incoming packets to make forwarding decisions.
15. Which of the following is NOT a failure detection option for static routes?
- A. Static route Hello handshake.
 - B. Manual ping and traceroute commands.
 - C. Customer Premises Equipment Check (CPE-Check).
 - D. Bidirectional Forwarding Detection (BFD).
16. Routers in a routing domain are running a link state routing protocol. Which of the following is a type of information that will NOT be exchanged by the routers?
- A. Router IDs.
 - B. The metric of links interconnecting the routers.
 - C. IP prefixes of the subnetworks attached to the routers.
 - D. The optimum next hop for each of the known IP prefixes.
17. A router is running a link state routing protocol. Which of the following is a type of information that is NOT included in its Forwarding database?
- A. List of neighboring routers and the state of each adjacency.
 - B. List of directly attached IP prefixes.
 - C. List of IP prefixes attached to other routers in the routing domain.
 - D. Optimum next hop for each known IP prefix.
18. Which of the following is NOT one of the generic types of messages exchanged by routers running a link state routing protocol?
- A. Hello messages.
 - B. Link state advertisements.
 - C. Messages to exchange advertisements reliably.
 - D. Disconnect messages.



19. Which of the following is NOT an advantage introduced by the link state protocol optimizations?
- A. Electing a designated router on a broadcast interface reduces the number of logical connections among routers, thus decreasing the complexity of the SPF algorithm.
 - B. Electing a designated router on a broadcast interface adds redundancy by offering an alternative path to forward packets.
 - C. Dividing the routing domain into separate areas reduces the amount of time needed to flood new link state information.
 - D. Dividing the routing domain into separate areas can help reduce route table sizes because the IP prefixes advertised between areas can be summarized.
20. Which of the following statements about the system IP address on a Nokia 7750 SR is FALSE?
- A. It has a prefix length of /32 for IPv4 and /128 for IPv6.
 - B. The system interface exists by default.
 - C. It belongs to a physical interface.
 - D. If the router-id is not configured, it inherits the system IPv4 address.
21. Which of the following statements about the data plane in a Nokia 7750 SR router is FALSE?
- A. The data plane utilizes the forwarding tables to forward packets to their destination.
 - B. The data plane must process every incoming packet.
 - C. The data plane exchanges signalling messages with other routers.
 - D. Input/Output cards perform data plane functions.
22. An OSPF backbone area contains AS External LSAs. If an ABR sends only Network Summary LSAs into the non-backbone area to which it is connected, what is the type of the non-backbone area?
- A. Normal
 - B. Stub
 - C. Stub with no summaries
 - D. It can be any type if summarization (area-range) has been configured.

23. Consider the exhibit. In the topology shown, router R1 is an ASBR configured to export external routes into OSPF. Assuming that all areas are normal, which of the following statements is TRUE?

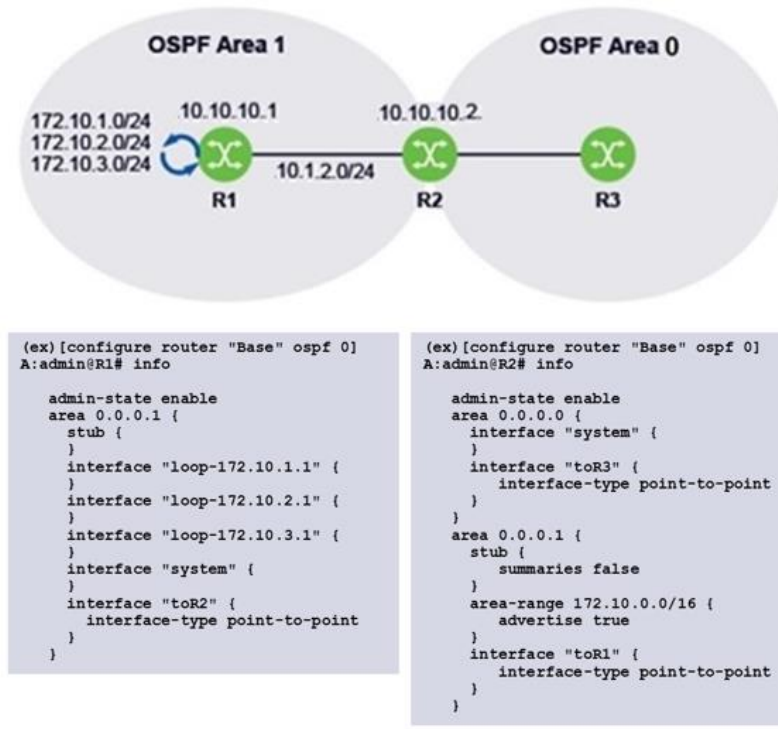


- A. Router R1 generates a type-5 LSA that is flooded to area 1 and converted into a type-4 LSA by R3 before forwarding it to area 0.
 - B. Router R1 generates a type-4 LSA that is flooded to area 1 and converted into a type-5 LSA by R3 before forwarding it to area 0.
 - C. Router R1 generates a type-5 LSA that is flooded to all areas with the help of ABRs R3 and R6. Router R3 advertises a companion type-4 LSA into area 0 and router R6 advertises a companion type-4 LSA into area 2.
 - D. Router R1 generates a type-4 LSA that is flooded to all areas with the help of ABRs R3 and R6. Router R3 advertises a companion type-5 LSA into area 0 and router R6 advertises a companion type-5 LSA into area 2.
24. In an OSPF network, which of the following is NOT an advantage of using route summarization on an ABR?
- A. It can reduce the link-state database size.
 - B. It can reduce the size of the route table.
 - C. It can reduce the number of exchanged Network Summary LSAs.
 - D. It can reduce the number of exchanged Router LSAs.
25. Which of the following actions is a mandatory step when configuring a Nokia 7750 SR router to run the OSPF protocol?
- A. Add the system interface to OSPF
 - B. Define one or more OSPF areas
 - C. Configure authentication parameters
 - D. Configure a reference-bandwidth



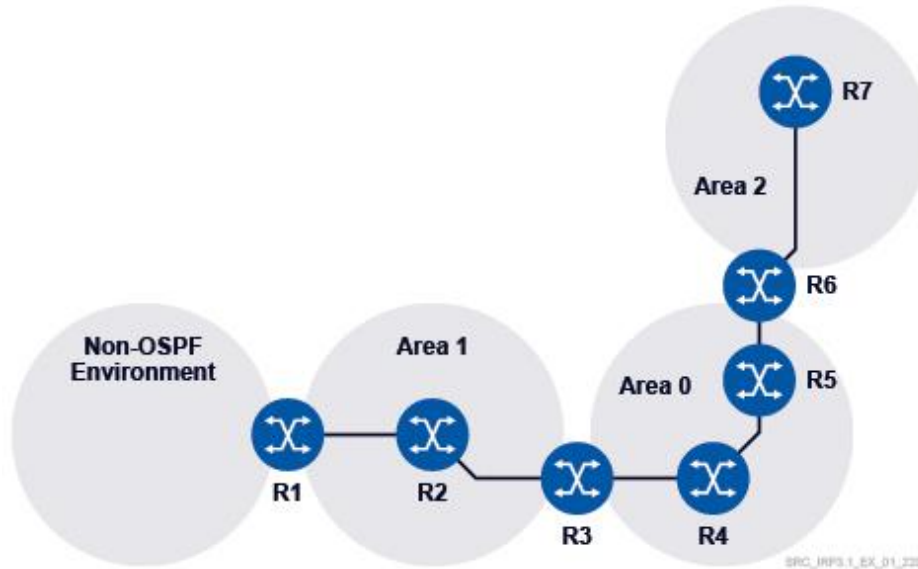
26. Which of the following is NOT an OSPF packet type?
- A. Hello
 - B. Database description
 - C. Link state request
 - D. Link state advertisement
 - E. Link state acknowledgment
27. When does the state of an OSPF adjacency change from 'loading' to 'full' on a router?
- A. When the router receives a hello packet from its neighbor that contains its own router ID in the neighbor list.
 - B. When the router receives a database description packet from its neighbor.
 - C. When the router sends a link state request packet to its neighbor, asking for detailed link state information.
 - D. When the router and its neighbor exchange link state request, link state update, and link state ack packets as needed until their link state databases are synchronized.
28. Which of the following statements about an OSPF type-2 Network LSA is FALSE?
- A. It is originated by a DR that is fully adjacent to at least one other router in the broadcast network.
 - B. It is flooded only within the area that contains the broadcast network.
 - C. It includes a metric field for each entry that depends on the corresponding link bandwidth.
 - D. It includes the DR in the list of advertised neighboring routers.

29. Consider the exhibit. Given the configuration on routers R1 and R2, how many type-3 Network Summary LSAs would you expect to see in router R3's OSPF database?



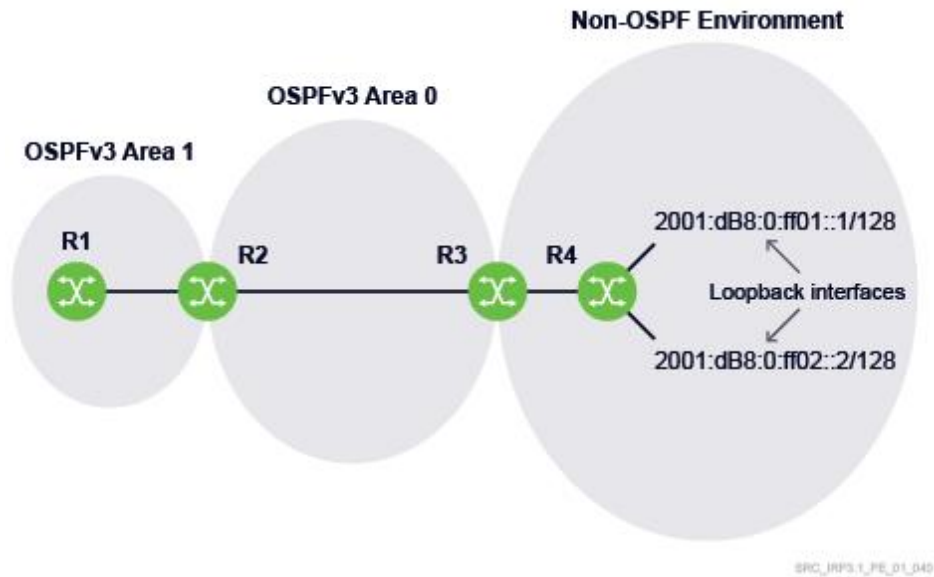
- A. 0
- B. 1
- C. 3
- D. 5

30. Consider the exhibit. In the topology shown, router R1 is an ASBR that exports external routes into OSPF. Assuming all areas are normal, which of the following statements about ASBR Summary (type-4) LSAs is TRUE?



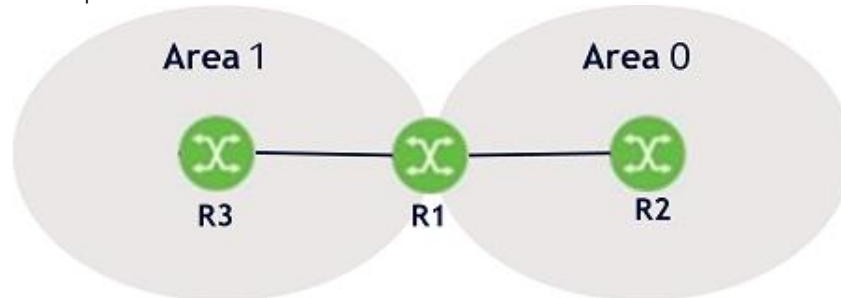
- A. Router R2 has a type-4 LSA in its OSPF link state database.
 - B. Router R5 receives a type-4 LSA generated by router R6.
 - C. Router R6 has two type-4 LSAs in its OSPF link state database.
 - D. Router R7 receives a type-4 LSA generated by router R3.
31. Which of the following statements about OSPFv3's Intra-Area Prefix (IAP) LSAs is TRUE?
- A. IAPLSAs are generated by ABRs to share prefix information between areas.
 - B. Each router generates one or more IAP LSAs to advertise its directly attached subnetworks.
 - C. A designated router lists the routers connected to the broadcast network in an IAP LSA.
 - D. IAPLSAs are flooded throughout the entire OSPFv3 routing domain.

32. Consider the exhibit. The route table on router R1 shows the loopback interfaces from the non-OSPF routing domain. Which router is configured as ASBR, and what type of LSA does it generate to advertise the loopback interfaces?



- A. R2 and it generates an Inter-Area Prefix LSA
- B. R2 and it generates an AS External LSA
- C. R3 and it generates an Inter-Area Prefix LSA
- D. R3 and it generates an AS External LSA

33. Consider the exhibit, which shows the OSPF configuration on routers R1 and R3. The OSPF adjacency between routers R1 and R3 does not come up. Which of the following is most likely the cause of the problem?



```
(ex) [/configure router "Base" ospf 0]
A:admin@R3#info
```

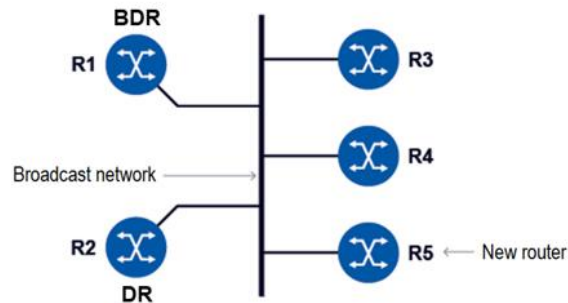
```
admin-state enable
area 0.0.0.1 {
  interface "system" {
  }
  interface "toR1" {
    interface-type broadcast
    passive true
  }
}
```

```
(ex) [/configure router "Base" ospf 0]
A:admin@R1#info
```

```
admin-state enable
area 0.0.0.0 {
  interface "toR2" {
    interface-type point-to-point
  }
}
area 0.0.0.1 {
  interface "system" {
  }
  interface "toR3" {
    interface-type point-to-point
  }
}
```

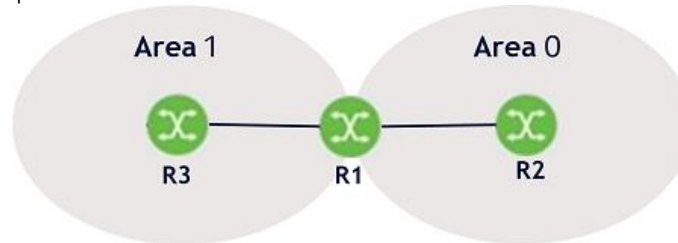
- A. The system interface of router R1, which is an ABR, must be in area 0.
- B. The interface type in the Hello messages exchanged by routers R1 and R3 does not match.
- C. Router R1 does not receive Hello messages from router R3.
- D. Router R3 does not receive Hello messages from router R1.

34. Consider the exhibit. A designated router (DR) and a backup designated router (BDR) have been elected among the OSPF routers connected to a broadcast network. A new router (R5 in the diagram) is added to the same broadcast network. Which of the following statements is TRUE?



- A. If the new router has a higher priority, it will become the new DR.
- B. The new router will establish a full adjacency with all the routers connected to the broadcast network.
- C. The new router will send its own link state advertisement to the DR and BDR using multicast address 224.0.0.6.
- D. All the routers that were connected to the broadcast network will generate a new link state update to reflect the topology change.

35. Consider the exhibit, which shows the OSPF configuration on routers R1 and R3. The OSPF adjacency between routers R1 and R3 does not come up. Which of the following is most likely the cause of the problem?



```
(ex) [/configure router "Base" ospf 0]
A:admin@R3#info

admin-state enable
area 0.0.0.1 {
  interface "system" {
    interface-type broadcast
  }
  interface "toR1" {
    interface-type broadcast
  }
}
```

```
(ex) [/configure router "Base" ospf 0]
A:admin@R1#info

admin-state enable
area 0.0.0.0 {
  interface "toR2" {
    interface-type point-to-point
  }
}
area 0.0.0.1 {
  interface "system" {
    interface-type point-to-point
  }
  interface "toR3" {
    interface-type point-to-point
  }
}
```

- A. The system interface of router R1, which is an ABR, must be in area 0.
 - B. The interface-type with which the system interface is added to OSPF does not match on routers R1 and R3.
 - C. The interface-type with which interface "toR1" is added to OSPF on R3 does not match the interface-type with which interface "toR3" is added to OSPF on router R1.
 - D. The area ID in the Hello messages exchanged by routers R1 and R3 does not match.
36. Enabling loopfree-alternate for a link state routing protocol does not change by itself the way that a router forwards data packets. However, it makes important calculations that can be used by other features on a Nokia 7750 SR. Which of the following features requires loopfree-alternate as a prerequisite to achieve its goal?
- A. SPF algorithm
 - B. IP fast re-route
 - C. Route summarization
 - D. Route leaking

37. Which of the following statements about OSPFv3's addressing is FALSE?
- A. OSPFv3-reserved multicast addresses are used to indicate the destination of control packets.
 - B. Link-local interface addresses are used to indicate the source of control packets.
 - C. Solicited-node multicast addresses are used to indicate the source of data packets.
 - D. Link-local interface addresses are used as next hops for entries in the protocol's forwarding database.
38. Which of the following statements about OSPFv3 is FALSE?
- A. If the router-ID is not configured, it uses the value of the system IPv6 address.
 - B. It uses the same control packets and adjacency states as OSPFv2.
 - C. Authentication is disabled by default, but it can be configured to use IPsec authentication.
 - D. Its LSAs carry either topology or IP reachability information, but not both.
 - E. It supports multiple area types.
39. Which of the following statements about OSPF link state advertisements (LSAs) in a single-area routing domain is TRUE?
- A. The only LSAs present in a single-area routing domain are Network LSAs and are generated by every router.
 - B. Every router generates a Router LSA and every designated router of a broadcast link generates an additional Network LSA.
 - C. Routers only connected to point-to-point links generate a Router LSA and routers connected to both link types generate a Network LSA.
 - D. Every router generates a Router LSA for each point-to-point link to which it is connected and a Network LSA for each broadcast link to which it is connected.
40. Which of the following statements about the OSPF link-state update (LSU) packet is FALSE?
- A. It is used to transfer one or more link-state advertisements (LSA).
 - B. It is sent to the interface IP address of each adjacent router.
 - C. It is transmitted when a link-state request (LSR) packet is received during database synchronization.
 - D. It is transmitted whenever a topology change occurs.



Answer Key

1. B	11. D	21. C	31. B
2. B	12. C	22. B	32. D
3. D	13. B	23. C	33. C
4. B	14. D	24. D	34. C
5. A	15. A	25. B	35. C
6. B	16. D	26. D	36. B
7. C	17. A	27. D	37. C
8. B	18. D	28. C	38. A
9. C	19. B	29. C	39. B
10. C	20. C	30. C	40. B

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