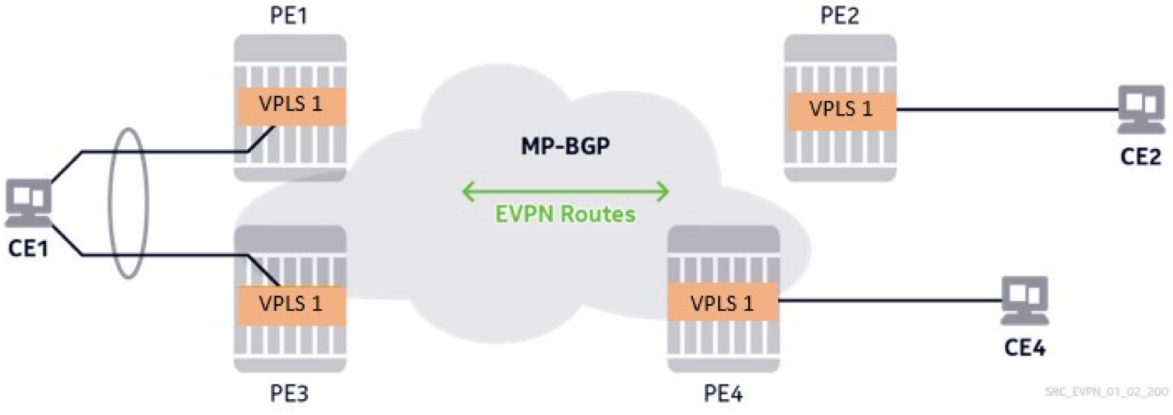
Practice Exam Questions for: Nokia Ethernet Virtual Private Network Services (exam number: 4A0-115)

The following questions will test your knowledge and prepare you for the Nokia Ethernet Virtual Private Network Services exam. Compare your responses with the Answer Key at the end of the document.

1. Which of the following statements about the EVPN-MPLS data plane is FALSE?
   a. EVPN-MPLS requires a routing protocol as a prerequisite to set up the tunnels.
   b. The transport tunnel is identified by inserting an additional IP header.
   c. The tunnels can rely on MPLS features such as fast reroute and traffic engineering.
   d. The PE encapsulates the customer traffic with a service label that uniquely identifies a specific service.

2. Consider the exhibit. Which of the following statements is TRUE?



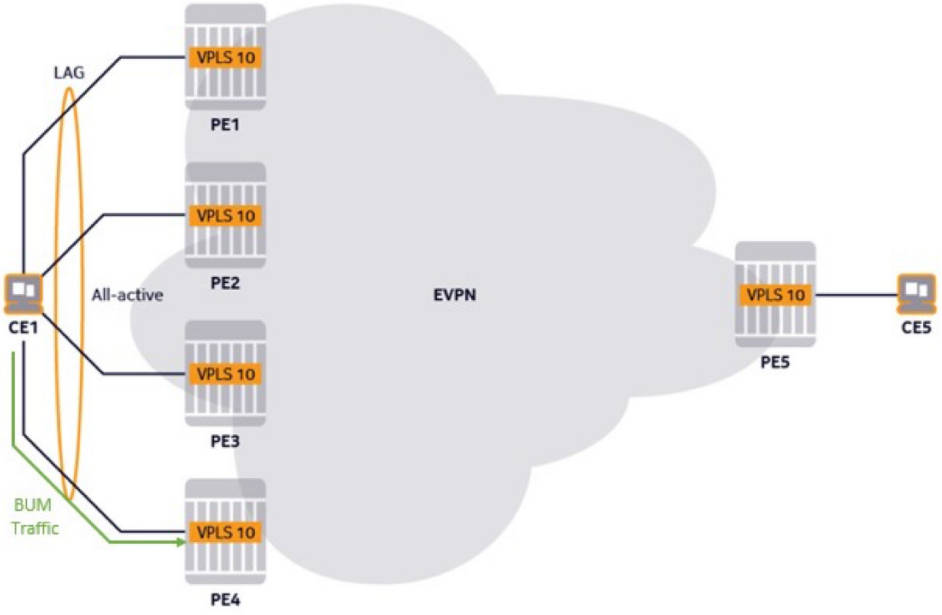
   a. There are four EVPN instances.
   b. There are four MAC-VRFs used to forward traffic.
   c. There are two Ethernet segments.
   d. There is one Ethernet segment identifier (ESI) configured on each PE..

3. Which of the following statements about multi-homing for an EVPN Layer-2 service is FALSE?
   a. Each Ethernet segment identifier is unique throughout the network.
   b. An Ethernet segment is a set of links that connect the CE to one or more PEs.
   c. The CE requires a LAG for single-active multi-homed connections.
   d. An Ethernet segment can consist of physical or logical links.

4. Which of the following statements about PE-to-PE MAC address advertisement is TRUE?
   a. The service distinguisher (label or VNI) is advertised with the Ethernet Segment updates.
   b. Route targets are used to uniquely identify routes between EVPN instances in the case of MAC address overlaps.
   c. The MAC address of a multi-homed CE is advertised to the remote PEs using Ethernet auto-discovery updates.
   d. A PE uses a single MP-BGP session with a remote peer to exchange the routes for all EVPN instances.

5. Which of the following statements about EVPN Layer-3 services that utilize the interface-ful model is TRUE?
   a. Intra-subnet traffic is carried over the tunnels provided by the supplementary broadcast domain (SBD) VPLS.
   b. The integrated routing and bridging (IRB) interface to the SBD can be numbered or unnumbered.
   c. The PEs utilize MAC/IP routing information to populate the VPRN routing tables.
   d. The VPRN can use a single IRB interface to connect to multiple VPLS instances on a PE.

6. Consider the exhibit. Which of the following statements is FALSE?



   a. The PE routers connected to the Ethernet segment automatically discover each other.
   b. PE4 will forward the BUM traffic to PE5 but not to the other PEs connected to the Ethernet segment.
   c. The PE routers connected to CE1 on the Ethernet segment elect one designated forwarder (DF).
   d. The non-designated forwarders (non-DFs) can forward unicast traffic to and from CE1.

7. Which of the following statements about MAC mobility in EVPN is FALSE?
   a. A PE that initially advertises a MAC address can include a MAC mobility sequence number in its advertised MAC/IP route.
   b. During MAC mobility, the new PE learns the MAC address on its local interface.
   c. During MAC mobility, the new PE advertises a new MAC/IP route with a sequence number lower than that stored in its database.
   d. Each PE keeps a single MAC/IP route per MAC address in its database.

8. Which of the following is NOT a function of the inclusive multicast Ethernet tag (IMET) routes?
   a. Discover all the PEs that are participating in the same VPLS.
   b. Specify the type of tunnels to be used for forwarding BUM traffic.
   c. Build a flooding list that is used for forwarding BUM traffic for the VPLS.
   d. Advertise the Layer-2 service MTU of the VPLS service.

9. Consider the exhibit. Which of the following statements is TRUE?

```
PE1# /show router bgp routes evpn incl-mcast originator-ip 10.10.10.2 detail
===============================================================================
 BGP Router ID:10.10.10.1       AS:65100       Local AS:65100
===============================================================================
-- Snip --
===============================================================================
BGP EVPN Inclusive-Mcast Routes
===============================================================================
Original Attributes

Network        : n/a
Nexthop        : 10.10.10.2
From           : 10.10.10.2
Res. Nexthop   : 10.1.2.2
Local Pref.    : 100                  Interface Name : toPE2
Aggregator AS  : None                 Aggregator     : None
Atomic Aggr.   : Not Atomic           MED            : None
AIGP Metric    : None                 IGP Cost       : 10
Connector      : None
Community      : target:65100:10 bgp-tunnel-encap:MPLS
Cluster        : No Cluster Members
Originator Id  : None                 Peer Router Id : 10.10.10.2
Flags          : Used Valid Best IGP
Route Source   : Internal
AS-Path        : No As-Path
EVPN type      : INCL-MCAST
Tag            : 0
Originator IP  : 10.10.10.2
Route Dist.    : 10.10.10.2:10
Route Tag      : 0
Neighbor-AS    : n/a
Orig Validation: N/A
Add Paths Send : Default
Last Modified  : 00h11m41s
-------------------------------------------------------------------------------
PMSI Tunnel Attributes :
Tunnel-type    : Ingress Replication
Flags          : Type: RNVE(0) BM: 0 U: 0 Leaf: not required
MPLS Label     : LABEL 524284
Tunnel-Endpoint: 10.10.10.2
```

   a. The MPLS label 524284 indicates the transport label that PE1 uses to reach neighbor 10.10.10.2.
   b. This IMET route has been imported by a local VPLS with a matching route-distinguisher.
   c. PE1 will add neighbor 10.10.10.2 to the flooding list of a local VPLS.
   d. PE1 forwards the BUM traffic to 10.10.10.2 using P2MP MPLS tunnels.

10. Consider the exhibit. Which of the following statements is FALSE?

```
PE1# /show router bgp routes evpn mac mac-address 00:00:00:02:10:02 hunt
===============================================================================
 BGP Router ID:10.10.10.1       AS:65100       Local AS:65100
===============================================================================
 Legend ...
===============================================================================
BGP EVPN MAC Routes
===============================================================================
-------------------------------------------------------------------------------
RIB In Entries
-------------------------------------------------------------------------------
Network        : n/a
Nexthop        : 10.10.10.2
From           : 10.10.10.2
Res. Nexthop   : 10.1.2.2
Local Pref.    : 100                    Interface Name : toPE2
Aggregator AS  : None                   Aggregator     : None
Atomic Aggr.   : Not Atomic             MED            : 0
AIGP Metric    : None                   IGP Cost       : 2
Connector      : None
Community      : target:65100:10 bgp-tunnel-encap:MPLS
Cluster        : No Cluster Members
Originator Id  : None                   Peer Router Id : 10.10.10.2
Flags          : Used Valid Best IGP
Route Source   : Internal
AS-Path        : No As-Path
EVPN type      : MAC
ESI            : ESI-0
Tag            : 0
IP Address     : n/a
Route Dist.    : 10.10.10.2:10
Mac Address    : 00:00:00:02:10:02
MPLS Label1    : LABEL 524284           MPLS Label2    : n/a
Route Tag      : 0
Neighbor-AS    : n/a
Orig Validation: N/A
Add Paths Send : Default
Last Modified  : 00h12m09s
```

a. The VPLS service on neighbor 10.10.10.2 has proxy-ARP in the disabled state.
b. This update has been imported into a local VPLS service with a matching route-target.
c. The MAC address 00:00:00:02:10:02 is a host connected to a service on neighbor 10.10.10.2.
d. PE1 uses this update to add neighbor 10.10.10.2 to the flooding list of a local VPLS service.

11. Consider the exhibit. Which of the following statements is TRUE?

```
PE1# /show router bgp routes evpn mac
===============================================================================
 BGP Router ID:10.10.10.1       AS:65100       Local AS:65100
===============================================================================
 Legend -
 Status codes  : u - used, s - suppressed, h - history, d - decayed, * - valid
                 l - leaked, x - stale, > - best, b - backup, p - purge
 Origin codes  : i - IGP, e - EGP, ? - incomplete

===============================================================================
BGP EVPN MAC Routes
===============================================================================
Flag  Route Dist.          MacAddr           ESI
      Tag                  Mac Mobility      Label1
                           Ip Address
                           NextHop
-------------------------------------------------------------------------------
u*>i  10.10.10.2:10        00:00:00:02:10:02 ESI-0
      0                    Seq:0             VNI 10
                           n/a
                           10.10.10.2

u*>i  10.10.10.3:10        00:00:00:03:10:03 ESI-0
      0                    Seq:0             VNI 10
                           n/a
                           10.10.10.3

-------------------------------------------------------------------------------
Routes : 2
```

a. PE1 has used these updates to build a flooding list for a local VPLS service.
b. The host with MAC 00:00:00:02:10:02 has moved from a PE within this service to PE2.
c. The VPLS service on neighbors 10.10.10.2 and 10.10.10.3 have proxy-ARP in the disabled state.
d. Neighbors 10.10.10.2 and 10.10.10.3 are connected to an all-active multi-homed Ethernet segment.

12. Proxy-ARP/ND is operational for a VPLS. Which of the following statements is FALSE?
    a. The “dynamic-populate” command allows for the learning of local IP/MAC combinations.
    b. The PE generates two MAC/IP routes for each locally-learned host.
    c. The PE is able to respond to a local ARP/ND query on behalf of a learned remote host.
    d. The VPLS FDB is populated with the corresponding IP addresses of local and remote hosts.

13. An EVPN VPLS is deployed over VXLAN and MPLS networks, which of the following statements about the gateway PE router is FALSE?
    a. The VPLS must be configured with two BGP instances.
    b. The route-distinguisher may be the same or different for each BGP instance.
    c. The route-target may be explicitly defined for each BGP instance.
    d. A BGP instance is assigned to support VXLAN while another instance is assigned to support MPLS.

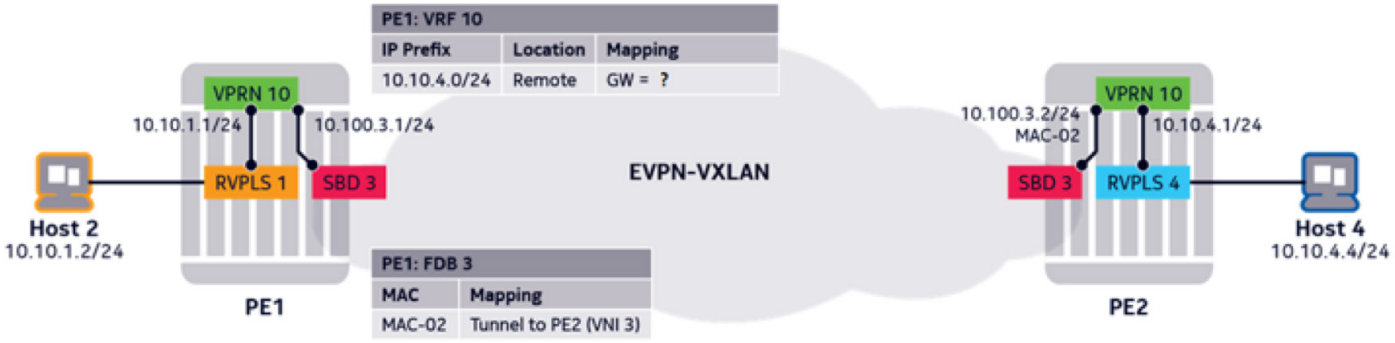
14. Which of the following statements about the Layer-3 EVPN architecture is FALSE?
    a. An integrated routing and bridging (IRB) interface is used to connect a VPLS to a VPRN.
    b. The VPRN service makes forwarding decisions based upon the destination IP address.
    c. A VPLS service that uses an IRB to connect to a VPRN is referred to as a R-VPLS.
    d. EVPN IMET routes are used to discover PEs participating in the same Layer-3 EVPN service.

15. Which of the following statements about the operation of the Layer-3 EVPN asymmetric forwarding model is FALSE?
    a. A MAC/IP route containing the host MAC address is advertised per host.
    b. A MAC/IP route is advertised with the MAC and IP address of the integrated routing and bridging (IRB) interface.
    c. An IP-Prefix route is advertised for each locally-attached subnet.
    d. dThis model is not scalable because it requires the instantiation of all VPLSs on each PE.

16. Which of the following statements about the operation of the Layer-3 EVPN interface-less forwarding model is FALSE?
    a. Local VRF routes are advertised using IP-Prefix updates.
    b. An R-VPLS instance is required on each PE regardless of whether the PE has a local host or not.
    c. The next-hop information in the IP-Prefix update is set to the originating PE address.
    d. Remote PEs use the route-target information to identify the VRF that will import the IP-Prefix update.

17. The interface-ful numbered model is used for a Layer-3 EVPN. Which of the following statements is TRUE?
    a. The participating PEs use IP-Prefix updates to advertise the locally-attached subnets.
    b. The participating PEs use MAC/IP updates to advertise the MAC and IP addresses of local hosts.
    c. The IP address of the integrated routing and bridging (IRB) interface is configured in the supplementary broadcast domain (SBD) VPLS.
    d. The SBD VPLS instances use a service access point (SAP) to connect to the IRB.

18. Consider the exhibit. What gateway (GW) address will be used by the VPRN on PE1 to reach the 10.10.4.0/24 network?



a. 10.10.4.1
b. 10.100.3.1
c. 10.100.3.2
d. MAC-02

19. A Layer-3 EVPN service has been configured using the interface-ful unnumbered forwarding model. Which of the following statements is FALSE?
a. Both IP-Prefix and MAC/IP updates are advertised by the participating PEs.
b. The MAC/IP update contains the CE MAC and IP information to be used in the remote VPRN VRF.
c. The integrated routing and bridging (IRB) interface used by the supplementary broadcast domain (SBD) does not have an IP address.
d. The IP-Prefix route contains the MAC address of the SBD IRB interface on the originating PE as an overlay index.

20. A Layer-3 EVPN has been configured on the Nokia 7750 service router to use the interface-ful numbered forwarding model. Which of the following statements regarding the configuration performed on each of the participating PEs is FALSE?
a. The VPLS service that connects the CE hosts is configured as a routed VPLS.
b. A supplementary broadcast domain (SBD) is configured as a routed VPLS.
c. The SBD service is configured to advertise IP-Prefix information.
d. The VPRN interface bound to the SBD has evpn-tunnel enabled.

21. Which of the following statements about the EVPN route types used to support multi-homing is FALSE?
a. The auto-discovery per Ethernet segment (A-D per ES) route includes an ESI label used in the split-horizon mechanism.
b. The auto-discovery per EVPN instance (A-D per EVI) route advertises the redundancy mode of the Ethernet segment.
c. Ethernet segment (ES) routes are used in the election of the designated forwarder (DF).
d. ES routes are only imported by PEs that are attached to the same Ethernet segment.

22. A PE is configured to advertise one auto-discovery per Ethernet segment (A-D per ES) route per EVPN instance (EVI). Which of the following statements is FALSE?
a. The update carries a route distinguisher (RD) that is set to the RD of the EVI.
b. The update carries a route target (RT) list that includes the RTs of the EVIs referencing the ES.
c. The update carries information that identifies the redundancy mode of the ES.
d. Updates referencing the same ES carry the same Ethernet segment identifier (ESI) label.

23. Which of the following statements about the auto-discovery per EVPN instance (A-D per EVI) update is FALSE?
    a. A PE advertises an A-D per EVI update for every operational service referencing an Ethernet segment (ES).
    b. A PE uses received A-D per EVI updates to create a primary/backup list of PEs that are part of an all-active ES.
    c. The A-D per EVI update contains a route-distinguisher (RD) that is set to the RD of the associated EVI.
    d. The A-D per EVI update contains a non-zero MPLS label to be used for data encapsulation.

24. Which of the following statements about the operation of a non-designated forwarder (non-DF) in an all-active Ethernet segment is FALSE?
    a. It is allowed to send unicast traffic to the CE.
    b. It is allowed to send multicast traffic to the CE.
    c. It is allowed to receive unicast traffic from the CE.
    d. It is allowed to receive multicast traffic from the CE.

25. Which of the following statements about the default designated forwarder (DF) election algorithm is FALSE?
    a. It is modulo-based.
    b. It yields a consistent result in all participating PEs.
    c. The result of this algorithm depends on the preference of each candidate PE.
    d. The result of this algorithm depends on the EVPN instance (EVI) value.

26. Which of the following statements about the preference-based designated forwarder (DF) election process for an Ethernet segment (ES) is TRUE?
    a. The desire to use this DF algorithm must be advertised in the auto-discovery per ES (A-D per ES) route update.
    b. When no EVPN instance (EVI) range is configured, the PE with the lowest preference value is elected as DF for all EVIs.
    c. When an EVI range is configured, the PE with the highest preference value is elected as DF for EVIs within the range.
    d. In the event of matching preference values, the PE configured with the non-revertive option is elected as DF.

27. The split-horizon mechanism is used in the case of EVPN all-active multi-homing. Which of the following statements about the operation of this mechanism is TRUE?
    a. This mechanism prevents BUM traffic from being forwarded back to the originating Ethernet segment.
    b. The CE sends the BUM traffic only to the PE elected as the designated forwarder (DF).
    c. The ingress PE does not forward the BUM traffic to other PEs attached to the originating Ethernet segment.
    d. The ingress PE adds an Ethernet segment identifier (ESI) label and forwards the BUM traffic to all remote PEs.

28. Which of the following statements regarding the EVPN operation in the case of a single-active multi-homing Ethernet segment (ES) is FALSE?
    a. PEs connected to the ES run a designated forwarder (DF) election algorithm and elect a DF for each operational EVI referencing the ES.
    b. The DF PE is allowed to forward unicast traffic to and from the CE.
    c. The non-DF PEs bring their SAPs which are referencing the ES operationally down.
    d. PEs not connected to the ES use the received auto-discovery routes to load balance traffic destined to the ES.

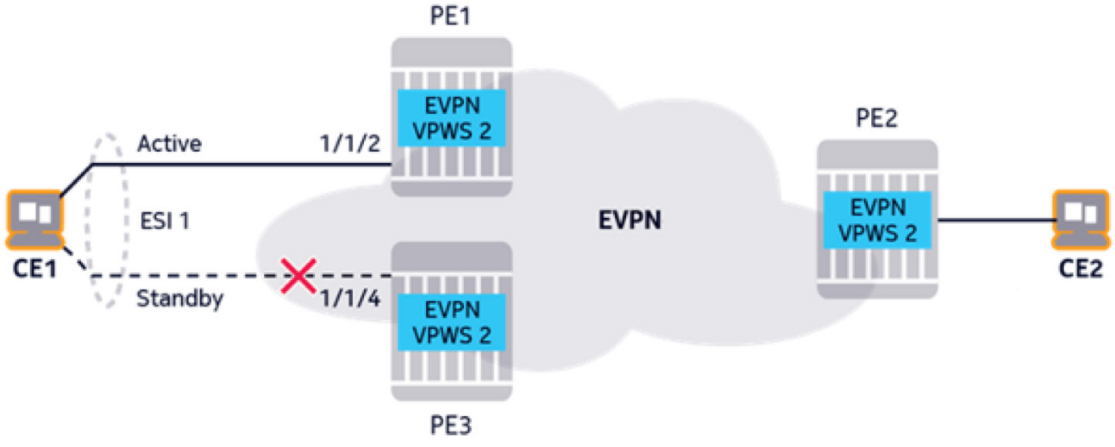
29. Which of the following EVPN routes is used to advertise the maximum transmission unit (MTU) for a VPWS to remote PEs?
    a. MAC/IP routes
    b. Auto-discovery per Ethernet segment routes
    c. Ethernet segment routes
    d. Auto-discovery per EVPN instance routes

30. Which of the following parameters is NOT included in an auto-discovery per EVPN instance (A-D per EVI) route advertised for a VPWS?
    a. Bits to identify if the PE is primary or backup in the case of a multi-homing scenario.
    b. An MPLS or a VNI label that is set to a non-zero value.
    c. An Ethernet tag ID that is set to the MAX-ET value.
    d. An Ethernet segment identifier that is set to a non-zero value in the case of a multi-homing scenario.

31. Which of the following is NOT part of the Layer 2 Attributes extended community carried by an A-D per EVI route advertised for a VPWS?
    a. A Layer-2 MTU that carries the service MTU value.
    b. A P bit that identifies the PE as a primary forwarder.
    c. A B bit that identifies the PE as a backup forwarder.
    d. A tag ID that carries the local attachment circuit ID.

32. A single-homed VPWS is provisioned and the associated A-D per EVI routes are advertised. Which of the following conditions is NOT required to bring the VPWS operationally UP?
    a. The received tag ID must match the tag ID locally-configured for the remote attachment circuit (AC).
    b. The received route target (RT) must match the RT of the locally-configured VPWS.
    c. The received P bit must be set to "1" to indicate that the far-end PE can forward traffic.
    d. The received Layer-2 MTU value must match the service MTU of the locally-configured VPWS.

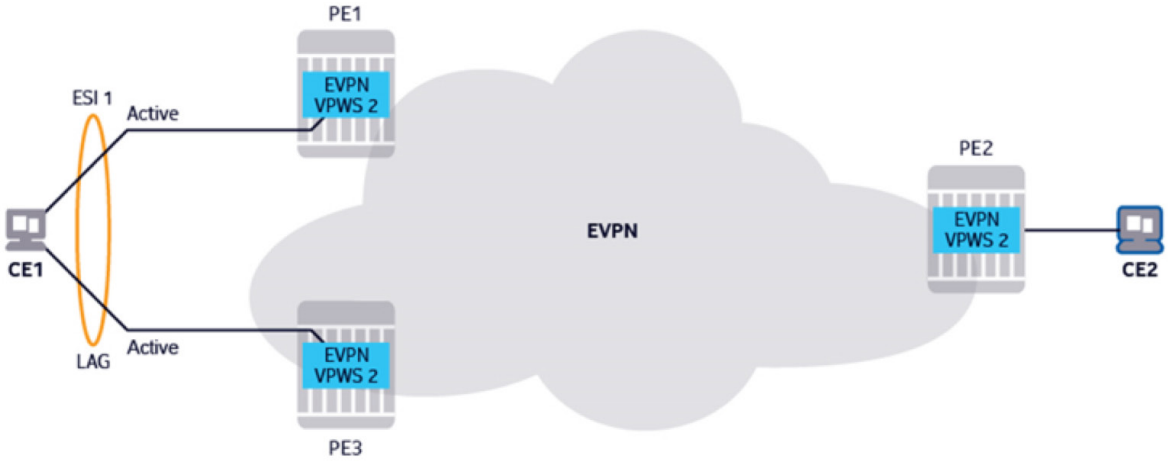
33. Consider the exhibit. Which of the following statements about the single-active multi-homed VPWS is FALSE?



    a. PE1 has been elected as designated forwarder (DF) for VPWS 2.
    b. PE1 sets the P bit to "1" in its advertised A-D per EVI route for VPWS 2.
    c. PE2 sets the P bit to "1" in its advertised A-D per EVI route for VPWS 2.
    d. PE3 sets the B bit to "1" in its advertised A-D per EVI route for VPWS 2.

34. An all-active multi-homed EVPN VPWS is provisioned. Which of the following operations is NOT performed by PEs that are part of the Ethernet segment?
    a. Elect a designated forwarder (DF).
    b. Include the Ethernet segment identifier (ESI) in the advertised A-D per EVI route.
    c. Include the local attachment circuit identifier in the advertised A-D per EVI route.
    d. Set the P bit to "1" in the advertised A-D per EVI route.

35. Consider the exhibit. Which of the following configuration statements must be satisfied for the operation of VPWS 2?



    a. The local AC tag on PE1 must match the remote AC tag on PE3.
    b. The local AC tag on PE1 must match the local AC tag on PE2.
    c. The same service MTU is configured on PE1, PE2, and PE3.
    d. PE2 is configured with an Ethernet segment identifier (ESI) that matches the ESI on PE1 and PE3.

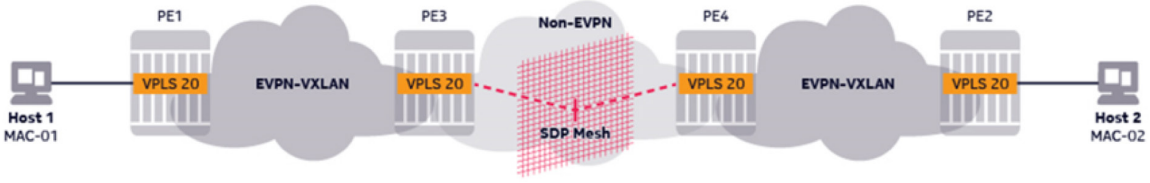
36. Consider the exhibit. Which of the following statements is TRUE?

    a. PE3 and PE4 use an SAP to connect to the core network.
    b. The local attachment circuit (AC) tag on PE1 must match the remote AC tag on PE2.
    c. PE1 advertises the service label to PE3 using an A-D per EVI route.
    d. The local AC tag on PE1 must match the local AC tag on PE3.

37. Consider the exhibit. Which of the following configuration statements do NOT need to be satisfied to enable Layer-2 communication between the two CEs?

a. PE3 is configured with a service distribution point towards PE4.
b. PE2 is configured with an MP-BGP session that allows the exchange of EVPN routes with PE4.
c. The ePipe on PE3 is configured with a spoke-sdp towards PE4.
d. The ePipe on PE1 is configured with remote attachment circuits for PE2, PE3, and PE4.

38. Consider the exhibit. Which of the following statements is TRUE?



a. PE1's flooding list contains entries for PE3, PE4, and PE2.
b. PE3 advertises a MAC/IP route for MAC-01 to PE2.
c. T-LDP can be used to exchange service labels between PE3 and PE4.
d. PE4 floods BUM traffic received from PE2 to PE1.

39. Consider the exhibit. The EVPN-IRB is using the interface-ful unnumbered model. Which of the following statements is FALSE?

a. PE3 and PE4 exchange service labels for VPRN15 using T-LDP.
b. PE1 advertises a MAC/IP route for MAC-01 to PE3.
c. PE3 advertises a VPN-IPv4 route for 10.10.1.0/24 to PE4.
d. PE4 advertises an IP-Prefix route for 10.10.1.0/24 to PE2.

40. Consider the exhibit. The EVPN-IRB is configured to use the interface-ful unnumbered model. Which of the following configuration is NOT required?

a. VPLS 3 is configured as a routed VPLS.
b. VPLS 3 requires a VXLAN instance to be configured.
c. VPRN 15 IRB interface to VPLS 3 requires an IP address to be configured.
d. VPRN 15 IRB interface to VPLS 40 requires an IP address to be configured.

Answer Key

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

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