EXAM 13/02/21

1. The difference between link state and distance vector routing algorithms can be summarized as follows:
   (a) Link state algorithms send local information only to neighboring nodes; distance vector algorithms send global information to all nodes in the network
   (b) Link state algorithms send global information to all nodes in the network; distance vector algorithms send local information only to neighboring nodes
   (c) Link state algorithms send local information to all nodes in the network; distance vector algorithms send global information only to neighboring nodes

2. A device equipped with the NAT64 functionality is able to
   (a) Operate on 64-bit IP addresses
   (b) Replace the IPv6 header of a packet with an IPv4 one, and vice versa 1,00
   (c) Convert an IPv6 packet in an Ethernet frame
   (d) Replace the IPv6 destination address in the IPv6 header of a packet with an IPv4 one, and vice versa

3. The IPsec "Tunnel Mode" encompasses the encryption of
   (a) Only the TCP/UDP header and payload
   (b) Only the payload of the internal packet
   (c) The whole external packet, header included
   (d) The IP header, TCP/UDP header, and payload of the internal packet

4. In order to setup a label switched path (LSP)
   (a) MPLS routers on the path must perform a mapping operation
   (b) The same layer-two protocol must be deployed on all links on the path
   (c) Final destinations of IP packets traveling on the LSP must support MPLS
   (d) MPLS routers on the path must deploy the same protocol for label distribution

5. The Interface ID of an IPv6 address
   (a) Is the same for all devices within the same link
   (b) Can be arbitrarily selected, sometimes it is derived from the MAC address of the interface
   (c) Is assigned by the ISP according to a hierarchical schema
   (d) Is assigned by the network administrator according to a hierarchical schema

6. An Autonomous System:
   (a) is identified by means of a 4 bytes long ID assigned by the CSA
   (b) is a set of subnets with a short topological proximity and managed by a single organization unit
   (c) is a subnet configured by leveraging the static routing
   (d) is identified by means of a 4 bytes long ID automatically computed by the BGP

7. The static routing
   (a) It is an obsolete technology no longer deployed since dynamic routing is preferred over it
   (b) Consists in one network node computing routes for other network nodes and providing the computed routes to them
   (c) Consists in the automatic learning of routes without exchanging routing information
   (d) Consists in the network administrator manually configuring routing information in each router

8. Among the four proposed alternatives, which is the smallest valid aggregation that can represent the IP networks 130.192.1.0/24 and 130.192.2.0/24 in a routing table?
   (a) 130.192.1.0/23
   (b) 0.0.0.0/0
   (c) 130.192.1.0/23
   (d) 130.192.0.0/23

9. The Mapping Address and Port (MAP) technique for the IPv4-IPv6 transition is based on
   (a) The utilization, on the Customer Premises Equipment (CPE), of an IPv6 address derived from the IPv4 address and the Port Set ID assigned by the provider to the customer
   (b) The utilization, on the Border Relay, of an IPv6 address derived from the IPv4 address and the Port Set ID assigned by the provider to the various customers
   (c) The utilization, on the Customer Premises Equipment (CPE), of an IPv6 address selected among a fixed set of addresses defined by a standard
   (d) The utilization, on the Customer Premises Equipment (CPE), of an IPv6 address which varies on the basis of the IPv4 destination address that the user would like to reach

10. The Integrated Services (IntServ) solution has been standardized to
   (a) Allow applications to request to and receive from the network the quality of service they need.
   (b) Mark packets as belonging to a specific class of service so that they can receive the most suitable service.
   (c) Integrate within the network traditional IP routers and MPLS (Multi-Protocol Label Switching) Label Switch Routers (LSRs), thanks to the common deployment of RSVP (Resource ReSerVation Protocol).
   (d) Enable the integrated deployment of IP routers and Ethernet switches to guarantee network connectivity.

11. The main contribution to the latency experienced in the nodes of a heavily loaded packet network is given by
   (a) The time needed to process the packet.
   (b) The time taken to transmit the packet on an output link (transmission delay).
   (c) The time taken to locate, in the routing table or in the forwarding table, the information need to forward the packet.
   (d) The time spent in buffers while waiting for resources occupied by other packets to become available (for example, the transmission capacity of a link).

12. With respect to previous solutions, The Long Term Evolution (LTE) technology is characterized, among the other things, by

(a) The usage of switching technique based on virtual circuits
(b) The usage of a circuit switching technique
(c) The usage of mobile terminals that are able to use the IP protocol for sending data
(d) The usage of an "all-IP" network architecture with shared communication channels

13. The IGMP protocol

(a) Allows a host to communicate to other hosts belonging to a given multicast group its own interest in entering the group
(b) Allows a router to communicate to other routers in the Internet network its own interest in receiving the traffic related to a given multicast group
(c) Carries the multicast traffic generated by hosts
(d) Allows a host to communicate to routers in the network its own interest in receiving the traffic related to a given multicast group

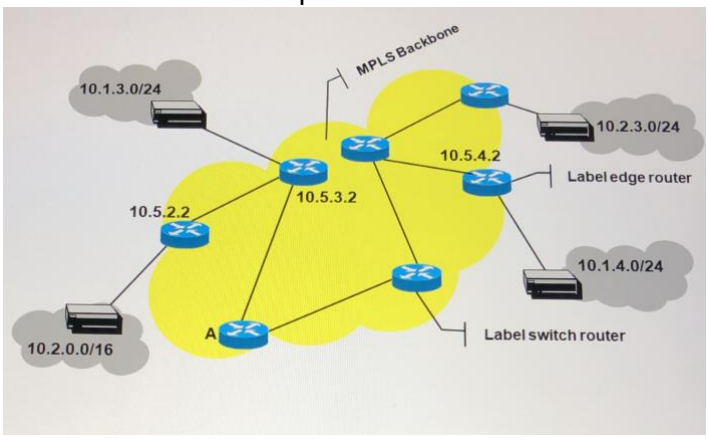
14. One of the reasons that are favoring the spread of the IPv6 protocol is

(a) The more and more widespread need to use multicast applications
(a) (b) The low inclination of network operators to modify the configuration of their own networks
(b) The possible inefficiency of the private IPv4 addressing
(c) The lack of MAC addresses

15. The paging procedure in a cellular network is used for

(a) Notifying the mobile terminal that it has to be contacted
(b) Notifying the mobile terminal that it is going to change the cell
(c) Forcing the mobile terminal to apply proper memory sharing policies
(d) Sending an SMS

16. With reference to the network in the following figure that provides VPN services over MPLS, router A binds a label to a FEC that identifies packets



(a) Going to hosts in subnet 10.2.3.0/24
(b) Coming from 10.5.4.2
(c) Going to 10.5.3.2
(d) Going to 10.5.2.2

17. One of the main strengths of the IPv6 protocol is
    (a) The possibility to use 10Gb/s channels, a feature not available in IPv4
    (b) The possibility to enable a routing mechanism based on names and no longer on addresses
    (c) The large size of the addressing space
    (d) The encryption of the packet payload, available by default for all the packets sent by a host

18. When an IPv6 host needs to learn the MAC address associated to a given IPv6 address
    (a) It can send a specific ICMPv6 message in multicast over the network
    (b) It can send a specific ICMPv6 message in unicast over the network
    (c) It can send an ARP Request in broadcast over the network
    (d) It can send a specific ICMPv6 message in broadcast over the network

19. In the 6PE solution packets traveling through the MPLS backbone have two labels;
    (a) The internal label is used by internal (P) routers to forward packets towards an IPv6 destination.
    (b) The external label is used by internal (P) routers to forward packets towards an IPv6 destination.
    (c) The internal label is used by internal (P) routers to forward packets towards a PE router.
    (d) The external label is used by internal (P) routers to forward packets towards a PE router.

20. Given a network based on several physical networks interconnected by routers and a range of IP addresses to use in that network, it is possible to define an addressing plan that optimizes routing on a given router of the network by
    (a) Assigning to the various physical networks distinct network IDs randomly selected within the address range given for the entire network
    (b) Splitting the network in areas and defining, within the given address range, smaller distinct address ranges to use in each area
    (c) Assigning to the various physical networks distinct network IDs selected within the address range given for the entire network. In particular, this assignment must proceed from in a decreasing order of network size

21. The application of Frequency Hopping (FH) in a GSM network results in
    (a) An increase of the maximum number of users the cell can serve, but with a reduction of the communication quality
    (b) A reduction of both the communication quality and the maximum number of users the cell can serve
    (c) An increase of the communication quality, but with a reduction of the maximum number of users the cell can serve
    (d) An increase of both the communication quality and the maximum number of users the cell can serve

22. The Random Access CHannel (RACH) in a GSM network is used
    (a) By mobile terminals for sending voice samples by means of a Slotted-Aloha technique for the medium access
    (b) By the network, for offering dedicated communication channels to mobile terminals
    (c) By mobile terminals, for requesting dedicated communication channels to the network
    (d) By mobile terminals for sending voice samples by means of a CSMA technique for the medium access

23. VPNs (virtual private networks) are used to
    (a) Divide a corporate local area network in a set of separate subnets, each for a different corporate function (e.g., sales, procurement, engineering, marketing)
    (b) Transport private traffic through a shared infrastructure while creating the same conditions the traffic would undergo through a private infrastructure
    (c) Optimize a public network in multiple networks virtually separated
    (d) Partition a private network (for example the one of a parent company with various subsidiaries) in multiple networks virtually separated

24. LSP (Label Switched Path) setup in MPLS (Multi-Protocol Label Switching) implies that
    (a) Routers connected at the ends of a link share which label should be prepended to packets belonging to the LSP.
    (b) The hosts sending and receiving packets belonging to the LSP support MPLS.
    (c) Routers at the two ends of the LSP (Label Edge Routers) directly exchange routing information.
    (d) The upstream router on a link communicates to the downstream router which label should be prepended to packets belonging to the LSP.

25. DWDM (Dense Wavelength Division Multiplexing) is a technology allowing to
    (a) Switch an optical signal from the input of a device to its output port
    (b) Multiplex/demultiplex optical signals (characterized by different wavelengths) on the same optical fiber
    (c) Package in a dense way a large number of optical fibers in the same cable
    (d) Multiplex/demultiplex various bit flows at different bit rates on a single optical channel (characterized by a specific wavelength)

26. SSL-based VPN (Virtual Private Network) solutions are widely deployed because
    (a) They do not have any problems when packets go through a NAT (Network Address Translation) function on their path to their destination.
    (b) They are the only VPN solutions providing a robust packet encryption and authentication functionality.
    (c) Allow packets to be encrypted and authenticated without the need of negotiating cryptographic keys.
    (d) Allow the layer 3 (network layer) header to be encrypted and authenticated.

27. When the link between two MPLS routers deploys a layer 2 protocol that supports virtual connections (such as ATM and Frame Relay)
    (a) Routing protocols specified for the given layer 2 protocol must be deployed (for example, a routing protocol of the ATM standard).
    (b) Labels can be bound only to FECs that include layer 2 destination identifiers (e.g., ATM addresses)
    (c) It is not possible to use more than one label for each packet.
    (d) The most external MPLS label is carried inside the layer 2 header.

28. An IPSec-based VPN (Virtual Private Network)
    (a) Requires that the end points support the IPSec protocol
    (b) Requires that the involved Gateway supports the IPsec protocol
    (c) Deploys tunneling to allow encryption and/or authentication of IP packets exchanged by corporate hosts
    (d) The encryption is mandatory, while the authentication is optional

29. A host A with IP address 130.192.225.79/24 sends an ARP Request on the local network in order to learn the MAC address of a host with IP address 130.192.225.1/26. The corresponding ARP Reply sent from B
    (a) Is sent to the MAC address of B's default gateway, because A is outside the IP network of B
    (b) Is not sent
    (c) Arrives to A only if the network is based on a shared medium (e.g., a Ethernet hub)
    (d) Is sent to the MAC address of A

30. The IPv6 Extension Headers are
    (a) Header chains that can be added to the main IPv6 header in order to move to the network layer some features that are typically of the transport layer (e.g., the transmission of acknowledges)
    (b) Padding techniques adopted to make the IPv6 packet of fixed size equal to 40 bytes
    (c) Header chains that can be added to the main IPv6 header in order to offer additional features
    (d) Padding techniques adopted to fix the size of the layer 2 frame containing the IPv6 packet

31. The Integrated IS-IS protocol
    (a) Is an obsolete routing protocol no longer used due to its low performance
    (b) Is a protocol used by Ethernet switches to create a routing tree in the network (spanning tree) removing closed paths (i.e., loops)
    (c) Is a protocol derived as an evolution of BGP for the exchange of information between routers belonging to different autonomous systems
    (d) Is a protocol based on the link state routing algorithm widely used in large networks