Computer Network Technologies and Services

This document contains a collection of previously asked exam questions from the course.
It is intended to serve as a study aid and to help you become familiar with the type of questions that may appear in the exam.

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I’ve done my best to cross-check the content and ensure its quality. My goal is to support fellow students by making learning resources more accessible.

That said, compiling and organizing this content took considerable time and effort. I hope it helps you as much as it helped me in preparing.

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Collection 1

1. In the coin bucket mechanism you can control:

A) The maximum traversal time of a router.

B) Internal queue management with WFQ.

C) The minimum speed of data entry.

D) The maximum burst size and average data entry rate.

2. Unlike IP version 4, version 6:

A) It does not have an associated version of ICMP.

B) It does not allow you to find out the MAC address of another station by knowing its IP address.

C) It has no broadcast addresses.

D) It does not have a TTL (time-to-live) field equivalent.

3. A protocol used in MPLS for label distribution is:

A) OSPF

B) IS-IS

C) RIP

D) BGP

4. IPsec:

A) Used only for VPN

B) Manages Key encryption

C) Has problems with solutions that use NAT

5. Which of the following definitions is new to the UMTS standard?

A) Microdiversity

B) Network Slicing

C) None of these definitions

D) Macrodiversity

6. increasing the number of VLANs

A) Increasing collision domains

B) Decrease in collision domains

C) Increase in broadcast domains

D) Decrease in broadcast domains

7. Handover is the mechanism that enables:

A) encrypting a communication channel

B) Manage release from a cell and reattachment to a new one

C) notify a user of an incoming call

D) Request access to the network by a user

8. PPTP protocol is usually used for:

A) Allow to create a tunnel in an access VPN.

B) Allow you to create a tunnel in a site-to-site overlay VPN.

C) Allow you to create a tunnel in a site-to-site peer VPN.

D) Allow you to create a tunnel in a Layer 4 VPN.

9. Multicast communications in an ipv4 network

A) are only possible within a single lan network, even with the use of additional protocols

B) are always possible, IGMP just makes them more efficient

C) are not possible without the use of additional protocols in the network

D) are possible on a geographic scale through the use of the IGMP protocol alone

10. Consider a simple network topology in which there are four routers (A, B, C, D). The first 3 are connected to each other in a ring (A-B-C-A), while the fourth is connected to C through a point-to-point link (C-D). If the hosts use a flooding routing algorithm and router A sends a packet to D, how many copies of the same packet will be delivered to router D?

A) 1

B) 2

C) 3

D) And proportional to the value of the Time To Live field in the package

11. The importance of MPLS (multi-protocol label switching) in today's and future networks stems from the possibility of

A) Efficiently transport IP packets over ATM networks

B) Connecting high-speed servers to their disks

C) Easily and effectively carry out traffic engineering (traffic engineering)

D) Making apparatus capable of operating without the need for configuration

12. The "Path Vector" technique employed by the BGP:

A) Stores in Path Vectors the list of Autonomous Systems to be traversed to reach a given destination network

B) Stores in Path Vectors the list of routers to traverse to reach a given destination network

C) Stores in Path Vectors the next Autonomous System to traverse to reach a given destination network

D) Stores in Path Vectors the next router to traverse to reach a given destination network

13. the fact that a VPN offers centralized Internet access implies that

A) enterprise network use a single internet service provider

B) No need to use devices to protect the corporate network,such as firewalls, from attacks from the Internet

C) packets sent to stations outside the private network(i.e., internet stations) may follow a suboptimal path on the physical network topology

D) the impact of public traffic (direct or from the Internet) on enterprise network infrastructure is reduced

14. The concepts of Forwarding and Routing:

A) They are synonymous; they identify the process of finding a valid path for a packet, from sender to receiver

B) They are synonymous; they identify the process of determining, in the face of an incoming packet at a network node, which is the best output port to the destination

C) They are different concepts; the forwarding process aims to identify a valid path for a packet, from sender to receiver; the routing process allows, in the face of a packet entering a network node, to determine which is the best exit port to the destination

D) They are different concepts; the routing process aims to identify a valid path for a packet, from sender to receiver; the forwarding process allows, in the face of a packet entering a network node, to determine which is the best exit port to the destination

15. For the establishment of an LSB, it is essential that

A) All links on the route use the same layer two protocol

B) Mpls routers on the route use the same protocol for label distribution

C) Final destinations of packages traveling on the LSP support mpls

D) Mpls routers on the route perform a 'mapping operation

16. IPv6 Header

A) The header is fixed size and no options can be added.

B) The header is of variable size.

C) Fixed header size but with possible addition of additional headers

17. What is an advantage of using a Link State type routing algorithm over a Distance Vector type routing algorithm?

A) The presence of the Link State Database eliminates the need for a routing table, saving memory

B) By having the Link State Database, each router is able to independently calculate routes to each destination

C) A lower demand in terms of processing power for the execution of the algorithm

D) Lower routing errors as Link States are exchanged by routers at a very high frequency

18. A host belonging to a certain VLAN

A) Can only contact hosts in the same VLAN

B) Can contact hosts in other VLANs via a router

19. Indicate the false claim among the below statements about the Link State algorithm

A) The Link State algorithm converges faster than the Distance Vector algorithm.

B) The RIP (Routing Information Protocol) protocol is based on the Link State algorithm.

C) The Link State algorithm seldom generates loops.

D) The Link State algorithm exchanges less information than the Distance Vector algorithm.

20. Which of the following is a significant disadvantage in the centralized routing technique?

A) Poor performance case the traffic carried is voice traffic

B) Difficulty in determining the actual network topology in case of failures

C) Particularly heavy data traffic around the central node

D) Criticality of the central node from the point of view of robustness and scalability

21. A link-local address:

A) It can be used to enable communication between stations over local links (e.g., a LAN) in the absence of other IPv6 addresses.

B) It is used to physically connect two stations on a local link.

C) It is the address used by stations on a LAN to exchange data.

D) It is used in all communication between local stations.

22. Given a network consisting of several physical networks interconnected by appropriate routers and a range of IP addresses to be used in that network, it is possible to make an addressing plan that can optimize routing on a certain router in that network:

A) Assigning randomly chosen addresses within the address range defined for the network to the various physical networks present

B) Assigning to the various physical networks present addresses chosen within the address range defined for the network, proceeding with assignment in descending order of network size

C) By dividing the network into areas and defining, within the starting address rangedistinct address ranges to be used in each of those areas

23. Neighbor Discovery Procedures in IPv6

A) is based on ARPv6

B) Is based on an ICMPv6 packet sent in broadcast

C) Is based sun an ICMPv6 packet sent in multicast

D) Requires the network to also support IPv4

24. High speed packet access (HSPA):

A) Uses dedicated channels for better transmission

B) TTI increases 10ms (2ms in UMTS)

C) Use shared channels to reduce resource waste

D) The TTI of 1ms through the use of OFDMA, MIMO systems and 64QAM modulation

25. RIP, feature:

A) Need configuration by administrator to function

B) Communicates information with neighboring routers

C) It can detect the IP addresses of connected hosts and communicate them to neighboring routers

26. What is the use of policing mechanisms?

A) They are for the user to agree with the provider on the level of QoS to be achieved.

B) They are used by the service provider to verify that the traffic entered by the customer is in accordance with the agreements made.

C) They are for the user to verify that incoming traffic from the provider is in accordance with the agreements made.

D) They are used in the various routers to guarantee a maximum traversal time for each of them.

27. DiffServ differs from IntServ because:

A) DiffServ tends to provide a guarantee on QoS that IntServ does not give.

B) DiffServ introduces new protocols to enable resource reservation for the purpose of achieving a given QoS.

C) IntServ tends to provide a guarantee on QoS that DiffServ does not give.

D) DiffServ tends to guarantee a maximum traversal time, while IntServ tends to provide a guaranteed minimum bandwidth.

28. The RIP protocol is characterized by

A) The use of the link state routing algorithm

B) The ability to be used for both interdomain and intradomain routing

C) The ability to operate on large networks because of its ability to operate hierarchically

D) Frequent instability and ease in creating circular forwarding paths

29. The GRE protocol aims to:

A) Protect packets against eavesdropping.

B) Manage encapsulation of packets to be transported through a tunnel.

C) Authenticate the sender of packets.

D) Verify the integrity of incoming packets.

30. The IPv6 Aggregatable Global Unicast addresses are:

A) Aggregable only in very small address ranges, so as to facilitate the accuracy of path calculation

B) Globally unique, essentially equivalent to public IPv4 addresses

C) Can be used only on devices belonging to the same local area network

D) Globally usable only in conjunction with appropriate Network Address Translation (NAT) techniques.

31. The MPLS (multi-protocol label switching) architecture is characterized by

A) A different mechanism (than pure IP) for deciding the output interface to which a packet should be forwarded.

B) Particularly advanced support for providing quality-assured services.

C) Routing protocols particularly quick update routing tables following topological changes so that failures are quickly recovered.

D) Intelligent network terminals that can customize the services received from the network.

32. Using the token bucket algorithm (or washed bucket) of capacity B tokens and filling speed r tokens/s we are able to control:

A) That the crossing time does not exceed rB seconds.

B) The number packets per second input does not exceed r, and the maximum burst does not exceed B.

C) The number of packets per second input does not exceed B, and the maximum burst does not exceed r.

D) The jitter does not exceed B/r.

33. An OSPF "Internal Router" in an area maintains in the LSA archive:

A) The detailed description of the topology of the entire OSPF domain.

B) Only and exclusively a detailed description of the topology of the area to which the router belongs

C) A detailed description of the topology of the area of which the router is a part and summaries all destinations in the OSPF routing domain

D) The detailed description of the topology of the area of which the router is a part, the detailed description of the backbone area, and the summary of the remaining destinations in the OSPF routing domain

34. In a packet traveling on a GRE tunnel, how many headers can there be?

A) Only one, otherwise the addressing is ambiguous.

B) Two headers, but the inner one can only contain private addresses.

C) Two headings, with no special limitations.

D) Two headers, but the outer one can only contain private addresses.

35. What are bursts?

A) They are packets that travel over the IP network

B) They are plots that travel through radio waves

C) They are data blocks traveling on circuit switched networks

D) These are the groupings of cells of size G

36. The MPLS (multi-protocol label switching) architecture is characterized by:

A) A different mechanism (than pure IP) for deciding the output interface to which a packet should be forwarded

B) Routing protocols that are particularly fast at updating routing tables following topological changes so that failures are quickly recovered.

C) Intelligent network terminals capable of personalizing the services received from the network.

D) A particularly advanced support for providing quality-assured services.

37. The metric (cost) in a routing algorithm expresses

A) The weight to be assigned to a link and used in path selection

B) The probability that the shortest path is used

C) The computational complexity of the algorithm

38. The 192.168.1.0/24 and 192.168.2.0/24 networks can be aggregated into:

A) 192.168.0.0/23

B) 0.0.0.0/0

C) 192.168.1.0/23

D) They are not aggregable.

39. MPLS-based layer 3 virtual private network (VPN) solutions are characterized by

A) Especially high levels of security through the use of cryptographic techniques

B) Good level of automation and integration between the public backbone and private networks

C) Layer 3 tunneling mechanisms, that is, within IP packets.

40. The Solicited Node Multicast Address is:

A) The multicast address used as the source address in a Neighbor Solicitation packet.

B) The multicast address that is placed in the payload (Target Address field of ARPv6) of a Neighbor Solicitation packet.

C) The multicast address that is placed in the payload (Target Address field of ICMPv6) of a Neighbor Solicitation packet.

D) The multicast address used as the destination address in a Neighbor Solicitation packet.

41. VPN (virtual private network) solutions based on SSL (secure socket layer) enable:

A) To securely deploy web-based applications on different servers

B) To create clusters of private servers

C) For a company to make specific business applications securely available to its off-site employees.

D) The establishment of a backbone on which a service provider (service provider) can easily and efficiently provide connectivity services to its customers

42. The "Path Vector" technique makes it possible to:

A) Solving the count to infinity problem

B) Solving the problem of overlapping routes

C) Make the protocol "transparent" with respect to the information carried

D) None of the above

43. A BSC (Base Station Controller)

A) is the access point for the MT

B) Contains static user data (such as ID, enabled services and security parameters)

C) Is able to control a single BTS

D) Is able to control a large number of BTS

44. LSPs (label switched paths) in the MPLS (multi-protocol label switching) architecture

A) They represent alternate routes maintained in a router's table for forwarding packets to a destination.

B) They are exchanged by routers to build a network map.

C) They constitute the shortest route to a destination.

D) They are created (set up) to transport packets belonging to a forwarding equivalence class (FEC).

45. A selective flooding routing algorithm:

A) It is basically similar to the classical flooding algorithm, with the difference that each incoming packet is retransmitted on all lines except the one on which it was received

B) It is definitely more robust than a classic flooding algorithm

C) Allows you to reduce the number of times a packet is sent over the same portion of the network

D) Requires sent packets to contain a sequence number

46. An OSPF Area Border Router

A) It has summary information about the areas it overlooks and disseminates it to the areas; it does not know the details of those areas.

B) Knows the details of the backbone area

C) Generates LSAs of type 5 to describe destinations outside the routing domain.

D) Forwards, through the flooding mechanism, all LSAs it receives from one area to all other areas it faces

47. In OSPF, a package of "Database Description":

A) It is used during the "Neighbor Discovery" phase.

B) It is used during the adjacency realignment phase

C) It is always sent encrypted to avoid security problems

D) It is always sent encrypted for privacy concerns

48. The "Split Horizon" mechanism makes it possible to:

A) Eliminate the possibility of loops (cyclic forwarding paths) occurring as result of topology changes

B) Reduce the probability of loops occurring as a result of topology changes

C) Disable, during the convergence phase, the sending of data packets to those destinations that could result in loops

D) Decrease routing traffic by implementing the neighbor discovery phase with dedicated packets ("Hello Packets")

49. In the coin bucket algorithm:

A) Bucket capacity is related to average speed over the long run.

B) The capacity of the bucket is related to the maximum burst size.

C) The capacity of the bucket has direct relationship with the band.

D) It is used to implement weighted fair queuing.

50. Two hosts connected to an Ethernet switch

A) They can communicate only if they belong to the same VLAN, whatever the network configuration

B) They can communicate even if they belong to different VLANs, depends on the network configuration

C) They must be able to communicate at all times without using an intermediate router

D) They cannot communicate using a router since they are connected to the same switch.

51. The RSVP (Resource reSerVation) is capable

A) Limiting the delay variations (jitter) experienced by packets in routers

B) Making routers aware of the quality of service requirements made by applications

C) Reserve computing resources in servers that share their processors

D) Check the delays and losses incurred by multimedia application packets on the network.

52. Two hosts connected to a Switched Ethernet network through ports configured in mode

A) They can communicate only if they belong to the same VLAN

B) They cannot communicate

C) If they belong to different VLANs, they can only communicate if they are connected to different switches and the link between the switches is configured in Trunk mode

D) If they belong to different VLANs, they may be able to communicate even if they are connected to different switches and the switch ports are configured in Access mode.

53. In OSPF, a package of "Link State Update":

A) It is also used in the Exchange procedure to exchange all LSAs held by routers, and it transports each LSA in full form

B) Carries key information related to a Link State Advertisement

C) And used to update adjacency status with a neighboring router and only carries information about that change

D) It is sent for under steady state network conditions, when the transient is now exhausted

54. Fiber optic advantage:

A) High-performance optical switches and low complexity

B) Higher speed in channel transmissions

55. In a packet traveling over an MPLS network, is it possible to have multiple labels at the same time?

A) No, it is not planned.

B) Yes, but no more than 2.

C) Yes, but no more than 20.

D) Yes, but only in the MPLS tunnels used for VPNs.

56. One difference of the OSPF routing protocol from IGRP is that:

A) OSPF is hierarchical

B) OSPF also allows routing between different ASs

C) OSPF allows routing information related to different protocol architectures to be carried simultaneously (integrated routing)

D) OSPF owns

57. Two stations A and B belong to the same physical network and have IP addresses 130.192.1.1/25 and 130.192.1.129/24, respectively.

A) A communicates directly with B and vice versa

B) A communicates directly with B but not vice versa

C) A communicates with B only through a router

D) A cannot communicate with B

58. The importance of MPLS (multi-protocol label switching) in today's and future networks stems from the possibility of

A) Making switches with specific support to ensure quality of service

B) Having a single control plan for different switching tencologies

C) Making apparatus capable of operating without the need for configuration

D) Distribute traffic across batteries of servers

59. VPN (virtual private network) solutions based on SSL (secure socket layer) enable

A) To securely deploy web-based applications on different servers

B) Of creating clusters of private servers

C) To a company to make specific business applications securely available to its off-site employees.

D) The implementation of a backbone on which a service provider (service provider) can easily and efficiently provide connectivity services to its customers

60. The International Mobile Equipment Identity (IMEI) is:

A) A temporary code assigned by the ISP

B) A fixed code assigned by the BTS

C) A temporary telephone number assigned to the terminal based on its location

D) Identifies the device, is assigned by the vendor, and is not modifiable

61. In the OSPF protocol, routers connected to the same LAN are represented in the graph describing the network as:

A) A single node

B) A star-shaped structure of logical connections

C) A fully knitted structure of logical connections

D) A structure composed of a set of nodes on a broadcast link

62. The IPv6 addressing scheme:

A) Provides only addresses uniquely assigned by a designated body.

B) It provides for each entity (e.g., company) to have a set of addresses globally assigned to it, which become its property in perpetuity.

C) It provides that the first 64 bits of an address are normally identified as the network prefix, at least on LANs.

D) It does not provide for the existence of multicast addresses.

63. In the final stage of a Link State routing algorithm, each router:

A) Runs the Shortest Path First algorithm, using the Link State Database as input.

B) Flooding your State Links to neighbors

C) Flood all Link State to neighbors

D) Performs the DUAL algorithm (Diffusing Update).

64. Consider a simple network topology in which there are four routers (A, B, C, D), connected to each other in a ring (A-B-C-D-A). If the hosts use a flooding routing algorithm and router A sends a packet to D, how many copies of the same packet will be delivered to router D?

A) 1

B) 2

C) 4

D) And proportional to the value of the Time To Live field in the package

65. DWDM is a technology that enables

A) Pack a large number of optical fibers densely on the same cable

B) Switching an optical signal from the input to the output of a device

C) Multiplex/demultiplex optical signals at different wavelengths on the same fiber

D) Multiply/demultiply various bit rate streams on a single optical channel at a specific wavelength

66. Aggregatable global unicast addresses

A) They can only be used by routers

B) They can only be used by hosts

C) They are geographically distributed hierarchically

67. Which of these techniques is not a solution for the IPV4-IPV6 transition?

A) 6to4

B) Teredo

C) 6over4

D) 6mix4

68. In the OSPF protocol, LSAs of type Network Link present in the Link State Database of a router contain:

A) The adjacencies of each router with the IP networks configured on its interfaces

B) IP networks present in the OSPF domain but in areas different from the area in which the router is located

C) The adjacencies with transit networks present in the OSPF domain.

D) Adjacencies with transit networks in the area under consideration.

69. The RIP protocol is characterized by

A) The use of the link state routing algorithm

B) The ability to be used for both interdomain and intradomain routing

C) The ability to operate over large networks because of its ability to operate hierarchically

D) Frequent instability and ease in creating circular forwarding paths

70. In the BGP routing protocol:

A) Topology information always takes precedence over the application routing policies ("policies")

B) Application of routing policies ("policies") always precedence over topology information

C) The lowest cost route to each destination is always chosen

D) The lowest cost path to each destination is always chosen, unless there are inherent limitations to the operation of hierarchical routing

71. The IPv6 address FE80::0201:06FF:FEA5:3A4C is:

A) An address that can be used by a host with MAC address 00:01:06:A5:3A:4C for communications with another host on the same link

B) An address that can be used by a server with MAC address 00:01:06:A5:3A:4C to offer a service on the IPv6 public Internet

C) An address that can be used by multiple devices in the same link

D) An address not currently provided in IPv6

72. Multicast Implementation in IPv4

A) Available without the need for additional protocols

B) Available but with additional protocols

C) Not supported

73. In OSPF, a package of "Database Description":

A) It is used by two adjacent routers to exchange their respective copies of the OSPF database

B) It is used by two adjacent routers to exchange their respective copies of the routing table

C) Allows a router that has detected a new adjacency with another OSPF router to know the LSAs it is missing

D) Allows a newly powered-up router to learn about the LSAs it is missing

74. The ICMPv6 Router Advertisement package

A) It is sent in response to an ICMPv6 Neighbor Solicitation packet.

B) is a broadcast package

C) Allows auto-configuration of devices without using DHCP protocol

D) It is sent periodically from one router to all other routers in the Internet network

75. operations that an MPLS router can perform on labels are as follows:

A) Add a label in any position of the MPLS header (PUSH), delete a label in any position (POP), change the contents of any label (SWAP).

B) Add a label in the outermost position in the MPLS header (PUSH), delete the label in the outermost position in MPLS header (POP), change the contents of the outer label (SWAP).

C) Add a label only if there are no others (only one label is permissible) (PUSH), delete the only permissible label on leaving the MPLS network (POP), and change the contents of the label (SWAP).

D) Labels cannot be manipulated by MPLS routers.

76. What distinguishes a VPN made according to an overlay pattern?

A) The user's equipment is the same as that which would be used if the various enterprise network trunks were directly connected

B) It is not possible to have confidential communications

C) Cannot be implemented without the consent of the chosen ISP

D) The network operator is not aware that a VPN is being implemented

77. The IPsec standard is used in VPNs (virtual private networks) for

A) Verify authentication information provided by remote users through an information exchange with an authentication server.

B) Allow authentication information (e.g., username and password or via challenge mechanisms) to be sent by users of an access VPN.

C) The establishment of tunnels through a public IP network on the through which IP packets from or destined for a private network can be carried regardless of the addressing plane used on that private network (as long as the addressing planes of the two private networks do not overlap).

D) The automatic creation of encrypted links between a company's locations through a public network, over which communication is therefore inherently insecure.

78. In the UMTS connection

A) Frequency reuse still exists, with possible interference

B) There is no longer frequency reuse and no interference due to the use of different codes

C) There is still frequency reuse, but optimized to avoid interference

D) There is no longer frequency reuse and no interference due to the use of different access times

79. The forwarding of Ipv6 packets on a LAN:

A) It does not make use of neighbor discovery mechanisms since there is a rule to map any IPv6 address to a MAC address.

B) It does not make use of neighbor discovery mechanism with regard to forwarding IPv6 multicast and broadcast packets because there is a rule to map these IPv6 addresses into a MAC address.

C) Makes use of neighbor discovery mechanisms for all types of IPv6 addresses.

D) It does not make use of neighbor discovery mechanisms with regard to forwarding IPv6 multicast packets because there is a rule to map these IPv6 addresses into a MAC address.

80. The protocol stack of the radio interface consists of the following layers

A) MAC layer, IP layer, TCP/UDP layer

B) MAC layer, Manage protocol layer

C) MAC layer, RLC layer, RRC layer

D) There is a single level

81. The GRE protocol is used for:

A) Encapsulate packets in other IP headers so they can be sent over a tunnel.

B) Ensure confidentiality of communications.

C) Ensuring the authenticity of packages.

D) Reserve some bandwidth for communication.

82. Two IP networks 130.192.0.0/24 and 130.192.2.0/24 can be aggregated into:

A) 130.192.0.0/23

B) 130.192.2.0/23

C) They are not aggregable

D) 130.192.0.0/22

83. In topology-based control-driven label binding:

A) Traffic from different applications running on the same hosts is carried on different LSPs B) MPLS router forwarding tables are configured manually

C) An LSP is created following the identification of a route to a destination (in other words, an LSP is created for each destination discovered)

D) MPLS routers must use the BGP protocol

84. 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 to an Ethernet frame

D) Replace the IPv6 destination address in the IPv6 header of a packet with an IPv4 one, and vice versa

85. The count to infinity

A) Lets you know if a node is no longer reachable

B) Is a variant of the link state algorithm ch avoids the creation of loops

C) Is a transient state of the distance vector algorithm

D) None of the above

86. The so-called VPN (virtual private network) access or virtual dial-up VPN solutions currently most widely used are based on:

A) Dial-up connections.

B) Tunnelling through an IP network.

C) existing cabling infrastructure to provide broadband access services

D) New line protocols (data-link layer).

87. Does IPv6 stateless autoconfiguration present privacy issues?

A) There are no particular problems.

B) It does not allow cargo encryption.

C) It is possible to locate the same interface if it connects to the Internet from various providers.

D) Does not allow the use of security headers (IPsec type).

88. In the steady-state OSPF protocol, all routers have in memory:

A) The same tree of excellent paths

B) The database describing the area to which they belong

C) The same database that describes the entire AS

D) A set of Distance Vectors of all adjacent routers

89. In routing protocols, the transition period:

A) is present only when the simplest algorithms are adopted (e.g., Distance Vector)

B) It is never present, as it is a feature of protocols that work at the data-link layer (e.g., Spanning Tree)

C) It always occurs in the period immediately following the detection of a fault

D) It always occurs at the moment when a part of the network changes state

90. Inter-domain routing:

A) Provides that each router knows exactly the path, in terms of routers traversed, taken by packets to a destination

B) Provides for an exterior gateway to make route choices, based on information collected through inter- domain routing protocols, consistent with existing agreements with other autonomous systems

C) Provides for each router to know exactly the cost of reaching any destination (e.g., in terms of the bandwidth of the links traversed) so that it can calculate the lowest cost path (e.g., higher bandwidth)

D) Is a concept that will tend to disappear

91. A device equipped with the NAT64 functionality is able to

A) Operate on 64-bit ip address

B) Replace the Ipv6 header of a packet with an ipv4 one, and vice versa

C) convert an IPv6 packet to an ethernet frame

D) replace the ipv6 destination address in the ipv6 header of a packet with an ipv4 one, and vice versa

92. Optical networks are specifically and uniquely characterized by the use of equipment capable of:

A) Transmit optical signals over fiber optic links

B) Switching an optical channel from an input port to an output port

C) Routing packets by processing their headers through optical circuits (not through electronic circuits)

D) Carry huge amounts of data due to their ability to switch traffic according to the information contained in a label, found in a special packet header

93. What is the typical role of IPSec in VPNs?

A) To distribute in a secure way the key required by other protocols to open a tunnel

B) To allow the transmission of authentication information (e.g. username and password) by users of VPN access

C) To open a managed secure tunnel across the public internet

D) To verify the user identity to allow other protocols to open tunnels only with authorized parties.

94. In an IPv4 network:

A) A station is reached by a multicast packet related to a particular group only if it is enrolled in that group, whatever Layer 2 technology is used.

B) A station is reached by a multicast packet related to a particular group even if it is not enrolled in that group.

C) a station always delivers to the application layer all received multicast packets.

D) a station is unable to understand an IPv4 multicast packet.

95. Multicast groups in ipv4

A) Are identified by particular IP addresses that cannot be assigned to individual stations

B) are identified from the list of MAC addresses of stations belonging to a given group. These addresses are then used as destination mac addresses in the multicast frames addressed

C) do not exist

D) are identified from the list of IP addresses of stations belonging to a given group. these addresses are then used as destination IP addresses in multicast plots addressed to those stations

96. The IPv4-IPv6 transition technique called DS-lite stipulates that:

A) It is not possible to connect to the network of IPv6 stations

B) The NAT is placed on the user's Customer Premises Equipment (CPE)

C) IPv4 addresses of private type are never used on user devices

D) NAT be placed on the Address Family Translation Router (AFTR).

97. Ipv6 addresses

A) They allow IPv6 stations to communicate with IPv4 stations without any special additional mechanism.

B) They maintain the same flexible division between a network part and a host part already present in IPv4.

C) They are rigidly partitioned into a network, subnetwork and host part.

D) They are rigidly partitioned into a network part and a host part.

98. Filtering table of a VLAN:

A) It can only be updated manually

B) It can be updated manually or automatically with special protocols

C) Contains only local network IPs

99. What is one consequence of using VLANs in a local area network?

A) Create on the switches virtual interfaces that, as such, are always working

B) Broadcast traffic is limited to the VLAN in which it was generated

C) The security of communication on the corporate network is increased as the plots are encrypted.

D) Users are required to authenticate themselves before they can access the VLAN

100. Scheduling algorithms are used:

A) In access routers, to ensure that the traffic generated by a user conforms to the traffic profile contracted with their service provider.

B) In firewalls, to delay packets entering a corporate network coming from the Internet for the purpose of preventing certain types of security attacks.

C) In routers, to decide the order in which waiting packets should be transmitted to an interface.

D) In routers, to appropriately schedule the list of configuration commands given by the user so as to minimize the disruption caused by the time it takes to apply changes.

101. The BGP protocol is used in the Internet for

A) The exchange of information between routers belonging to different autonomous systems

B) Communicating the status of a router's links to neighboring routers

C) The discovery of neighboring routers (bordering routers) on a local area network

D) Locate the geographic location of a host based on its IP address

102. The IGMP Protocol

A) Allows an IPv4 router to find out which multicast groups are present in a network directly connected to it

B) Allows an IPv4 host to create a new multicast group

C) Allows an IPv4 router to find out which multicast groups are active at any given time in the Internet network

D) It is a new version of the ICMP protocol

103. The IPv6 protocol requires that the IP packet header:

A) Always be authenticated through opportune encryption algorithms to increase the security of transmissions

B) Be smaller in size than IPv4 packets so as to increase efficiency in transmission bandwidth utilization by reducing protocol overhead

C) Be composed only of fixed-length fields that carry necessary information in each packet

D) Include some fields, previously available only as IPv4 options, for features that have proven to be in wide use over time.

104. In the layer 3 solution of MPLS- and BGP-based vpn, packets transiting the MPLS backbone have two labels

A) internal(p) routers never modify(swap) the outermost label

B) the outermost label is used by internal(p) routers to forward to a PE router

C) the innermost label is used by internal routers(p) to forward to a PE router

D) both labels are used by internal (P) routers to forward packets to PE routers

105. Unlike IP version 4, version 6:

A) It has no variable-length header.

B) It does not allow you to find out the MAC address of another station by knowing its IP address.

C) It does not have an equivalent of TTL (time-to-live).

D) It does not allow the use of IPsec.

106. 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

107. Optical networks are based on the use of

A) Fiber-optic links between high-performance packet switches

B) IP router capable of forwarding packets based on their destination address by realizing look- up in the routing table using optical techniques.

C) Apparatus capable of switching an electromagnetic signal at a certain carrier frequency in the field of optics from an input port to an output port

108. Frequency hopping (FH) allows

A) To transmit consecutive bursts on different frequencies at the expense of reduced capacity

B) To transmit consecutive slots on the same frequency with a reduction in capacity

C) To transmit consecutive bursts on different frequencies with increased capacity

D) To transmit consecutive bursts on the same frequency

109. An extranet is

A) A network that is used when extra transmission capacity is needed to connect two business sites

B) A part of a private network that is publicly accessible from the Internet, to which public enterprise servers are normally connected, such as web servers,mail servers,dns servers

C) A private network that includes networks of independent organizations,such as several corporate networks

D) A private network used to connect additional servers such as disk servers or database servers for use when needed

110. To make a VPN using MPLS, at level 3 according to the peer model, it is possible to:

A) Use an appropriately modified version of BGP.

B) Use an appropriately modified version of TCP.

C) Use an appropriately modified version of RIP.

D) Use an appropriately modified version of the RTP.

111. The difference between link state and distance vector type routing algorithms can be summarized as follows

A) Link state algorithms send information about the entire network to all nodes in the network; distance vector algorithms send information about the local topology only to neighboring nodes

B) Link state algorithms send local topology information only to neighboring nodes; distance vector algorithms send information about the network in its entirety to all nodes

C) Link state algorithms send local topology information to all nodes in the networkdistance vector algorithms send information about the network in its entirety only to neighboring nodes

112. DiffServ architecture is characterized by:

A) A mechanism to separate traffic into classes each of which can receive a specific service at each node traversed

B) Sophisticated reporting protocols for resource reservation

C) The ability to provide quality-assured service to applications or flows that explicitly request it from the network

D) Sophisticated routing protocols to choose the route of each individual packet to ensure that it receives the service it needs

113. Relative to Secure Socket Layer (SSL)-based VPN solutions, which of these statements is false?

A) They do not do IP header authentication

B) They have critical issues with respect to DoS attacks

C) They use tunnels based on the TCP or UDP protocol

D) There are standard solutions

114. The importance of MPLS (multi-protocol label switching) in today's and future networks stems from the possibility of

A) Making switches with specific support to ensure quality of service

B) Having a single control plan for different switching technologies

C) Making apparatus capable of operating without the need for configuration

D) Distribute traffic across batteries of servers

115. Solutions for implementing layer 3 virtual private networks (VPNs) through an MPLS backbone are characterized by

A) Especially high levels of security.

B) High scalability

C) Unlike all other proposed solutions, they do not require the use of NAT (network address translator) features when dealing with private addresses.

D) The provision quality-assured service to traffic traversing the VPN.

116. MPLS-based layer 3 virtual private network (VPN) solutions are characterized by

A) Especially high levels of security through the use of cryptographic techniques

B) Good level of automation and integration between the public backbone and private networks

C) Layer 3 tunneling mechanisms, i.e., within IP packets

117. Global unicast aggregatable addresses

A) They can only be used by routers

B) They can only be used by hosts

C) They are geographically distributed in a hierarchical manner

118. Virtual private networks (VPNs) are used for

A) Carry private traffic over a shared infrastructure by recreating the same conditions as would be through the use of a private infrastructure

B) Divide an enterprise local area network into a number of separate subnets for different business functions (sales, purchasing, engineering, marketing)

C) Partitioning a private network (for example, that of a parent company with a number subsidiary companies) into several virtually separate networks

119. Two hosts connected to an Ethernet switch network through ports configured in Access mode:

A) They cannot communicate

B) If they belong to different VLANs, they can communicate only when connected to different switches and the link between the switches is configured in trunk mode

C) Can only communicate if they belong to the same VLAN

D) If they belong to different VLANs, they may be able to communicate even if they are connected to different switches and the switch ports are configured in access mode

120. What is the function of the "scope" associated with IPv6 addresses?

A) It serves to resolve, in special cases, ambiguity regarding the sender.

B) There is no scope associated with IPv6 addresses.

C) It is needed to be able to use global addresses.

D) It is needed to be able to use anycast addresses.

121. Stateless autoconfiguration in IPv6 requires:

A) A DHCPv6 server (Dynamic Host Configuration Protocol version 6)

B) A server present on the local network.

C) A server present on the corporate network (intranet).

D) This is possible even if no server or router is present.

122. The Distance Vector type routing algorithm:

A) It can cause of "Counting to Infinity" phenomena only in nets that have meshes

B) Always causes "Counting to Infinity" phenomena in unmeshed networks

C) is characterized by a lower possibility of "Counting to Infinity" phenomena in mesh-free networks if the "Split Horizon" technique is used

D) The phenomenon of "Counting to Infinity" is peculiar to Link State networks.

123. The distribution of labels in MPLS (Multi-Protocol Label Switching)

A) It can be operated using the (Resource ReSerVation Protocol)

B) It is not required when the nodes in the network use the Border Gateway Protocol (BGP) routing protocol.

C) Involves network nodes and stations

D) It can be done implicitly through the Open Shortest Path First (OSPF) routing protocol.

124. Two stations A and B respectively have 130.192.1.1/25 and 130.192.1.100/24

A) communicates directly with B and vice versa

B) communicates directly with A but not vice versa

C) communicates directly with B only through a router

D) communicates directly with b but not vice versa

125. In IPv6 what disappears from the headers, compared to IPv4?

A) The lifetime of the package.

B) The sender and receiver addresses.

C) The indication as to which header is next.

D) The header checksum.

126. Assume the existence of three sequentially connected AS (Autonomous System) (A-B-C). If the intermediate AS B wants to prevent its network from being used as transit from A to C:

A) Must perform route masking to A

B) He must set up an access list ("packet filtering") at the entrance of his domain that discards incoming packets from A to C

C) Must set up masking of routes to A and an access list at the entrance of its domain on packets coming from A and going to C

D) AS B cannot block traffic, as each AS must provide transit to the ASs adjacent to it

127. The RIP protocol provides mechanisms to reduce the possibility of loop occurrence:

A) By analyzing packets in transit and identifying those that pass through the same router more than once

B) By means of "traceroute" processes activated periodically

C) Through mechanisms of "Split-Horizon" and "Hold-Down"

D) None of the above answers

128. In a user station connected to a VPN with centralized access, messages directed to stations outside the VPN go through:

A) The site of the VPN to which the user machine is connected.

B) It is not possible to reach stations outside the VPN.

C) A specialized router for these packets.

D) They are sent directly from the user station to the external recipient.

129. The characteristic of a centralized access VPN is that

A) Traffic not directed to the VPN is still routed through the VPN gateway.

B) User authentication for VPN access is delegated to the ISP.

C) Traffic not directed to the VPN is not forced to go through the VPN gateway.

D) User authentication is not done by the VPN gateway.

130. LSPs (label switched paths) in the MPLS (multi-protocol label switching) architecture

A) They are obtained by reserving resources in network nodes so as to ensure appropriate quality of service to the applications that created them.

B) They constitute the shortest route to a destination.

C) They are created (set up) by applications to transport packets belonging to a forwarding equivalence class (FEC).

D) They are created by network nodes agreeing on the labels to be used for packets belonging to a forwarding equivalence class (FEC).

131. RIP protocol is bagged:

A) Directly into IP, to limit the size of routing packets

B) Directly into IP, to enable broadcast transmission of packets

C) In UDP, to enable broadcast transmission of packets

D) In UDP, for issues mainly related to the greater simplicity of software development

132. The combination of token bucket (or bucket hole) and Weighted Fair Queueing (WFQ) mechanisms serves to ensure:

A) A maximum traversal time of a router.

B) A maximum crossing time of a NAT.

C) A maximum bandwidth per packet stream.

D) A maximum burst of consecutive packets, per stream.

133. The Neighbor Discovery procedure in IPv6

A) It is based on an ICMPv6 packet sent in multicast

B) It is based on an ICMPv6 packet sent in broadcast

C) It is based on ARPv6

D) Requires that the network also supports IPv4

134. What is ping-pong effect?

A) The proposing the release cell as the docking cell

B) The bouncing of signals within a cell.

C) An alternative way to define the concept of handover

135. A Host A has address 192.168.1.1/24 and a Host B 192.168.1.129/25

A) Both can communicate directly with each other.

B) A can communicate directly with B but not vice versa.

C) A needs a router to communicate with B

D) They cannot communicate.

136. Fiber optic advantage

A) Increased speed in channel transmissions

B) High-performance optical switches and low complexity

137. fixing cell size G and DECREASING radius R

A) capacity increase

B) capacity decrease

C) capacity remains same

138. The IPv6 address 2001:4600::0201:06FF:FEA5:3A4C is:

A) A private-type address

B) An address that can be used by a server to offer a service on the public Internet IPv6

C) An address that can be used by a host solely to carry out communications with another host on the same link

D) A currently invalid address in IPv6

139. In MPLS, the protocol for label assignment is:

A) OSPF

B) RSVP-TE

C) IS-IS

D) L2TP

140. In an IPV4 network

A) A station is reached by a multicast packet related to a particular group only if it is enrolled in that group, whatever liv 2 technology is used

B) A station can be reached by a multicast packet related to a particular group even if it is not enrolled in that group

C) A station is unable to understand an IPV4 multicast packet

D) A station always delivers all received multicasts to the application layer

141. A Neutral Access Point is a particular network in which:

A) Multiple Autonomous Systems connect, at layer 2, a number of routers in order exchange routing information

B) Multiple Autonomous Systems connect, at layer 3, a number of routers in order exchange routing information

C) An Autonomous System connects, at layer 2, a number of routers so as to speed up the exchange of routing information within the domain

D) An Autonomous System connects, at layer 3, a number of routers so as to speed up the exchange of routing information within the domain

142. IPv6 addresses of type Site Local

A) They are set automatically by stations for on-link communications

B) They are assigned by a central authority ensures their uniqueness worldwide

C) There are no

D) They are deprecated but can still be used

143. The term "Peering" refers to:

A) The connection point between two routers of two different Internet Service Providers.

B) The exchange of information between a router and a station using a routing protocol

C) The exchange of information between two OSPF routers connected by a virtual link

D) The exchange of information between two OSPF routers in the same area.

144. In a radio interface, among many functions the MAC layer

A) Allows flow control

B) Allows access to the channel

C) Performs QoS negotiation and control

D) None of the above

145. The "Tunnel " of operation of IPsec requires that it be encrypted

A) TCP/UDP header and payload only.

B) Only the payload of the internal package

C) The IP header, TCP/UDP header and the internal packet payload

D) All external package including IP header

146. The link-local addresses

A) They are valid within an organization that can use them to assign addresses to machines in the various subnets of its intranet (they are the counterparts of IPv4 private addresses).

B) They cannot be assigned to routers.

C) They are normally built automatically by the station from the MAC address its own card, to which it prepends a predefined prefix.

D) They are used to identify machines that perform a certain service (e.g. DNS servers).

147. The 192.168.1.0/24 and 192.168.2.0/24 networks can be aggregated into:

A) 192.168.0.0/23

B) 192.168.1.0/23

C) 0.0.0.0/0

D) They are not aggregable.

148. Layer 3 virtual private network (VPN) solutions through an MPLS backbone are characterized by

A) Especially high levels of security through the use of cryptographic techniques.

B) Good level of automation and integration between the public backbone and private networks.

C) Layer 3 tunneling mechanisms, that is, within IP packets.

D) Direct management by the user, without operator intervention.

149. A Network Provider considered "Tier-1":

A) Has a single interconnection to another Tier-1 Autonomous System

B) Is an Autonomous System connected to other AS Tier-1s only with peering connections, i.e., not paid connections

C) Is an Autonomous System connected to other AS Tier-1s predominantly by peering connections, i.e., non-paying

D) Is an Autonomous System connected to other AS Tier-1s predominantly with transit connections, i.e., for a fee

150. The technique of "Split Horizon":

A) Predicts that routes received in neighbor router announcements are always announced to that neighbor with metric equal to infinity

B) Provides that a prefix is not announced to the neighbor representing the "next hop" to that destination

C) Provides for a destination to be declared unattainable when the cost exceeds a certain threshold of infinity.

D) None of the above answers

151. Redistribution in the context of routing protocols consists of

A) Distribute the routing table over multiple devices so as to reduce the memory occupancy on each device

B) Redistribute traffic over multiple alternative routes to make full use of network resources and avoid congestion on specific routes

C) Communicating via one routing route protocol acquired with another, however much this results in a loss of information

D) Learning how to reach destinations without having to exchange routing information with other computers

152. IPv6 addresses of type Private

A) They are defined in such a way as to be unique with high probability, but still cannot be used globally

B) They are used only for on-link communications

C) They are used only on routers

D) They are used to connect private networks through a public network

153. How can MPLS be used to implement a VPN?

A) To implement an access VPN.

B) MPLS cannot be used to implement VPN.

C) It can provide all the routing mechanism in overlay networks or of point-to-point links in peer networks.

D) It can provide point-to-point links in overlay networks or the whole routing mechanism in peer networks.

154. How many types of bursts are there?

A) 3: Regular, Access and Synchronization

B) 2: Regular and Access

C) 5: Regular, Access, Synchronization, Frequency Correction and Dummy.

D) 1: Regular

155. For support of variable-length network prefixes in a network zone where dynamic routing is used:

A) The netmask associated with the prefix must be provided to the routers during configuration (with the "network" command on Cisco routers)

B) The netmask is automatically deduced from the class of addresses used

C) Routing information exchanged between routers must include the subnet mask associated with each prefix announced

D) And mandatory use of OSPF or BGP protocols.

156. The difference between link state and distance vector type routing algorithms can be summarized as follows

A) Link state algorithms send information about the entire network to all nodes in the network; distance vector algorithms send information about the local topology only to neighboring nodes

B) Link state algorithms send local topology information only to neighboring nodes; distance vector algorithms send information about the network in its

entirety to all nodes

C) Link state algorithms send local topology information to all nodes in the networkdistance vector algorithms send information about the network in its entirety only to neighboring nodes

157. The main limitation of RIP routing protocol compared with IGRP is that:

A) Since RIP is proprietary, it is not available on all routers

B) The RIP metric is less indicative than the IGRP metric of the true degree to which one network route is preferred over others

C) Does not, unlike IGRP, allow hierarchical routing

D) is a Distance Vector type protocol, thus less scalable than IGRP (Link State)

158. In the DS-Lite solution for IPv4-IP6 transition

A) NAT functionality is implemented for all users on appropriate ISP devices

B) NAT functionality is implemented on the user's CPE

C) NAT functionality is implemented on both the CPE and the ISP's devices

D) NAT functionality is not provided

159. Is the establishment of a loop in a network using Link State routing possible?

A) Yes

B) No, because each router has a complete view of the network topology

C) No, because Link State updates are sent in flooding

D) No, because a hold-down timer is used.

160. In Diffserv, a "Class of Service" identifies:

A) A set of packets that belong to the same VoIP session

B) A set of packets that receive the same treatment by the router (e.g., VoIP traffic)

C) An operating mode of the edge routers, which must classify and mark incoming packets

161. In the DS-Lite solution for IPV4-IPV6 transition

A) NAT functionality is not provided

B) NAT functionality is implemented on the user's CPE

C) NAT functionality is implemented on both the CPE and the ISP's devices

D) NAT functionality is implemented for all users on appropriate ISP devices

162. IPsec's "Tunnel " of operation requires that it can be encrypted:

A) Only the payload of the internal package

B) The IP header, TCP/UDP header and the internal packet payload

C) Exclusively theTCP/UDP header and payload.

D) The whole external package, including the IP header.

163. Two IP networks 130.192.0.0/24 and 130.192.2.0/24 can be aggregated into:

A) 130.192.0.0/23

B) 130.192.2.0/23

C) They are not aggregable

D) 130.192.0.0/22

164. In MPLS, the protocol for label assignment is:

A) OSPF

B) RSVP-TE

C) IS-IS

D) L2TP

165. One of the reasons that is promoting the spread of ipv6 is

A) Scarcity of MAC addresses

B) Possible inefficiency of private ipv4 addressing

C) Increasing to use multicast applications

D) Poor ability of operators to change the configuration of their networks

166. In what situation is it possible for a packet to have two IP headers?

A) The packet passed through an incoming firewall.

B) The packet is in the public network after going through a NAT on the way out.

C) The packet is in the public network, having passed through a firewall on its way out.

D) The packet is in the public network in transit over an IP tunnel connecting two segments of an IP- based VPN.

167. In the IPv6 protocol:

A) Routing protocols (e.g., packet format) do not change from IPv4.

B) The ARP protocol is incorporated into ICMPv6, but retains exactly the previous scheme operation (broadcast request, unicast response).

C) There is a possibility for a station on a network segment to self-configure by listening for Router Advertisement messages.

D) Like IPv4, IPv6 does not provide mechanisms for reconfiguring routers.

168. The Multipath routing:

A) Is supported by major implementations of RIP

B) Allows routers to use multiple routes during transients on the network, so as to speed up the dissemination of routing information and decrease the duration of the transient

C) It can be a cause of loops if one admits that the paths used may have different costs

D) It is only recommended if the data traffic is mainly composed TCP packets

169. The smallest aggregation that can contain the two IP networks 130.192.0.0/25 and 130.192.1.0/25

A) 130.192.1.0/23

B) 130.192.0.0/24

C) 130.192.1.0/24

D) 130.192.0.0/23

170. In isolated routing:

A) Each router calculates, through message exchanges with only its neighbors, its own routing table

B) Each router calculates, through message exchanges with all routers in the network, its own routing table

C) Each router calculates, by analyzing only the traffic passing through it, its own routing table

D) Some portions of the network are isolated from the remaining routers, preventing data transit between the public portion of the network and the isolated portion

171. The Neighbor Discovery Procedure in IPv6

A) It is based on an ICMPv6 packet sent in multicast

B) It is based on an ICMPv6 packet sent in broadcast

C) It is based on ARPv6

D) Requires that the network also supports IPv4

172. Redistribution:

A) is that process that needs to be enabled on the router for it to be able to sort packets to the appropriate destination

B) Is used to exchange information between an internal router (interior gateway) and an external router (exterior gateway) using the BGP protocol

C) It is mainly used by peripheral routing domains, which connect to a single Internet service provider for Internet access

D) Is used to allow routing information to be passed from routing domain A to routing domain B

173. The "Label Swapping" forwarding technique:

A) Not suitable if there is a need to provide service quality guarantees in package forwarding

B) Provides that a data packet maintains the same label ("label") throughout the path from the source node to the destination node

C) Requires all nodes on the path to share exactly the same forwarding table

D) May require a "Path Setup" phase for route determination

174. A Neutral Access Point is a particular network in which:

A) All equipment is connected through the use of a high-performance central router equipped multiple network interfaces

B) various ASs exchange traffic in a "peering" mode, i.e., not for a fee

C) The connection between the devices is made at level 2

D) Each connected router sees at layer 3 all other routers on the network and can peer with each of them

175. Addresses in IPv6 of type Site Local

A) They are assigned by a central authority ensures their uniqueness worldwide

B) They are deprecated but can still be used

C) There are no

D) They are set automatically by the stations for on-link communication

176. 1. Two stations A and B belong to the same physical network and have IP addresses 130.192.1.1/25 and 130.192.1.129/24 respectively

A) A communicates directly with B and vice versa

B) A communicates directly with B but not vice versa

C) A communicates with B only through a router

D) A cannot communicate with B

177. The filtering database entries of an Ethernet switch

A) They all have infinite time validity

B) Have a time validity that can generally be set by the switch administrator

C) They all have time validity of less than one second in order to better manage the movement of devices

D) They have a time validity that varies over time, depending on the number of plots received

178. An Autonomous System is:

A) A computer capable of self-configuration

B) An area of an IP network that is administered, especially from a routing perspective, independently of others and with connections to at least two other Autonomous System

C) A network device that can autonomously discover the best route along which to forward packets for destinations

D) The network of an ISP

179. The OSPF routing protocol chooses the path to a destination taking into account:

A) Length of each link along the route

B) Bandwidth and delay per link

C) It can be configured to use a variety of metrics whose semantics are determined by the network operator

D) Hop Count

180. Which of these technologies is best suited to handle multiple paths to the same destination ("multipath")?

A) Forwarding by network address

B) Label Swapping and Source Routing

C) Label Swapping

D) Source Routing

181. Given a certain LAN on which VLANs have been defined, a frame broadcast:

A) Reaches possibly only a portion of the LAN

B) Reaches all hosts on the LAN

182. LSPs (label switched paths) in the MPLS (multi-protocol label switching) architecture:

A) Represent alternate routes maintained in a router's table forwarding packets to a destination

B) They are exchanged by routers to build a map of the network

C) They constitute the shortest route to a destination

D) They are created (set up) for transporting packets belonging to a forwarding equivalence class (FEC)

183. An LSA Router Link of the OSPF protocol describes:

A) A link that connects the advertising router with one of the routers adjacent to it

B) A summary of reachable networks

C) The list of routers connected in a LAN

D) The current value of parameters (CPU load, load on the link, uptime, etc.) related to a link between two routers

184. The BGP routing protocol:

A) Uses rules (policy) on additional information to cost metrics to identify the "best" to reach a destination

B) Is used exclusively for information exchange between routers of different autonomous systems

C) Is used exclusively for information exchange between routers of the same autonomous system

D) Is the protocol that will replace OSPF

185. LTE uses which channel access?

A) fdma

B) cdma

C) ofdma

D) tdma

186. Quality of service can be guaranteed on packet networks when

A) Packets are carried by a cell-switched infrastructure (e.g., ATM)

B) Network nodes put in place appropriate mechanisms that regulate packet service (e.g., scheduling algorithms)

C) Applications are able to encode the information to be transferred according to layers (layers) of different importance

187. A Host A has address 192.168.1.1/24 and a Host B 192.168.1.129/25.

A) Both can communicate directly with each other.

B) A can communicate directly with B but not vice versa.

C) A needs a router to communicate with B

D) They cannot communicate.

188. In reference to Short Message Service (SMS), if the Mobile Terminal is off:

A) GSM network informs the network and stores the message, which will be sent when the MT becomes on

B) you use SDCCH to deliver the message

C) you use SACCH to deliver the message

D) the message cannot be sent

189. Which of these techniques is not a solution for IPv4-IPv6 transition?

A) 6over4

B) 6to4

C) 6mixt4

D) Teredo

190. Two Ethernet plots can collide for what reason?

A) Switched full duplex

B) Switched half duplex

C) Because of the queue in the switch buffers

D) It happens often because of channel contention

191. The "Source Routing" forwarding technique:

A) Provides for the use of very simple clients ("hosts") and very complex intermediate nodes ("routers")

B) is suitable when you want to minimize the number of bytes required for routing operations and present in each packet

C) The sender node must have (at least partial) knowledge of the network topology

D) Is the technique commonly used by the IP protocol in forwarding operations

192. An IPv6 host on reboot, will acquire the following address:

A) It is not possible to know precisely the address itself, since the IPv6 address is regenerated each time with a random number regarding the Interface ID portion.

B) An address FE80::/32

C) As for the link-local address, it will assume the same IPv6 address it possessed before the reboot.

D) The address depends entirely on the configuration it will acquire from its default router.

193. DiffServ architecture is characterized by:

A) A mechanism to separate traffic into classes each of which can receive a specific service at each traversed node

B) Sophisticated reporting protocols for resource booking

C) The ability to provide quality-assured service to applications or streams that explicitly request it from the network

D) Sophisticated routing protocols to choose the route of each individual packet to ensure that it receives the service it needs

194. The IS-IS Protocol

A) It is an obsolete routing protocol no longer used because of its poor performance

B) It is a routing protocol based on the link state algorithm widely used in large networks

C) It is a protocol used by Ethernet switches to create a spanning tree in the network by eliminating closed paths

D) It is an evolutionary protocol of BGP for exchanging routing information between routers belonging to different autonomous systems

195. In the Path Vector type routing algorithm:

A) Each record contained in the Path Vector contains the destination, the distance to the router under consideration, and the next hop router to reach that destination

B) Each record contained in the Path Vector contains the destination, the distance to the router under consideration, and the next Autonomous System to reach that destination

C) Each record contained in the Path Vector contains the destination, the distance from the router under consideration, and the list of routers to be traversed to reach that destination

D) Each record contained in the Path Vector contains the destination, the distance from the router under consideration, and the list of Autonomous Systems to be traversed to reach that destination

Collection 2

1. Indicate the false claim among the below statements about the Link State algorithm:

A) The Link State algorithm converges faster than the Distance Vector algorithm

B) The RIP (Routing Information Protocol) protocol is based on the Link State algorithm

C) The Link State algorithm seldom generates loops

D) The Link State algorithm exchanges less information than the Distance Vector algorithm

2. MPLS consists of:

A) Insert in the IP packet a label that is used by the nodes to determine the path

B) Associate each package with a label that nodes use to determine how to process the package

C) Associate to each packet a label that allows the final receiver to which data flow the packet belongs

D) Insert in the layer 2 frames a label that the nodes use to identify the various higher level protocols

3. One of the main properties of the new 5G infrastructure is:

A) The use of virtualization techniques on mobile terminals in order to properly support novel applications

B) The come back to the secret switching technology in order to guarantee a proper quality of service which is key in a new generation mobile network

C) The use of software emulators and simulators for the design of the mobile operators' network infrastructures which for this reason are usually referred to as software defined networks

D) The joint use of virtualization techniques and flexible solutions for the network control, with the aim of dividing available network resources in an efficient and effective way

4. Using the privacy-aware configuration method (RFC 4941) an IPv6 station obtains an address:

A) With an untraceable interface ID

B) With a prefix and Interface ID both untraceable

C) Valid only within a VPN

D) With an untraceable prefix

5. The “count to infinity”:

A) Allows you to understand if a node is no longer reachable

B) It is a variant of the link state algorithm which avoids the creation of loops

C) Is a transient state of the distance vector algorithm

D) None of the above

6. With respect to the link state which of these statements is false:

A) Link state rarely creates loops

B) The link state converges faster than the distance vector algorithm

C) The RIP protocol is based on the Link State algorithm

D) The link state exchanges less information than the distance vector

7. In the level 3 solution of VPN based on MPLS and BGP the packages that pass on the MPLS backbone have two labels:

A) Internal routers (P) never change (swap) the outermost label

B) The outermost label is used by internal routers (P) to forward to a PE router

C) The innermost label is used by internal routers (P) to forward to a PE router

D) Both tags are used by internal routers (P) to forward packages to PE routers

8. Centralized routing:

A) Mandates that network nodes do not exchange routing information

B) Mandates that traffic traverses a specific network node

C) Is an obsolete solution that is never used in modern networks

D) Consists in one network node computing routes for other network nodes and providing the computed routes to them

9. Regarding Secure Socket Layer (SSL) based VPN solutions, which of these claims is false?

A) They do not authenticate the IP header

B) They have critical issues with respect to DoS attacks

C) They use tunnels based on the TCP or UDP protocol

D) There are standard solutions

10. The IPv6 address 2001:4600::0201:06FF:FEA5:3A4C is:

A) A private address

B) An address that a server can use to offer a service on the IPv6 public Internet

C) An address that a host can only use to communicate with another host on the same link

D) An address that is currently not valid in IPv6

11. The Solicited Node Multicast Address is:

A) The multicast address used as the source address in a Neighbor Solicitation packet

B) The multicast address that is inserted in the payload (ARPv6 Target Address field) of a Neighbor Solicitation packet

C) The multicast address that is inserted in the payload (ICMPv6 Target Address field) of a Neighbor Solicitation packet

D) The multicast address used as the destination address in a Neighbor Solicitation packet

12. The Aggregatable Global Unicast IPv6 addresses are:

A) They can be aggregated only in very small address ranges, in order to favor the accuracy of the route calculation

B) Globally unique, essentially equivalent to IPv4 public addresses

C) Can only be used on devices belonging to the same local network

D) Can be used globally only together with appropriate Network Address Translation (NAT) techniques

13. Regarding VPN solutions, which of these statements is true?

A) None of the other answers

B) An end-to-end solution is always preferable to a site-to-site solution

C) A Skewed Channel is an encryption-only IPsec tunnel

D) Protections such as firewalls and IDSs cannot be placed within a protected network with a VPN gateway

14. In topology-based control-driven label binding:

A) Traffic from different applications running on the same hosts is carried on different LSPs

B) The forwarding tables of the MPLS routers are configured manually

C) An LSP is created as a result of identifying a path to a destination (in other words, an LSP is created for each destination discovered)

D) MPLS routers must use the BGP protocol

15. Multi-Protocol Label Switching (MPLS) Label Distribution:

A) Can be operated using the Resource ReSerVation Protocol (RSVP)

B) Not required when network nodes use Border Gateway Protocol (BGP) routing

C) It involves network nodes and stations

D) It can be done implicitly via the OSPF (Open Shortest Path First) routing protocol

16. The IPv4-IPv6 transition technique called DS-lite provides that:

A) It is not possible to connect to the network of IPv6 stations

B) The NAT is placed on the user's Customer Premises Equipment (CPE)

C) Private IPv4 addresses are never used on user devices

D) The NAT is placed on the Address Family Translation Router (AFTR)

17. In an IPv4 network:

A) A station is reached by a multicast packet relating to a particular group only if it is registered in that group, whatever the level 2 technology used is.

B) A station is reached by a multicast packet related to a particular group even if it is not subscribed to that group.

C) A station always delivers all received multicast packets to the application layer.

D) A station cannot understand an IPv4 multicast packet.

18. What is a main function of NSS (Network Switching Subsystem)?

A) Paging

B) Authentication

C) Resource allocation

19. High speed packet access (HSPA):

A) Use dedicated channels for better broadcasting

B) TTI increases 10ms (2ms in UMTS)

C) Use shared channels to reduce wasted resources

D) The TTI of 1ms thanks to the use of OFDMA, MIMO systems, and 64QAM modulation

20. Which of the following definitions is new to the UMTS standard?

A) Microdiversity

B) Network Slicing

C) None of these definitions

D) Macrodiversity

21. In a radio interface, among the many functions, the MAC layer:

A) Allows flow control

B) Allows access to the channel

C) Performs negotiation and QoS control

D) None of the above

22. The protocol stack of the radio interface is divided into the following levels:

A) MAC layer, IP layer, TCP / UDP layer

B) MAC layer, Manage protocol layer

C) MAC layer, RLC layer, RRC layer

D) There is a single level

23. In the UMTS connection:

A) There is still the reuse of frequencies, with possible interference

B) There is no longer the reuse of frequencies and there is no interference thanks to the use of different codes

C) There is still the reuse of frequencies, but optimized to avoid interference

D) There is no longer the reuse of frequencies and there is no interference thanks to the use of different access times

24. What is the ping-pong effect?

A) Proposing the release cell as a latch cell

B) The bounce of signals inside a cell

C) An alternative way to define the concept of handover

25. In reference to the Short Message Service (SMS), if the Mobile Terminal is off:

A) The GSM network informs the network and stores the message, which will be sent when the MT turns on

B) SDCCH is used to deliver the message

C) SACCH is used to deliver the message

D) The message could not be sent

26. Handover is the mechanism that allows you to:

A) Encrypt a communication channel

B) Manage the disconnection from a cell and the hanging up of a new one

C) Notify a user of an incoming call

D) Request access to the network by a user

27. How many types of bursts are there?

A) 3: Regular, Access, and Synchronization

B) 2: Regular and Access

C) 5: Regular, Access, Synchronization, Frequency Correction, and Dummy

D) 1: Regular

28. Frequency hopping (FH) allows:

A) To transmit consecutive bursts on different frequencies at the expense of a reduction in capacity

B) To transmit consecutive slots on the same frequency with a reduction in capacity

C) To transmit consecutive bursts on different frequencies with an increase in capacity

D) To broadcast consecutive bursts on the same frequency

29. What are bursts?

A) They are packets that travel on the IP network

B) They are plots that travel through radio waves

C) They are data blocks that travel on circuit-switched networks

D) They are the groupings of cells of dimension G

30. One BSC (Base Station Controller):

A) Is the access point for the MT

B) Contains static user data (such as ID, enabled services, and security parameters)

C) Is capable of controlling a single BTS

D) Is able to control a large number of BTS

31. The International Mobile Equipment Identity (IMEI) is:

A) A temporary code assigned by the ISP

B) A fixed code assigned by the BTS

C) A temporary telephone number assigned to the terminal based on its location

D) Identifies the device, is vendor-assigned, and cannot be changed

32. Multipath routing:

A) Is supported by major RIP implementations

B) Allows routers to use multiple paths during transients on the network, thus speeding up the dissemination of routing information and decreasing the duration of the transient

C) It can cause loops if one admits that the paths used may have different costs

D) It is only recommended if the data traffic is mainly composed of TCP packets

33. In OSPF, a "Link State Update" package:

A) It is also used in the Exchange procedure for the exchange of all the LSAs owned by the routers, and carries each LSA in complete form

B) It carries the main information related to a Link State Advertisement

C) It is used to update the status of the adjacency with a nearby router and only carries information related to that change

D) It is sent in normal network conditions when the transient is now exhausted

34. In OSPF, a package of "Database Description":

A) It is used during the "Neighbor Discovery" phase

B) It is used during the adjacency realignment phase

C) It is always sent encrypted to avoid security problems

D) It is always sent encrypted for privacy concerns

35. In the OSPF protocol, the Network Link LSAs present in the Link State Database of a router contain:

A) The adjacencies of each router with the IP networks configured on its interfaces

B) IP networks present in the OSPF domain but in areas other than the area in which the router is located

C) The adjacencies with the transit networks present in the OSPF domain

D) The proximity to the transit networks present in the area under examination

36. An LSA Router Link of the OSPF protocol describes:

A) A link that connects the advertising router with one of the routers adjacent to it

B) A summary of the reachable networks

C) The list of routers connected in a LAN

D) The current value of the parameters (CPU load, link load, uptime, etc.) related to a link between two routers

37. The RIP protocol is packaged:

A) Directly in IP, to limit the size of routing packets

B) Directly in IP, to allow the broadcast transmission of packets

C) In UDP, to allow broadcasting of packets

D) In UDP, for issues mainly related to the greater simplicity of software development

38. To support variable-length network prefixes in a network zone where dynamic routing is used:

A) The netmask associated with the prefix must be provided to the routers during the configuration phase (with the "network" command on Cisco routers)

B) The netmask is automatically deduced from the class of the addresses used

C) The routing information exchanged between routers must include the subnet mask associated with each advertised prefix

D) The use of the OSPF or BGP protocols is mandatory

39. A Neutral Access Point is a particular network in which:

A) All the devices are connected through the use of a high-performance central router, equipped with multiple network interfaces

B) The various ASs exchange traffic in "peering" mode, i.e., not for a fee

C) The connection between the devices is made at level 2

D) Each connected router sees at level 3 all the other routers present on the network and is capable of peering with each of them

40. A selective flooding routing algorithm:

A) It is substantially similar to the classic flooding algorithm, with the difference that each classic flooding, with the difference that each incoming packet is retransmitted on all lines except the one on which it was received.

B) It is certainly more robust than a classic flooding algorithm

C) Allows you to reduce the number of times a packet is sent over the same portion of the network

D) Requires packets sent to contain a sequence number

41. Consider a simple network topology in which there are four routers (A, B, C, D). The first three are connected to each other in a ring (ABC), while the fourth is connected to C through a point-to-point link (CD). If the hosts use a flooding routing algorithm and router A sends a packet to D, how many copies of the same packet will be delivered to router D?

A) 1

B) 2

C) 3

D) It is proportional to the value of the Time-To-Live field present in the packet

42. Given a network consisting of several physical networks interconnected by appropriate routers and a range of IP addresses to be used in this network, it is possible to create an addressing plan capable of optimizing routing on a certain router of that network:

A) By assigning randomly selected addresses to the various physical networks present within the range of addresses defined for the network

B) Assigning to the various physical networks present some addresses chosen within the range of addresses defined for the network, proceeding with the assignment in descending order of network size

C) By dividing the network into areas and defining, within the starting address range, distinct address ranges to be used in each of those areas

43. Two stations A and B have addresses 130.192.1.1/25 and 130.192.1.100/24 respectively:

A) Communicate directly with B and vice versa

B) Communicate directly with A but not vice versa

C) It communicates directly with B only through a router

D) Communicates directly with b but not vice versa

44. The smallest aggregation that can contain the two IP networks 130.192.0.0/25 and 130.192.1.0/25:

A) 130.192.0.0/24

B) 130.192.1.0/23

C) 130.192.1.0/24

D) 130.192.0.0/23

45. DWDM is a technology that allows:

A) Densely packing a large number of optical fibers on the same cable

B) Switch an optical signal from the input to the output of a device

C) Multiplex/demultiplex optical signals at different wavelengths on the same fiber

D) Multiplex/demultiplex various bit rate streams on a single optical channel at a specific wavelength

46. One of the reasons that is driving the spread of IPv6 is:

A) Scarcity of MAC addresses

B) Possible inefficiency of private IPv4 addressing

C) Increasingly widespread need to use multicast applications

D) Poor attitude of operators to change the configuration of their networks

47. The fact that a VPN offers centralized internet access implies that:

A) The corporate network uses a single internet service provider

B) It is not necessary to use devices for the protection of the corporate network, such as firewalls, from attacks from the Internet

C) Packets sent to stations not belonging to the private network (i.e., internet stations) could follow a non-optimal path on the physical topology of the network

D) The impact of public traffic (direct or from the internet) on corporate network infrastructures is reduced

48. Neighbor Discovery procedures in IPv6:

A) It is based on ARPv6

B) It is based on an ICMPv6 packet sent in broadcast

C) It is based on an ICMPv6 packet sent in multicast

D) Requires that the network also supports IPv4

49. In MPLS, the protocol for labeling is:

A) OSPF

B) RSVP-TE

C) IS-IS

D) L2TP

50. Fixing cell size G and decreasing radius R:

A) Capacity increases

B) Capacity decreases

C) Capacity remains the same

51. LTE uses which channel access?

A) FDMA

B) CDMA

C) OFDMA

D) TDMA

52. Multicast communications in an IPv4 network:

A) They are only possible within a single LAN network, even with the use of additional protocols

B) Are always possible, IGMP only makes them more efficient

C) They are not possible without using additional protocols in the network

D) Are possible on a geographical scale thanks to the use of the IGMP protocol only

53. Multicast groups in IPv4:

A) They are identified by particular IP addresses that cannot be assigned to individual stations

B) They are identified by the list of MAC addresses of the stations belonging to a given group. These addresses are then used as destination MAC addresses in addressed multicast frames

C) They do not exist

D) They are identified by the list of IP addresses of the stations belonging to a given group. These addresses are then used as destination IP addresses in multicast frames addressed to these stations

54. Redistribution in the context of routing protocols consists of:

A) Distribute the routing table across multiple devices in order to reduce memory occupation on each device

B) Redistribute traffic on multiple alternative routes to take full advantage of network resources and avoid congestion on specific routes

C) Communicate via a routing protocol acquired routes with another, even though this results in a loss of information

D) Learn how to reach destinations without having to exchange routing information with other computers

55. The quality of service can be guaranteed on packet networks when:

A) Packets are transported by a cell-switched infrastructure (e.g., ATM)

B) The network nodes implement appropriate mechanisms that regulate the packet service (for example, scheduling algorithms)

C) Applications are able to encode the information to be transferred according to levels of different importance

56. Virtual private network (VPN) solutions based on SSL (secure socket layer) allow:

A) To securely deploy web-based applications on different servers

B) To create clusters of private servers

C) A company to securely make specific business applications available to its off-site employees

D) The creation of a backbone on which a service provider can easily and efficiently provide connectivity services to its customers

57. Optical fiber advantage:

A) Higher speed in transmissions on the channel

B) High-performance and low complexity optical switches

58. DiffServ architecture is characterized by:

A) A mechanism for separating traffic into classes, each of which can receive a specific service in each node traversed

B) Sophisticated reporting protocols for reserving resources

C) The ability to provide guaranteed quality service to applications or flows that explicitly request it from the network

D) Sophisticated routing protocols to choose the path of each individual packet in order to ensure that it receives the service it needs

59. The MPLS (multi-protocol label switching) architecture is characterized by:

A) A different mechanism (compared to pure IP) to decide the outbound interface to which a packet should be forwarded

B) A particularly advanced support to provide guaranteed quality services

C) Routing protocols particularly fast to update the routing tables following topological changes in order to quickly recover faults

D) Intelligent network terminals able to customize the services received from the network

60. IPv6 header:

A) The header is of a fixed size and options cannot be added

B) The header is of variable size

C) Fixed header size but with possible addition of additional Headers

61. Aggregable global unicast addresses:

A) They can only be used by routers

B) Can only be used by hosts

C) They are geographically distributed in a hierarchical way

62. The networks 192.168.1.0/24 and 192.168.2.0/24 can be aggregated into:

A) 192.168.0.0/23

B) 0.0.0.0/0

C) 192.168.1.0/23

D) They cannot be combined

63. A Host A has address 192.168.1.1/24 and a Host B 192.168.1.129/25:

A) Both can communicate directly with each other

B) A can communicate directly with B but not vice versa

C) A needs a router to communicate with B

D) They cannot communicate

64. Layer 3 virtual private network (VPN) solutions based on MPLS are characterized by:

A) Particularly high levels of security thanks to the use of cryptographic techniques

B) Good level of automation and integration between the public backbone and private networks

C) Layer 3 tunneling mechanisms, i.e. inside IP packets

65. The IPsec "Tunnel mode" operating mode requires that it be encrypted:

A) Only the internal packet payload

B) The IP header, TCP / UDP header, and internal packet payload

C) Only the TCP / UDP header and payload

D) All external packet, including the IP header

66. Label switched path (LSP) in multi-protocol label switching (MPLS) architecture:

A) They represent alternative routes maintained in a router table for forwarding packets to a destination

B) They are exchanged by routers to build a network map

C) They are the shortest route to a destination

D) They are created (set up) for the transport of packets belonging to a forwarding equivalence class (FEC)

67. The importance of multi-protocol label switching (MPLS) in today's and future networks stems from the possibility of:

A) Realize switches with specific support to guarantee quality of service

B) Having a single control plan for different switching technologies

C) Create equipment capable of operating without the need for configuration

D) Distribute traffic over server stacks

68. The RIP protocol is characterized by:

A) The use of the link-state routing algorithm

B) The ability to be used for both cross-domain and intra-domain routing

C) The ability to operate on large networks due to its ability to operate in a hierarchical manner

D) Frequent instabilities and ease in creating circular forwarding paths

69. The difference between link state and distance vector routing algorithms can be summarized as follows:

A) The link state algorithms send information about the network in its entirety to all nodes in the network; distance vector algorithms send local topology information only to neighboring nodes

B) Link state algorithms send local topology information only to neighboring nodes; distance vector algorithms send information about the network in its entirety to all nodes

C) The link state algorithms send information about the local topology to all nodes on the network; distance vector algorithms send information about the network in its entirety only to neighboring nodes

70. Two hosts connected to a Switched Ethernet network through ports configured in mode:

A) They can communicate only if they belong to the same VLAN

B) They cannot communicate

C) If they belong to different VLANs, they can communicate only if they are connected to different switches and the link between the switches is configured in Trunk mode

D) If they belong to different VLANs, they may be able to communicate even if they are connected to different switches and the switch ports are configured in Access mode

71. In the DS-Lite solution for the IPv4-IPv6 transition:

A) The NAT functionality is implemented for all users on appropriate ISP devices

B) The NAT functionality is implemented on the user's CPE

C) The NAT functionality is implemented both on the CPE and on the ISP devices

D) NAT functionality is not provided

72. Which of these techniques is not a solution for the IPv4-IPv6 transition?

A) 6over4

B) 6to4

C) 6mix4

D) Teredo

73. Site Local IPv6 addresses:

A) They are set automatically by the stations for on-link communications

B) They are assigned by a central authority which guarantees their uniqueness worldwide

C) They do not exist

D) They are deprecated but can still be used

74. The Neighbor Discovery procedure in IPv6:

A) It is based on an ICMPv6 packet sent in multicast

B) It is based on an ICMPv6 packet sent in broadcast

C) It is based on ARPv6

D) Requires the network to also support IPv4

75. Two IP networks 130.192.0.0/24 and 130.192.2.0/24 can be aggregated into:

A) 130.192.0.0/23

B) 130.192.2.0/23

C) They cannot be combined

D) 130.192.0.0/22

76. Two stations A and B belong to the same physical network and have IP addresses 130.192.1.1/25 and 130.192.1.129/24 respectively:

A) A communicates directly with B and vice versa

B) A communicates directly with B but not vice versa

C) A communicates with B only through a router

D) A cannot communicate with B

77. Optical networks are characterized in a specific and univocal way by the use of equipment capable of:

A) Transmit optical signals over fiber optic links

B) Switch an optical channel from an input port to an output port

C) Route packets by processing their header via optical circuits (not electronic circuits)

D) Carry huge amounts of data thanks to their ability to switch traffic according to the information contained in a label, present in a special packet header

78. The operations that an MPLS router can perform on the labels are the following:

A) Add a label in any position of the MPLS header (PUSH), delete a label in any position (POP), change the content of any label (SWAP)

B) Add a label in the outermost position in the MPLS header (PUSH), delete the label in the outermost position of the MPLS header (POP), change the contents of the external label (SWAP)

C) Add a label only if there are no others (only one label is allowed) (PUSH), delete the only label admissible when exiting the MPLS network (POP), and change the content of the label (SWAP)

D) Labels cannot be manipulated by MPLS routers

79. A protocol used in MPLS for label distribution is:

A) OSPF

B) IS-IS

C) RIP

D) BGP

80. In DiffServ, a "Class of Service" identifies:

A) A set of packets that belong to the same VoIP session

B) A set of packets that receive the same treatment by the router (for example, all VoIP traffic)

C) An operating mode of onboard routers, which must classify and mark incoming packets

81. The Resource Reservation Protocol (RSVP) is able to:

A) Limit the variations in delay (jitter) experienced by packets in routers

B) Let routers know about quality of service requests made by applications

C) Reserve compute resources on servers that share their processors

D) Check for delays and losses experienced by multimedia application packets on the network

82. The IS-IS protocol:

A) It is an obsolete routing protocol that is no longer used due to its poor performance

B) It is a routing protocol based on the link-state algorithm widely used in large networks

C) It is a protocol used by Ethernet switches to create a spanning tree by eliminating closed paths

D) It is an evolution protocol of BGP for the exchange of routing information between routers belonging to different autonomous systems

83. The BGP protocol is used on the Internet for:

A) The exchange of information between routers belonging to different autonomous systems

B) Communicate the link status of a router to neighboring routers

C) The discovery of neighboring routers (bordering routers) on a local network

D) Find the geographic location of a host based on its IP address

84. The "Path Vector" technique used by BGP:

A) It stores in the Path Vectors the list of Autonomous Systems to cross to reach a given destination network

B) It stores in the Path Vectors the list of routers to cross to reach a given destination network

C) It stores in the Path Vectors the next Autonomous System to cross to reach a given destination network

D) It stores in the Path Vectors the next router to cross to reach a given destination network

85. The "Split Horizon" mechanism allows you to:

A) Eliminate the possibility of loops (cyclic forwarding paths) occurring as a result of topology changes

B) Reduce the likelihood of loops occurring as a result of topology changes

C) Disable, during the convergence phase, the sending of data packets to those destinations that could give rise to loops

D) Reduce routing traffic by implementing the neighbor discovery phase with special packets ("Hello Packets")

86. The RIP protocol has mechanisms to reduce the possibility of loops occurring:

A) By analyzing packets in transit and identifying those that pass more than once from the same router

B) By means of "traceroute" processes activated periodically

C) Through "Split-Horizon" and "Hold-Down" mechanisms

D) None of the previous answers

87. An Autonomous System is:

A) A self-configuring calculator

B) A zone of an IP network managed, above all from the point of view of routing, autonomously from the others and with connections with at least two other Autonomous Systems

C) A network device that can independently discover the best route along which to forward packets to destinations

D) The network of an ISP

88. The OSPF routing protocol chooses the path to a destination taking into account:

A) Length of each link along the path

B) Bandwidth and delay for each link

C) It can be configured to use various metrics whose semantics are established by the network manager

D) Hop Count

89. The MPLS (Multi-Protocol Label Switching) architecture is characterized by:

A) A different mechanism (compared to pure IP) to decide the outbound interface to which a packet should be forwarded

B) A particularly advanced support to provide guaranteed quality services

C) Particularly fast routing protocols to update the routing tables following topological changes in order to recover faults quickly

D) Intelligent network terminals able to customize the services received from the network

90. The IPv6 protocol requires that the header of IP packets:

A) It is always authenticated through appropriate encryption algorithms to increase the security of transmissions

B) It is smaller than that of IPv4 packets in order to increase the efficiency in the use of the transmission band by reducing the protocol overhead

C) It consists only of fixed-length fields that carry necessary information in each packet

D) It includes some fields, previously only available as IPv4 options, for features that have proven to be in widespread use over time

91. IPv6 packet forwarding over a LAN:

A) It does not use neighbor discovery mechanisms as there is a rule to map any IPv6 address to a MAC address

B) It does not use neighbor discovery mechanisms for forwarding IPv6 multicast and broadcast packets as there is a rule to map these IPv6 addresses to a MAC address

C) It makes use of neighbor discovery mechanisms for all types of IPv6 addresses

D) It does not use neighbor discovery mechanisms with regards to forwarding IPv6 multicast packets as there is a rule to map these IPv6 addresses to a MAC address

92. An IPv6 host on reboot will acquire the following address:

A) It is not possible to know precisely the address itself, since the IPv6 address is regenerated with a random number for the Interface ID

B) A FE80::/32 address

C) As for the link-local address, it will assume the same IPv6 address it had before the reboot

D) The address depends entirely on the configuration it will acquire from its default router

93. A link-local address:

A) It can be used to allow communication between stations on local links (e.g., a LAN) in the absence of other IPv6 addresses

B) It is used to physically connect two stations on a local link

C) It is the address used by stations on a LAN to exchange data

D) It is used in all communications between local stations

94. IPv6 addresses:

A) They allow the communication of IPv6 stations with IPv4 stations without any additional mechanism

B) They maintain the same flexible division between a network part and a host part already present in IPv4

C) They are rigidly partitioned into a network, subnetwork, and host part

D) They are rigidly partitioned into a network part and a host part

95. The combination of token bucket and Weighted Fair Queueing (WFQ) mechanisms serves to ensure:

A) A maximum traversal time of a router

B) A maximum traversal time of a NAT

C) A maximum bandwidth for each packet stream

D) A maximum burst of consecutive packets, for each stream

96. What is the typical role of IPSec in VPNs?

A) To distribute in a secure way the key required by other protocols to open a tunnel

B) To allow the transmission of authentication information (e.g., username and password) by users of access VPN

C) To open a managed secure tunnel across the public internet

D) To verify the user identity to allow other protocols to open tunnels only with authorized parties

97. The concepts of Forwarding and Routing:

A) They are synonyms; they identify the process that allows finding a valid path for a packet, from the sender to the recipient

B) They are synonyms; they identify the process that allows, in the face of a packet entering a network node, to determine which is the best exit port to the destination

C) They are different concepts; the forwarding process aims to identify a valid path for a packet, from the sender to the recipient; the routing process allows, in the face of a packet entering a network node, to determine which is the best exit port towards the destination

D) They are different concepts; the routing process aims to identify a valid path for a packet, from the sender to the recipient; the forwarding process allows, in the face of a packet entering a network node, to determine which is the best exit port towards the destination

98. The "Label Swapping" forwarding technique:

A) It is not suitable when there is a need to provide quality of service guarantees in packet forwarding

B) It requires a data packet to keep the same “label” all the way from the source node to the destination node

C) Requires all nodes on the path to share exactly the same forwarding table

D) It may require a “Path Setup” phase to determine the path

99. The "Source Routing" forwarding technique:

A) It involves the use of very simple clients ("hosts") and very complex intermediate nodes ("routers")

B) It is suitable when you want to minimize the number of bytes needed for the routing operations and present in each packet

C) The sending node must have (at least partial) knowledge of the network topology

D) Is the technique commonly used by the IP protocol in forwarding operations

100. Which of these technologies is best suited to manage multiple paths to the same destination (“multipath”)?

A) Forwarding by network address

B) Label Swapping and Source Routing

C) Label Swapping

D) Source Routing

101. In routing protocols, the transition period:

A) It is present only when the simplest algorithms are adopted (e.g., Distance Vector)

B) It is never present, as it is a characteristic of protocols that work at the data-link level (e.g., Spanning Tree)

C) It always occurs in the period immediately following the detection of a fault

D) It always occurs when a part of the network changes state

102. Which of these elements represents a significant disadvantage in the centralized routing technique?

A) Poor performance if the traffic carried is of the voice type

B) Difficulty in determining the actual network topology in case of failure

C) Particularly intense data traffic around the central node

D) Criticality of the central node from the point of view of robustness and scalability

103. The Distance Vector routing algorithm:

A) It can cause “Counting to Infinity” phenomena only in networks with meshes

B) It always causes “Counting to Infinity” phenomena in non-meshed networks

C) It is characterized by a lower possibility of "Counting to Infinity" phenomena in networks that do not have meshes if the "Split Horizon" technique is used

D) The phenomenon of “Counting to Infinity” is typical of Link State networks

104. The "Split Horizon" technique:

A) Expects routes received in advertisements from a neighbor router to always be announced to that neighbor with metrics of infinity

B) Provides that a prefix is not announced to the neighbor representing the "next hop" to that destination

C) It requires a destination to be declared unreachable when the cost exceeds a certain threshold of infinity

D) None of the previous answers

105. The "Path Vector" technique allows you to:

A) Solve the count to infinity problem

B) Solve the problem of overlapping routes

C) Make the protocol "transparent" with respect to the information transported

D) None of the above

106. In the final stage of a Link State routing algorithm, each router:

A) Executes the Shortest Path First algorithm, using the Link State Database as input

B) Floods its link states to neighbors

C) Floods all Link States to neighbors

D) Runs the Diffusing Update Algorithm (DUAL)

107. The redistribution process in routing protocols:

A) It is that process that must be enabled on the router to ensure that it is able to route packets to the appropriate destination

B) It is used for the exchange of information between an internal router (interior gateway) and an external router (exterior gateway) that uses the BGP protocol

C) It is mainly used by peripheral routing domains, which connect to a single Internet service provider for Internet access

D) It is used to allow the passage of routing information from a routing domain A to a routing domain B

108. The term "Peering" refers to:

A) The connection point between two routers of two different Internet Service Providers

B) The exchange of information between a router and a station using a routing protocol

C) The exchange of information between two OSPF routers connected by a virtual link

D) The exchange of information between two OSPF routers of the same area

109. The OSPF routing protocol chooses the path to a destination taking into account:

A) Length of each link along the path

B) Bandwidth and delay for each link

C) It can be configured to use various metrics whose semantics are established by the network manager

D) Hop Count

110. An OSPF Area Border Router:

A) It has summary information on the areas it overlooks and disseminates it in the areas; it does not know the details of those areas

B) Knows the details of the backbone area

C) Generate Type 5 LSA to describe destinations outside the routing domain

D) Through the flooding mechanism, it forwards all the LSAs it receives from an area to all the others it overlooks

111. The BGP routing protocol:

A) Uses rules (policies) on additional information to cost metrics to identify the "best" path to reach a destination

B) Is used exclusively for exchanging information between different autonomous system routers

C) Is used exclusively for information exchange between routers of the same autonomous system

D) Is the protocol that will replace OSPF

112. In the BGP routing protocol:

A) Topology information always takes precedence over the application of routing policies ("policy")

B) The application of routing policies (“policies”) always takes precedence over topology information

C) The cheapest route to each destination is always chosen

D) The lowest-cost route to each destination is always chosen, unless there are inherent limitations to the operation of hierarchical routing

113. In an MPLS-based VPN at level 3, the packets that traverse the MPLS backbone have two labels:

A) Internal routers (P) never change (swap) the outermost label

B) The outermost label is used by internal routers (P) to forward packets to a PE router

C) The innermost label is used by internal routers (P) to forward packets to a PE router

D) Both labels are used by internal routers (P) to forward packets to PE routers

114. What is the function of the "scope" associated with IPv6 addresses?

A) It serves to resolve, in particular cases, the ambiguity regarding the sender

B) There is no scope associated with IPv6 addresses

C) It is needed to be able to use global addresses

D) It is used to use anycast addresses

115. The DiffServ (Differentiated Services) model differs from the IntServ (Integrated Services) model because:

A) DiffServ tends to provide a guarantee on QoS which IntServ does not give

B) DiffServ introduces new protocols to allow the reservation of resources in order to obtain a given QoS

C) IntServ tends to provide a guarantee on QoS which DiffServ does not give

D) DiffServ tends to guarantee a maximum traversal time, while IntServ tends to provide a minimum guaranteed bandwidth

116. Using the "Token Bucket" algorithm:

A) The capacity of the bucket is related to the average speed over the long term

B) The capacity of the bucket is linked to the maximum burst size

C) The capacity of the bucket has a direct relationship with the bandwidth

D) It is used to implement weighted fair queuing

117. What is a key advantage of using MPLS over traditional IP routing?

A) MPLS uses a simpler packet format than IP

B) MPLS provides a single control plane for multiple network layers

C) MPLS eliminates the need for routing tables in backbone networks

D) MPLS does not require any routing protocols to function

118. The GRE (Generic Routing Encapsulation) protocol is used for:

A) Encapsulating packets in other IP headers so they can be sent over a tunnel

B) Ensuring the confidentiality of communications

C) Ensuring the authenticity of packets

D) Reserving some bandwidth for communication

119. What is the main function of IPSec in a VPN?

A) To provide authentication and encryption of network traffic

B) To allow private addressing without NAT

C) To improve TCP performance over long-distance networks

D) To ensure packet forwarding in a multi-homed network

120. The main reason for implementing IPv6 over IPv4 is:

A) To improve TCP and UDP performance

B) To provide built-in security features

C) To allow for a larger number of IP addresses

D) To reduce the complexity of networking

121. What is the primary advantage of MPLS in a modern network?

A) It enables the use of higher bandwidth frequencies

B) It ensures Quality of Service (QoS) and traffic engineering

C) It reduces the number of network hops

D) It eliminates the need for routing tables

122. The main difference between IPv6 and IPv4 addressing is:

A) IPv6 uses longer addresses, increasing the number of available IPs

B) IPv6 does not support subnetting

C) IPv6 uses a different checksum algorithm

D) IPv6 removes the need for a network mask

123. What does a VPN tunnel do?

A) Encapsulates private network traffic within a secure connection

B) Converts IP packets into a different protocol

C) Automatically assigns a public IP address to a private network

D) Redirects all network traffic through a firewall

124. What is the role of BGP (Border Gateway Protocol) in the Internet?

A) It allows autonomous systems (AS) to exchange routing information

B) It is used for managing VLANs in a data center

C) It provides DNS resolution

D) It guarantees Quality of Service (QoS)

125. Which IPv6 address type is used for communication between nodes on the same link?

A) Global unicast

B) Site-local

C) Link-local

D) Anycast

126. The main goal of OSPF’s link-state database (LSDB) is to:

A) Store the entire network topology for optimal routing decisions

B) Store only directly connected neighbors

C) Reduce convergence time by eliminating shortest-path calculations

D) Exchange entire routing tables between OSPF-enabled routers

127. The main advantage of using the DiffServ model for QoS is:

A) It eliminates the need for traffic prioritization

B) It allows prioritization of packets based on traffic class

C) It automatically increases bandwidth based on demand

D) It ensures absolute priority for VoIP and video traffic

128. What does MPLS use instead of IP addresses for packet forwarding?

A) MAC addresses

B) Labels

C) Checksums

D) Tunnel IDs

129. In a typical VPN setup, what ensures data security across an untrusted network?

A) NAT traversal

B) Tunneling and encryption

C) Load balancing

D) MPLS

130. Which of the following statements is true about IPv6 addressing?

A) IPv6 uses NAT for all communications

B) IPv6 supports automatic address configuration

C) IPv6 does not support multicast

D) IPv6 is only used for private networks

131. A Neutral Access Point is a particular network in which:

A) Several Autonomous Systems connect, at level 2, a certain number of routers in order to exchange routing information

B) Several Autonomous Systems connect, at level 3, a certain number of routers in order to exchange routing information

C) An Autonomous System connects, at level 2, a certain number of routers in order to speed up the exchange of routing information within the domain

D) An Autonomous System connects, at level 3, a certain number of routers in order to speed up the exchange of routing information within the domain

132. For the establishment of an LSB it is essential that:

A) All links on the path use the same layer two protocol

B) The MPLS routers on the path use the same protocol for label distribution

C) The final destinations of packets traveling on the LSP support MPLS

D) The MPLS routers on the path perform a mapping operation

133. An extranet is:

A) A network that is used when extra transmission capacity is needed to connect two corporate sites

B) A part of a private network that is publicly accessible from the internet, to which public company servers are normally connected, such as web servers, mail servers, dns servers

C) A private network that includes networks of independent organizations, such as several corporate networks

D) A private network used to connect additional servers such as disk servers or database servers for use when needed,

134. In the Path Vector routing algorithm:

A) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the next hop router to reach that destination

B) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the next Autonomous System to reach that destination

C) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the list of routers to cross to reach that destination

D) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the list of Autonomous Systems to cross to reach that destination

135. The redistribution:

A) It is that process that must be enabled on the router to ensure that it is able to route packets to the appropriate destination

B) It is used for the exchange of information between an internal router (interior gateway) and an external router (exterior gateway) that uses the BGP protocol

C) It is mainly used by peripheral routing domains, which connect to a single Internet service provider for Internet access

D) It is used to allow the passage of routing information from a routing domain A to a routing domain B

136. Inter-domain routing:

A) It requires each router to know exactly the path, in terms of routers traversed, made by packets to a destination

B) It requires an exterior gateway to make choices of routes, based on information collected through inter-domain routing protocols, consistent with existing agreements with other autonomous systems

C) It requires each router to know exactly the cost of reaching any destination (for example in terms of the bandwidth of the links crossed) in order to calculate the path at a lower cost (for example at higher bandwidth)

D) It is a concept that will tend to disappear

137. Suppose there are three AS (Autonomous System) connected sequentially (ABC). If intermediate AS B wants to prevent its network from being used as a transit from A to C:

A) Must do the masking of routes to A.

B) He must set up an access list ("packet filtering") at the entrance of his domain that discards all incoming packets from A to C

C) He must set the masking of routes to A and an access list at the entrance of his domain on packets coming from A and going to C

D) AS B cannot block traffic, as each AS must provide transit to the ASs adjacent to it

138. A Network Provider considered "Tier-1":

A) It has only one interconnection to another Tier-1 Autonomous System

B) It is an Autonomous System connected to other AS Tier-1 only with “Peering” type connections, ie not for a fee

C) It is an Autonomous System connected to other AS Tier-1 mainly with “Peering” type connections, ie not for a fee

D) It is an Autonomous System connected to other AS Tier-1 mainly with “transit” connections, ie for a fee

139. The main limitation of the RIP routing protocol compared to IGRP is that:

A) Being the proprietary RIP it is not available on all routers

B) The metric of the RIP is less indicative, than that of the IGRP, of the real degree of preferability of a network path over others

C) Unlike IGRP, it does not allow hierarchical routing

D) It is a Distance Vector protocol, therefore less scalable than IGRP (Link State)

140. A difference of the OSPF routing protocol compared to the IGRP is that:

A) OSPF is hierarchical

B) OSPF also allows routing between different ASs

C) OSPF allows the simultaneous transport of routing information related to different protocol architectures (integrated routing)

D) OSPF is proprietary

141. The OSPF routing protocol chooses the path to a destination taking into account:

A) Length of each link along the path

B) Bandwidth and delay for each link

C) It can be configured to use various metrics whose semantics are established by the network manager

D) Hop Count

142. An OSPF "Internal Router" in an area keeps in the LSA archive:

A) The detailed description of the topology of the whole OSPF domain

B) Only and exclusively a detailed description of the topology of the area to which the router belongs

C) The detailed description of the topology of the area to which the router belongs and the summaries of all the destinations present in the OSPF routing domain

D) The detailed description of the topology of the area to which the router is part, the detailed description of the backbone area, and the summary of the remaining destinations in the OSPF routing domain

143. In the OSPF protocol the routers connected to the same LAN are represented in the graph that describes the network as:

A) A single knot

B) A structure of logical connections in the shape of a star

C) A fully meshed structure of logical connections

D) A structure composed of a collection of nodes on a broadcast link

144. In the fully operational OSPF protocol, all routers have in memory:

A) The same tree of optimal routes

B) The database describing the area to which they belong

C) The same database describing the entire AS

D) A Distance Vector set of all neighboring routers

145. The metric (cost) in a routing algorithm expresses:

A) The weight to be assigned to a link is used in path selection

B) The probability that the shortest path will be used

C) The computational complexity of the algorithm

146. Two hosts connected to an Ethernet switch:

A) They can communicate only if they belong to the same VLAN, whatever the network configuration

B) They can communicate even if they belong to different VLANs, it depends on the network configuration

C) They must always be able to communicate without using an intermediate router

D) They cannot communicate using a router as they are connected to the same switch.

147. What is a consequence of using VLANs in a local network?

A) Create virtual interfaces on the switches which, as such, are always functional

B) Broadcast traffic is limited to the VLAN in which it was generated

C) The security of communication on the corporate network increases as the frames are encrypted.

D) Users are required to authenticate before they can access the VLAN

148. What is a consequence of using VLANs in a local network?

A) They all have infinite temporal validity

B) They have a time validity that can generally be set by the switch administrator

C) They all have a temporal validity of less than one second in order to better manage the movements of the devices

D) They have a temporal validity that varies over time, based on the number of frames received

149. The IPv6 address FE80 :: 0201: 06FF: FEA5: 3A4C is:

A) An address that can be used by a host with MAC address 00: 01: 06: A5: 3A: 4C for communications with another host on the same link

B) An address that can be used by a server with MAC address 00: 01: 06: A5: 3A: 4C to offer a service on the IPv6 public Internet

C) An address that can be used by multiple devices in the same link

D) An address not currently provided in IPv6

150. IPv6 addresses of type Private:

A) They are defined in such a way that they are unique with high probability, but they cannot be used globally anyway

B) They are used only for on-link communications

C) They are used only on routers

D) They are used to connect private networks across a public network

151. The IGMP protocol:

A) It allows an IPv4 router to find out which multicast groups are present in a network directly connected to it

B) Allows an IPv4 host to create a new multicast group

C) It allows an IPv4 router to find out which multicast groups are active at any given time on the Internet

D) It is a new version of the ICMP protocol

152. Two hosts connected to an Ethernet switch network through ports configured in Access mode:

A) They cannot communicate

B) If they belong to different VLANs, they can communicate only when connected to different switches and the link between the switches is configured in trunk mode

C) They can communicate only if they belong to the same VLAN

D) If they belong to different VLANs, they may be able to communicate even if they are connected to different switches and the switch ports are configured in access mode.

153. The ICMPv6 Router Advertisement package:

A) It is sent in response to an ICMPv6 Neighbor Solicitation packet

B) It is a broadcast packet

C) It allows an IPv4 router to find out which multicast groups are active at any given time on the Internet

D) It is sent periodically by a router to all the other routers on the internet

154. What is the advantage of using a Link State routing algorithm compared to a Distance Vector type?

A) The presence of the Link State Database eliminates the need for a routing table, saving memory

B) By having the Link State Database available, each router is able to independently calculate the routes to each destination

C) A lower requirement in terms of processing power for the execution of the algorithm

D) Fewer routing errors as link states are exchanged by routers at a very high frequency

155. Two ethernet frames can collide for what reason?

A) Switched full duplex

B) Switched half duplex

C) Because of the queue in the switch buffers

D) It often happens due to the contention of the channel

156. IPsec:

A) Used for VPN only

B) Handles Key encryption

C) It has problems with solutions that use NAT

157. Two ethernet frames can collide for what reason?

A) Collision domains increase

B) Collision domains decrease

C) Broadcast domains are increasing

D) Broadcast domains are decreasing

158. IPsec:

A) It can only contact hosts in the same VLAN

B) It can contact hosts in other VLANs through a router

159. Filtering table of a VLAN:

A) It can only be updated manually

B) It can be updated manually or automatically with appropriate protocols

C) Contains only local network Ips

160. Given a certain LAN on which VLANs have been defined, a broadcast frame:

A) It possibly reaches only a portion of the LAN

B) It reaches all hosts on the LAN

161. RIP, feature:

A) Requires administrator configuration to function

B) Communicate information with neighboring routers

C) It can detect the IP addresses of connected hosts and communicate them to neighboring routers

162. Aggregatable global unicast addresses:

A) They can only be used by routers

B) They can only be used by hosts

C) They are geographically distributed in a hierarchical way

163. Multicast implementation in IPv4:

A) Available without the need for additional protocols

B) Available but with additional protocols

C) Not supported

164. What distinguishes a VPN built according to an overlay scheme?

A) The user's equipment is the same that would be used if the various corporate network sections were directly connected

B) It is not possible to have confidential communications

C) They cannot be carried out without the consent of the chosen ISP

D) The network operator is not aware that a VPN is being built

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166. In the coin bucket algorithm:

A) The capacity of the bucket is related to the average speed over the long term.

B) The capacity of the bucket is linked to the maximum burst size.

C) The capacity of the bucket has a direct relationship with the band.

D) It is used to implement weighted fair queuing.

167. The so-called VPN (virtual private network) access or virtual dial-up VPN solutions currently most popular are based on:

A) Dial-up connections.

B) Tunneling through an IP network.

C) Use of an existing cabling infrastructure to provide broadband access services.

D) New line protocols (data-link layer).

168. The solutions for the creation of level 3 VPN (virtual private network) through an MPLS backbone are characterized by:

A) Particularly high levels of security.

B) High scalability

C) Unlike all the other solutions proposed, they do not require the use of NAT (network address translator) functionality when dealing with private addresses.

D) The provision of a guaranteed quality service to the traffic passing through the VPN.

169. In a packet traveling over a GRE tunnel, how many headers can there be?

A) Only one, otherwise the addressing is ambiguous.

B) Two headers, but the internal one can only contain private addresses.

C) The capacity of the bucket has a direct relationship with the band.

D) Two headers, but the outer one can only contain private addresses.

170. How can MPLS be used to make a VPN?:

A) To make an access VPN.

B) MPLS cannot be used to build VPNs.

C) It can provide all the routing mechanism in overlay networks or point-to-point links in peer networks.

D) It can provide point-to-point connections in overlay networks or the whole routing mechanism in peer networks

171. The PPTP protocol is typically used for:

A) Allowing you to create a tunnel in an access VPN.

B) Allows you to create a tunnel in an overlay-type site-to-site VPN.

C) Allows you to create a tunnel in a peer-type site-to-site VPN.

D) Allowing you to create a tunnel in a layer 4 VPN.

172. Unlike version 4 of the IP, version 6:

A) It has no variable-length header.

B) It does not allow you to discover the MAC address of another station, knowing its IP address.

C) It has no time-to-live (TTL) equivalent.

D) It does not allow the use of IPsec.

173. Optical networks rely on the use of:

A) Fiber optic connections between high performance packet switches

B) IP routers able to forward packets based on their destination address by carrying out the look-up in the routing table with optical techniques.

C) Apparatus capable of switching an electromagnetic signal at a certain carrier frequency in the field of optics from an input port to an output port

174. Secure socket layer (SSL) based virtual private network (VPN) solutions allow:

A) To securely deploy web-based applications across multiple servers

B) To create private server clusters

C) For a company to securely make specific business applications available to their off-site employees.

D) The creation of a backbone on which a service provider can easily and efficiently provide connectivity services to its customers

175. The IPv6 protocol requires that the header of IP packets:

A) It is always authenticated through appropriate encryption algorithms to increase the security of transmissions

B) It is smaller than that of IPv4 packets in order to increase the efficiency in the use of the transmission band by reducing the protocol overhead

C) It consists only of fixed-length fields that carry necessary information in each packet

D) It includes some fields, previously only available as IPv4 options, for features that have proven to be in widespread use over time.

176. The IPv6 protocol requires that the header of IP packets:

A) It does not use neighbor discovery mechanisms as there is a rule to map any IPv6 address to a MAC address.

B) It does not use neighbor discovery mechanism for forwarding IPv6 multicast and broadcast packets as there is a rule to map these IPv6 addresses to a MAC address.

C) It makes use of neighbor discovery mechanisms for all types of IPv6 addresses.

D) It does not use neighbor discovery mechanisms with regards to forwarding IPv6 multicast packets as there is a rule to map these IPv6 addresses to a MAC address.

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C) It has no time-to-live (TTL) equivalent.

D) It does not allow the use of IPsec.

178. The "Split Horizon" mechanism allows you to:

A) Eliminate the possibility of loops (cyclic forwarding paths) occurring as a result of topology changes

B) Reduce the likelihood of loops occurring as a result of topology changes

C) Disable, during the convergence phase, the sending of data packets to those destinations that could give rise to loops

D) Reduce routing traffic by implementing the neighbor discovery phase with special packets ("Hello Packets")

179. The "Path Vector" technique allows you to:

A) Solve the count to infinity problem

B) Solve the problem of overlapping routes

C) Make the protocol "transparent" with respect to the information transported

D) None of the above

180. Inter-domain routing:

A) It requires each router to know exactly the path, in terms of routers traversed, made by packets to a destination

B) It requires an exterior gateway to make choices of routes, based on information collected through inter-domain routing protocols, consistent with existing agreements with other autonomous systems

C) It requires each router to know exactly the cost of reaching any destination (for example in terms of the bandwidth of the links crossed) in order to calculate the path at a lower cost (for example at higher bandwidth)

D) It is a concept that will tend to disappear

181. An Autonomous System is:

A) A self-configuring calculator

B) A zone of an IP network managed, above all from the point of view of routing, autonomously from the others and with connections with at least two other Autonomous Systems

C) A network device that can independently discover the best route along which to forward packets to destinations

D) The network of an ISP

Collection 3

1. **Distribute the routing table across multiple devices to reduce memory footprint on each device**

   A) Communicating via a routing protocol acquired routes with another, even though this results in a loss of information

   B) Redistribute traffic across multiple alternate paths to take full advantage of network resources and avoid congestion on specific paths

   C) Learn how to reach destinations without having to exchange routing information with other routers

   D) Expects traffic to pass through a particular network node

2. **The OSPF (Open Shortest Path First) protocol is used for:**

   A) It was originally designed for different protocol architectures and then adapted for use in IP and Ethernet networks

   B) It requires each network node to provide its neighbors with the shortest distance between it and any destination

   C) It is used by IP routers to calculate a shortest path to each destination

   D) It is used by Ethernet switches to create a Shortest Path tree by eliminating closed paths in the network

3. **The GRE protocol is used for:**

   A) The identification of the protocol wrapped in an ethernet frame

   B) The identification of the protocol wrapped in an IP packet

   C) Exchange routing information in various protocol architectures

   D) Encrypted tunneling in building secure VPNs

4. **The basic idea of MPLS is to:**

   A) Insert a label in the IP packet that is used by network nodes to determine the path of the packet

B) Associate each packet with a label that is used by network nodes to determine how to process the packet

C) Insert a label in the layer two frames that is used by the network nodes to identify the various higher-level protocols

D) Associate each packet with a label that allows the final receiver to understand which data flow the packet belongs to

5. **The smallest aggregation that can contain the two IP networks 130.192.0.0/25 and 130.192.1.0/25 is:**

   A) 130.192.0.0/24

   B) 130.192.1.0/23

   C) 130.192.1.0/24

   D) 130.192.0.0/23

6. **Multicast communications in an IPv4 network:**

   A) They are only possible within a single LAN, even with the use of additional protocols

   B) They are always possible, IGMP only makes them more efficient

   C) They are not possible without using additional protocols in the network

   D) They are possible on a geographical scale thanks to the use of only the IGMP protocol

7. **The MAC address of the network card of switch S to which station A is connected is used as the destination MAC address in an ethernet frame:**

   A) Sent from B to A

   B) Sent from A to S, for example, for management or configuration purposes

   C) Sent from A to B

   D) Sent from To to a destination outside the network

8. **The so-called static routing:**

A) Consists in the use of routing algorithms that allow network devices to identify a static path to each destination

B) It is an obsolete technology that is no longer used as dynamic routing is preferred

C) It consists of manually configuring the routing information on each node by the network administrator

D) It consists in the static connection of network nodes to form a topology that allows reaching every destination in the network

9. **VLANs are:**

   A) Local networks virtually distinct from each other but created on a single private infrastructure

   B) Networks capable of emulating the presence of a remote device on a given LAN, often made with tunneling techniques

   C) Networks created solely between virtual machines (VMs)

   D) High-performance wireless networks

10. **In MPLS, the label binding consists of:**

    A) Send, through a specific protocol, to another MPLS node a label associated with a forwarding equivalence class (FEC)

    B) Associate a label with a routing path in the network

    C) Include a label in BGP protocol routing announcements

    D) Associate a label with a FEC

11. **For the establishment of a label switched path (LSP) it is essential that:**

    A) All links on the path use the same layer two protocol

    B) MPLS routers on the route use the same protocol for label distribution

    C) The final destinations of packets traveling on the LSP support MPLS

    D) MPLS routers on the path perform a mapping operation

12. **Traffic encryption in VPNs is:**

    A) Not used in some solutions; although it gives a fundamental technology in modern networks to ensure data confidentiality, encryption has nothing to do with VPN solutions

    B) An important component, although not essential and not present in some VPN solutions

    C) An important, though not essential, component present at least optionally in any VPN solution

    D) A substantial component that underpins any VPN solution

13. **Which of these is an IPv4 to IPv6 transition method:**

    A) TAP (transforming address to port)

    B) MAP (mapping address and port)

    C) None of the above

    D) CAP (Converting address and port)

14. **According to the founding principles of the IPv6 protocol, the size of routing tables in a global network (e.g. the Internet) should:**

    A) Tend to increase

    B) Surely remain constant because the principles of operation of IPv6 are the same as of IPv4

    C) Tend to decrease

15. **The GRE protocol aims to:**

    A) Protect packets against eavesdropping

    B) Manage the encapsulation of packets to be transported through a tunnel

    C) Authenticate the sender of the packets

    D) Check the integrity of incoming packets

16. **Why are virtual private networks used?**

A) They are used to allow access to the public internet via a private access network

B) They are used to enable an existing cabling infrastructure to provide broadband services

C) They are used to build a private infrastructure using a public one

D) They are used to connect two sites of an organization using a dedicated line

17. **The GRE protocol is used for:**

A) Guarantee the authenticity of packages

B) Encapsulate packets in other IP headers, so they can be sent over a tunnel

C) Ensure the confidentiality of communications

D) Reserve some bandwidth for communication

18. **Where are planning algorithms used?**

A) They are used in access routers to verify that the traffic generated by users is as negotiated with the provider

B) They are used in firewalls to delay the entry of packets into a corporate network to reduce the risk of Denial of Services attacks

C) They are used in routers to decide the order of transmission of pending packets

D) They are used in routers to correctly execute the sequence of configuration commands

19. **What is the distinguishing feature of a VPN that implements an overlay model?**

A) Allowing you to create a tunnel in an access VPN

B) Allows you to create a tunnel in an overlay-type site-to-site VPN

C) Allows you to tunnel into a peer-type site-to-site VPN

D) Allowing you to create a tunnel in a layer 4 VPN

20. **The feature of a centralized access VPN is that:**

A) Traffic not directed to the VPN is still passed through the VPN gateway

B) User authentication for VPN access is delegated to the ISP

C) Traffic not directed to the VPN is not forced to go through the VPN gateway

D) User authentication is not done by the VPN gateway

21. **DiffServ differs from IntServ because:**

A) DiffServ tends to provide a guarantee on QoS which IntServ does not give

B) DiffServ introduces new protocols to allow the reservation of resources in order to obtain a given QoS

C) IntServ tends to provide a guarantee on QoS which DiffServ does not give

D) DiffServ tends to guarantee a maximum traversal time, while IntServ tends to provide a minimum guaranteed band

22. **How is QoS managed in SIP?**

A) It is used natively managed by SIP

B) The RTCP protocol is used to obtain the QoS

C) It is optional

D) SIP does not provide any mechanism for QoS

23. **Where are queue scheduling policies used?**

A) In access routers to make sure that the traffic profile generated by a user complies with what has been agreed with the service provider

B) In the firewall, to delay packets entering the company's network from the Internet, in order to prevent certain types of attacks

C) In a router to decide the order of transmission of packets waiting on each interface

D) In a router to schedule the list of configuration commands issued by the user to minimize the impact on normal operations caused by applications of configuration changes

24. **To build a VPN using MPLS, at level 3 according to the peer model, you can:**

A) Use an appropriately modified version of the BGP

B) Use a suitably modified version of the TCP

C) Use a suitably modified version of the RIP

D) Use an appropriately modified version of the RTP

25. **Virtual private networks (VPNs) are used for:**

A) Carrying private traffic on a shared infrastructure creating the same conditions as using a private infrastructure

B) Divide a company's local network into a number of different subnets for different business activities (sales, purchasing, engineering, marketing)

C) Partitioning a private network (for example the main company network with a number of secondary units) into several networks practically divided

26. **Because it is useful to use the GRE encapsulation protocol instead of IP:**

A) Because it provides an encryption mechanism

B) Because it is possible to encapsulate lower-level protocols (e.g. Data Link Layers) in IP datagrams

C) Because the resulting packet is shorter

D) Because it is possible to authenticate the sender

27. **In a packet traveling over a GRE tunnel, how many headers can there be?**

A) Only one, otherwise the addressing is ambiguous

B) Two headers, but the internal one can only contain private addresses

C) Two headings, without particular limitations

D) Two headers, but the outer one can only contain private addresses

28. **What is the use of policing mechanisms?**

A) They are used by the user to agree with the supplier on the level of QoS to be obtained

B) They are used by the service provider to verify that the traffic entered by the customer complies with the agreements made

C) They are used by the user to verify that the traffic arriving from the supplier complies with the agreements made

D) They are used in the various routers to guarantee a maximum crossing time for each of them

29. **Scheduling algorithms are used:**

A) In access routers, to make sure that the traffic generated by a user complies with the traffic profile contracted with their service provider

B) In firewalls, to delay packets entering a corporate network from the Internet in order to prevent certain types of security attacks

C) In routers, to decide the order in which pending packets should be transmitted to an interface

D) In routers, to properly schedule the list of configuration commands given by the user in order to minimize the disruption caused by the time necessary for the application of the changes

30. **The IPsec standard is used in virtual private networks (VPNs) for:**

A) Verify authentication information provided by remote users by exchanging information with an authentication server

B) The creation of tunnels through a public IP network on which it is possible to transport IP packets coming from or destined for a private network regardless of the addressing plan used on this private network (provided that the addressing plans of the two private networks are not superimposed)

C) The automatic creation of encrypted connections between the offices of a company through a public network, over which communication is therefore inherently insecure

31. **Why are access VPNs used?**

A) They are used to allow access to a public network (Internet) via a private network

B) They are used to enable an existing cabling infrastructure to provide broadband services

C) They are used to build a private infrastructure using a public one

D) They are used to connect two sites in an organization using a dedicated link

32. **Level 3 virtual private network (VPN) solutions through an MPLS backbone are characterized by:**

A) Particularly high levels of security thanks to the use of cryptographic techniques

B) Good level of automation and integration between the public backbone and private networks

C) Layer 3 tunneling mechanisms, i.e., inside IP packets

D) Direct management by the user, without operator intervention

33. **What is the role of the GRE protocol?**

A) Allows you to increase the address space

B) Introduces an encryption mechanism for packets

C) Allows you to encapsulate a layer 2 frame in an IP packet

D) Allows encapsulation but it is not possible to encapsulate lower layer units in a layer 3 package

34. **VPNs are used for:**

A) Carrying private traffic over a shared infrastructure, creating the same conditions that would have occurred if a private infrastructure had been used

B) Divide a company's LAN into groups of subnets for the company's various activities

C) Divide a private network into several virtual networks

35. **In a user station connected to a VPN with centralized access, messages directed to stations outside the VPN go through:**

A) The site of the VPN to which the user machine is connected

B) It is not possible to reach stations outside the VPN

C) A specialized router for these packets

D) They are sent directly from the user station to the external recipient

36. **What is the goal of PPTP?**

A) To implement site-to-site VPN

B) To implement VPN access

C) To implement centralized access VPN

D) To implement VPN with distributed access

37. **The solutions for the creation of level 3 VPN (virtual private network) through an MPLS backbone are characterized by:**

A) Particularly high levels of security

B) High scalability

C) Unlike all the other solutions proposed, they do not require the use of NAT (network address translator) functionality when dealing with private addresses

D) The provision of a guaranteed quality service to the traffic passing through the VPN

38. **In the DiffServ architecture, the PHB allows to:**

A) Treat the various classes of service differently

B) Monitor the maximum crossing time of a single router for each flow that passes through it

C) Provide the end-to-end guarantee of the QoS required by each stream

D) Ensuring the QoS required by each stream passing through a router

39. **The RED (Random Early Detection) algorithm:**

A) Manages the internal queues of routers by transmitting packets from the various queues in rotation

B) Allows the inbound marking of traffic belonging to different classes

C) Manages the internal queues of routers, starting to discard packets with increasing probability when the queue reaches a minimum length

D) Allows control of the maximum burst size

40. **In what situation is it possible for a packet to have two IP headers?**

A) The packet went through an inbound firewall

B) The packet is in the public network, having passed through a NAT outbound

C) The packet is on the public network after passing through a firewall outbound

D) The packet is on the public network in transit over an IP tunnel connecting two segments of an IP-based VPN

41. **What is a feature of the Differentiated Services (DiffServ) architecture?**

A) Sophisticated reporting protocols for resource reservation

B) Ability to provide guaranteed QoS for packet flow by explicitly requesting it

C) A mechanism for providing a different type of treatment to packets belonging to different classes of service

D) Sophisticated signaling protocols to ensure each stream receives guaranteed QoS

42. **What is the typical role of IPSec in VPNs?**

A) Securely distribute the key required by other protocols to open a tunnel

B) Allow the transmission of authentication information (such as username and password) by the users of the accessing VPN

C) Open a secure tunnel managed over the public Internet

D) Verify user identity to allow other protocols to open tunnels only with authorized parties

43. **Why is the IPsec standard used in some VPNs (virtual private network)?**

A) It is used only to verify the authentication credentials of remote users by exchanging data with an authentication server

B) It is only used to allow the remote user to send username and password to access the VPN

C) It is used to set up secure tunnels between different sites of the same company using a public network

D) It is used to overcome the problems associated with the use of private networks

44. **The quality of service can be guaranteed on packet networks when:**

A) Packets are transported by a cell-switched infrastructure (e.g. ATM)

B) The network nodes implement appropriate mechanisms that regulate the packet service (for example scheduling algorithms)

C) Applications are able to encode the information to be transferred according to levels of different importance

45. **What can you do with an SSL (secure socket layer) based VPN (virtual private network)?**

A) Securely distribute the workload of a web-based application across multiple servers

B) To implement private network clusters

C) Implement a backbone of an Internet service provider to provide an interconnection service, in a simple and effective way

D) It is possible for an enterprise to securely make certain applications available on the corporate network

16. **Unlike version 4 of the IP, version 6:**

A) It does not allow you to discover the MAC address of another station, knowing its IP address

B) It has no broadcast addresses

C) It has no time-to-live (TTL) field equivalent

D) It does not have an associated ICMP version

17. **Is fragmentation allowed in IPv6?**

A) Datagrams can only be fragmented by the sender and reassembled at the final destination

B) The mechanism is similar to that included in IPv4

C) It is not possible to fragment datagrams, both for routers and for the sender

D) Fragmentation is only allowed on routers whenever it is needed

18. **What is a feature of the IPv6 addressing scheme?**

A) The entire address is assigned by a single authority

B) The addresses are distributed to facilitate aggregation in the forwarding tables of the backbone router

C) Multicast addresses are not used

D) Variable length addresses are used

19. **What mechanism is used to forward IPv6 packets over the LAN?**

A) No adjacent discovery mechanism is used as there is an algorithm to map any possible address to a MAC address

B) Near discovery is not used for IPv6 multicast and broadcast packets as there is an algorithm to map the IPv6 address to the MAC address

C) The adjacent discovery mechanism is used for all possible types of IPv6 addresses

D) The near detection mechanism is not used for IPv6 multicast packets as there is an algorithm to map the IPv6 address to the MAC address

50. **The MPLS (Multiprotocol Label Switching) architecture is characterized by:**

A) Final system capable of negotiating the label of the generated packets with the network

B) Intelligent terminals able to customize the service received from the network

C) Extremely fast routing protocols in updating routing tables when topology changes occur to ensure rapid error recovery

D) A different mechanism (than pure IP) to select the output interface to which the packet is to be forwarded

51. **A Neutral Access Point is a particular network in which:**

A) All devices are connected through the use of a high-performance central router, equipped with multiple network interfaces

B) The connection between the devices is made at level 2

C) Each connected router sees at level 3 all the other routers present on the network and is able to peer with each of them

D) The various ASs exchange traffic in "peering" mode, i.e., not for a fee

52. **The LSP (Label Switched Path) in MPLS (Multiprotocol Label Switching) are:**

A) They are obtained by reserving resources in the network nodes in order to guarantee an appropriate quality of service to the applications that created them

B) They are the shortest route to a destination

C) They are created (set up) by applications for transporting packets belonging to a forwarding equivalence class (FEC)

D) They are created by the network nodes that agree on the labels to be used for packets belonging to a forwarding equivalence class (FEC)

53. **How can MPLS be used to build a VPN?**

A) To make an access VPN

B) MPLS cannot be used to build VPNs

C) It can provide all the routing mechanism in overlay networks or point-to-point links in peer networks

D) It can provide point-to-point connections in overlay networks or all routing mechanism in peer networks

54. **Why is MPLS important?**

A) In such networks, routers with specific support can be implemented to ensure the required quality of services

B) It is possible to have a single control plane for different switching technologies

C) It is possible to implement devices that do not need to be configured

D) Traffic can be distributed among multiple equivalent servers

55. **Stateless autoconfiguration in IPv6 requires:**

A) A server on the local network

B) A server on the corporate network (intranet)

C) A DHCPv6 (Dynamic Host Configuration Protocol version 6) server

D) It is possible even if there is no server or router present

56. **What is the role of the link-local IPv6 address?**

A) Can be used to enable communication between hosts in the same subnet when other types of IPv6 addresses are not available

B) It is used to physically connect two hosts on a local link

C) It is the only address that can be used to communicate on a LAN

D) It is the only address to communicate to routers

57. **What is a feature of stateless automatic configuration in IPv6?**

A) It is based on DHCPv6 (Dynamic Host Configuration Protocol version 6)

B) Uses a standard prefix followed by a 64-bit long host number, derived from the MAC address

C) It is mandatory to have a router in the subnet to obtain the network prefix (the most significant 64 bits) with a router solicitation message

D) You must have a router in the subnet to get the network prefix (most significant 64 bits) with a router advertisement message

58. **An IPv6 host on reboot will acquire the following address:**

A) It is not possible to know precisely the address itself, since the IPv6 address is each time regenerated with a random number as regards the part reserved for the Interface ID

B) A FE80::/32 address

C) As for the link-local address, it will assume the same IPv6 address it had before the reboot

D) The address depends entirely on the configuration it will acquire from its default router

59. **A Neutral Access Point is a particular network in which:**

A) Several Autonomous Systems connect, at level 2, a certain number of routers in order to exchange routing information

B) Several Autonomous Systems connect, at level 3, a certain number of routers in order to exchange routing information

C) An Autonomous System connects, at level 2, a certain number of routers in order to speed up the exchange of routing information within the domain

D) An Autonomous System connects, at level 3, a certain number of routers in order to speed up the exchange of routing information within the domain

30. **The link-local addresses:**

A) They are valid within an organization that can use them to assign addresses to machines in the various subnets of its intranet (they are the counterparts of IPv4 private addresses)

B) They cannot be assigned to routers

C) They are normally built automatically by the station starting from the MAC address of its card, to which a predefined prefix is prefixed

D) They are used to identify machines that perform a certain service (for example DNS servers)

31. **What is the characteristic of the IPv6 address?**

A) They allow communication between hosts with IPv4 and IPv6 addresses without additional mechanisms

B) They keep the same flexible division between the subnet and host fields

C) They are organized rigidly into fields of networks, subnets, and hosts

D) They include a unique broadcast address

32. **Is there a version of DHCP for IPv6?**

A) It does not exist because stateless automatic configuration alone solves the same problem

B) There is an IPv6 DHCP

C) It does not exist because stateless auto-configuration and router advertising solve the same problem

D) It does not exist because it is safer if the host is manually configured

33. **In the IPv6 protocol, IP packet header:**

A) Routing protocols (e.g. packet format) do not change compared to IPv4

B) The ARP protocol is incorporated into ICMPv6, but it maintains exactly the previous operating scheme (broadcast request, unicast response)

C) There is the possibility, for a station on a network segment, to configure itself by listening to Router Advertisement messages

D) Like IPv4, IPv6 has no router reconfiguration mechanisms

34. **What operations can a single MPLS router perform on a label?**

A) Add a label in any position (PUSH), drop a label in any position (POP), change the value of a label in any position (SWAP)

B) Add external label (PUSH), release external label (POP), change external content (SWAP)

C) Add a label if the router is the incoming one (only 1 label is allowed) (PUSH), release the only label if the router is the outgoing one (POP), and change the content of the only label present (SWAP)

D) Labels cannot be manipulated by MPLS routers

35. **The multi-protocol label switching (MPLS) architecture is characterized by:**

A) A particularly advanced support to provide guaranteed quality services

B) A different mechanism (compared to pure IP) for deciding the outbound interface to which a packet should be forwarded

C) Routing protocols particularly fast to update the routing tables following topological changes in order to quickly recover faults

D) Intelligent network terminals capable of personalizing the services received from the network

36. **The "Label Swapping" forwarding technique:**

A) It is not suitable when there is a need to provide guarantees of service quality in the forwarding of packets

B) It requires a data packet to keep the same label ("label") for the entire path from the source node to the destination node

C) Requires that all nodes on the path share exactly the same forwarding table

D) It may require a "Path Setup" phase to determine the path

37. **Is it possible to establish a loop in a network that uses Link State routing?**

A) Yes

B) No, because each router has a complete view of the network topology

C) No, because Link State updates are sent in flooding

D) No, because a Hold-Down timer is used

38. **Using the algorithm of the coin-operated bucket (or token bucket) of capacity B tokens and filling speed r tokens/s it is possible to check:**

A) That the crossing time does not exceed rB seconds

B) The number of packets per second entered does not exceed r, and the maximum burst does not exceed B

C) The number of packets per second entered does not exceed B, and the maximum burst does not exceed r

D) The jitter does not exceed B/r

39. **In the Path Vector routing algorithm:**

A) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the next hop router to reach that destination

B) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the next Autonomous System to reach that destination

C) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the list of routers to cross to reach that destination

D) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the list of Autonomous Systems to cross to reach that destination

70. **In isolated routing:**

A) Each router calculates, through message exchanges with neighbors only, its own routing table

B) Each router calculates its own routing table by exchanging messages with all routers in the network

C) Each router calculates its own routing table by analyzing only the traffic that passes through it

D) Some portions of the network are isolated from the remaining routers, preventing the transit of data between the public portion of the network and the isolated one

71. **The concepts of Forwarding and Routing:**

A) They are synonyms; they identify the process of finding a valid path for a packet, from the sender to the recipient

B) They are synonyms; identify the process that allows, in the face of a packet entering a network node, to determine which is the best exit port to the destination

C) They are different concepts; the forwarding process aims to identify a valid path for a packet, from the sender to the recipient; the routing process allows, in the face of a packet entering a network node, to determine which is the best exit port to the destination

D) They are different concepts; the routing process aims to identify a valid path for a packet, from the sender to the recipient; the forwarding process allows, in the face of a packet entering a network node, to determine which is the best exit port towards the destination

72. **What is the function of the "scope" associated with IPv6 addresses?**

A) It serves to resolve, in particular cases, the ambiguity regarding the sender

B) There is no scope associated with IPv6 addresses

C) Used to use global addresses

D) It is needed in order to use anycast addresses

73. **A link-local address:**

A) It can be used to allow communication between stations on local links (e.g., a LAN) in the absence of other IPv6 addresses

B) It is used to physically connect two stations on a local link

C) It is the address used by stations on a LAN to exchange data

D) It is used in all communications between local stations

74. **Are there any security issues with IPv6 stateless autoconfiguration?**

A) There are no particular problems

B) Does not allow encryption of the load

C) It is possible to find the same interface, if you connect to the internet from various providers

D) Disallows the use of security headers (IPsec type)

75. **The IPv6 addressing scheme:**

A) It only provides for addresses uniquely assigned by a body in charge

B) It provides for each entity (e.g., company) to be globally assigned a set of addresses, which become its property for an unlimited time

C) Provides that the first 64 bits of an address are normally identified as the network prefix, at least on LANs

D) It does not foresee the existence of multicast addresses

76. **In a packet traveling on an MPLS network, is it possible to have multiple labels at the same time?**

A) No, it is not expected

B) Yes, but no more than 2

C) Yes, but no more than 20

D) Yes, but only in the MPLS tunnels used for VPNs

77. **The "Label Swapping" forwarding technique:**

A) It is not suitable when there is a need to provide guarantees of service quality in the forwarding of packets

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B) Does not allow encryption of the load

C) It is possible to find the same interface, if you connect to the internet from various providers

D) Disallows the use of security headers (IPsec type)

36. **The IPv6 addressing scheme:**

A) It only provides for addresses uniquely assigned by a body in charge

B) It provides for each entity (e.g., company) to be globally assigned a set of addresses, which become its property for an unlimited time

C) Provides that the first 64 bits of an address are normally identified as the network prefix, at least on LANs

D) It does not foresee the existence of multicast addresses

37. **Is it possible to establish a loop in a network that uses Link State routing?**

A) Yes

B) No, because each router has a complete view of the network topology

C) No, because Link State updates are sent in flooding

D) No, because a Hold-Down timer is used

38. **Using the token bucket algorithm of capacity B tokens and filling speed r tokens/s, it is possible to check:**

A) That the crossing time does not exceed rB seconds

B) The number of packets per second entered does not exceed r, and the maximum burst does not exceed B

C) The number of packets per second entered does not exceed B, and the maximum burst does not exceed r

D) The jitter does not exceed B/r

39. **In the Path Vector routing algorithm:**

A) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the next hop router to reach that destination

B) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the next Autonomous System to reach that destination

C) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the list of routers to cross to reach that destination

D) Each record contained in the Path Vector contains the destination, the distance from the router in question, and the list of Autonomous Systems to cross to reach that destination

40. **In isolated routing:**

A) Each router calculates, through message exchanges with neighbors only, its own routing table

B) Each router calculates its own routing table by exchanging messages with all routers in the network

C) Each router calculates its own routing table by analyzing only the traffic that passes through it

D) Some portions of the network are isolated from the remaining routers, preventing the transit of data between the public portion of the network and the isolated one

91. **The concepts of Forwarding and Routing:**

A) They are synonyms; they identify the process of finding a valid path for a packet, from the sender to the recipient

B) They are synonyms; they identify the process that allows, in the face of a packet entering a network node, to determine which is the best exit port to the destination

C) They are different concepts; the forwarding process aims to identify a valid path for a packet, from the sender to the recipient; the routing process allows, in the face of a packet entering a network node, to determine which is the best exit port to the destination

D) They are different concepts; the routing process aims to identify a valid path for a packet, from the sender to the recipient; the forwarding process allows, in the face of a packet entering a network node, to determine which is the best exit port towards the destination

92. **What is the function of the "scope" associated with IPv6 addresses?**

A) It serves to resolve, in particular cases, the ambiguity regarding the sender

B) There is no scope associated with IPv6 addresses

C) Used to use global addresses

D) It is needed in order to use anycast addresses

93. **A link-local address:**

A) It can be used to allow communication between stations on local links (e.g., a LAN) in the absence of other IPv6 addresses

B) It is used to physically connect two stations on a local link

C) It is the address used by stations on a LAN to exchange data

D) It is used in all communications between local stations

94. **Are there any security issues with IPv6 stateless autoconfiguration?**

A) There are no particular problems

B) Does not allow encryption of the load

C) It is possible to find the same interface, if you connect to the internet from various providers

D) Disallows the use of security headers (IPsec type)

95. **The IPv6 addressing scheme:**

A) It only provides for addresses uniquely assigned by a body in charge

B) It provides for each entity (e.g., company) to be globally assigned a set of addresses, which become its property for an unlimited time

C) Provides that the first 64 bits of an address are normally identified as the network prefix, at least on LANs

D) It does not foresee the existence of multicast addresses

96. **In MPLS, the label binding consists of:**

A) Send, through a specific protocol, to another MPLS node a label associated with a forwarding equivalence class (FEC)

B) Associate a label with a routing path in the network

C) Include a label in BGP protocol routing announcements

D) Associate a label with a FEC

97. **Traffic encryption in VPNs is:**

A) Not used in some solutions; although it gives a fundamental technology in modern networks to ensure data confidentiality, encryption has nothing to do with VPN solutions

B) An important component, although not essential and not present in some VPN solutions

C) An important, though not essential, component present at least optionally in any VPN solution

D) A substantial component that underpins any VPN solution

98. **Which of these is an IPv4 to IPv6 transition method:**

A) TAP (transforming address to port)

B) MAP (mapping address and port)

C) None of the above

D) CAP (Converting address and port)

99. **According to the founding principles of the IPv6 protocol, the size of routing tables in a global network (e.g. the Internet) should:**

A) Tend to increase

B) Surely remain constant because the principles of operation of IPv6 are the same as of IPv4

C) Tend to decrease

100. **The GRE protocol aims to:**

A) Protect packets against eavesdropping

B) Manage the encapsulation of packets to be transported through a tunnel

C) Authenticate the sender of the packets

D) Check the integrity of incoming packets

101. **Why are virtual private networks used?**

A) They are used to allow access to the public internet via a private access network

B) They are used to enable an existing cabling infrastructure to provide broadband services

C) They are used to build a private infrastructure using a public one

D) They are used to connect two sites of an organization using a dedicated line

02. **In a user station connected to a VPN with centralized access, messages directed to stations outside the VPN go through:**

A) The site of the VPN to which the user machine is connected

B) It is not possible to reach stations outside the VPN

C) A specialized router for these packets

D) They are sent directly from the user station to the external recipient

03. **The feature of a centralized access VPN is that:**

A) Traffic not directed to the VPN is still passed through the VPN gateway

B) User authentication for VPN access is delegated to the ISP

C) Traffic not directed to the VPN is not forced to go through the VPN gateway

D) User authentication is not done by the VPN gateway

04. **The solutions for the creation of level 3 VPN (virtual private network) through an MPLS backbone are characterized by:**

A) Particularly high levels of security

B) High scalability

C) Unlike all the other solutions proposed, they do not require the use of NAT (network address translator) functionality when dealing with private addresses

D) The provision of a guaranteed quality service to the traffic passing through the VPN

05. **The quality of service can be guaranteed on packet networks when:**

A) Packets are transported by a cell-switched infrastructure (e.g. ATM)

B) The network nodes implement appropriate mechanisms that regulate the packet service (for example scheduling algorithms)

C) Applications are able to encode the information to be transferred according to levels of different importance

06. **What can you do with an SSL (secure socket layer) based VPN (virtual private network)?**

A) Securely distribute the workload of a web-based application across multiple servers

B) To implement private network clusters

C) Implement a backbone of an Internet service provider to provide an interconnection service, in a simple and effective way

D) It is possible for an enterprise to securely make certain applications available on the corporate network

07. **Unlike version 4 of the IP, version 6:**

A) It does not allow you to discover the MAC address of another station, knowing its IP address

B) It has no broadcast addresses

C) It has no time-to-live (TTL) field equivalent

D) It does not have an associated ICMP version

08. **What operations can a single MPLS router perform on a label?**

A) Add a label in any position (PUSH), drop a label in any position (POP), change the value of a label in any position (SWAP)

B) Add external label (PUSH), release external label (POP), change external content (SWAP)

C) Add a label if the router is the incoming one (only 1 label is allowed) (PUSH), release the only label if the router is the outgoing one (POP), and change the content of the only label present (SWAP)

D) Labels cannot be manipulated by MPLS routers

09. **The "Path Vector" technique allows you to:**

A) Solve the problem of count to infinity

B) Solve the problem of overlapping routes

C) Make the protocol "transparent" with respect to the information carried

D) None of the above

10. **The BGP routing protocol:**

A) Uses rules (policies) on additional information to cost metrics to identify the "best" path to reach a destination

B) It is used exclusively for exchanging information between different autonomous system routers

C) It is used exclusively for exchanges of information between routers of the same autonomous system

D) It is the protocol that will replace OSPF

11. **The "Split Horizon" mechanism allows you to:**

A) It foresees that the routes received in the advertisements of a neighboring router are always announced to that neighbor with metric equal to infinity

B) Provides that a prefix is not announced to the neighbor representing the "next hop" to that destination

C) It provides that a destination is declared unreachable when the cost exceeds a certain threshold of infinity

D) None of the previous answers

12. **A Neutral Access Point is a particular network in which:**

A) All devices are connected through the use of a high-performance central router, equipped with multiple network interfaces

B) The connection between the devices is made at level 2

C) Each connected router sees at level 3 all the other routers present on the network and is able to peer with each of them

D) The various ASs exchange traffic in "peering" mode, i.e., not for a fee

13. **The BGP protocol is used on the Internet for:**

A) The exchange of information between routers belonging to different autonomous systems

B) Communicate the link status of a router to neighboring routers

C) The discovery of neighboring routers (bordering routers) on a local network

D) Find the geographic location of a host based on its IP address

14. **The IS-IS protocol:**

A) It is an obsolete routing protocol that is no longer used due to its poor performance

B) It is a routing protocol based on the link-state algorithm widely used in large networks

C) It is a protocol used by Ethernet switches to create a spanning tree by eliminating closed paths

D) It is an evolution protocol of BGP for the exchange of routing information between routers belonging to different autonomous systems

15. **The "acceptable neighbor" of a router R, in the Diffusing Update Algorithm (DUAL):**

A) The connection point between two routers of two different Internet Service Providers

B) The exchange of information between a router and a station using a routing protocol

C) The exchange of information between two OSPF routers connected by a virtual link

D) The exchange of information between two OSPF routers of the same area

16. **The term "Peering" refers to:**

A) It has only one interconnection to another Tier-1 Autonomous System

B) An Autonomous System connected to other AS Tier-1 only with "peering" type connections, i.e., not for a fee

C) An Autonomous System connected to other AS Tier-1 mainly with "peering" connections, i.e., not for a fee

D) An Autonomous System connected to other AS Tier-1 mainly with "transit" connections, i.e., for a fee

17. **What is a consequence of using VLANs in a local network?**

A) Create virtual interfaces on the switches which, as such, are always functional

B) Broadcast traffic is limited to the VLAN in which it was generated

C) The security of communication on the corporate network increases as the frames are encrypted

D) Users are required to authenticate before they can access the VLAN

18. **A host belonging to a certain VLAN:**

A) Can only contact hosts in the same VLAN

B) Can contact hosts in other VLANs through a router

19. **In MPLS, the protocol for labeling is:**

A) OSPF

B) RSVP-TE

C) IS-IS

D) L2TP

20. **A Host A has address 192.168.1.1/24 and a Host B 192.168.1.129/25:**

    A) Both can communicate directly with each other

    B) A can communicate directly with B but not vice versa

    C) A needs a router to communicate with B

    D) They cannot communicate

21. **Optical networks are characterized in a specific and univocal way by the use of equipment capable of:**

    A) Transmit optical signals over fiber optic links

    B) Switch an optical channel from an input port to an output port

    C) Route packets by processing their header via optical circuits (not electronic circuits)

    D) Carry huge amounts of data thanks to their ability to switch traffic according to the information contained in a label, present in a special packet header

22. **The Resource Reservation Protocol (RSVP) is able to:**

    A) Limit the variations in delay (jitter) experienced by packets in routers

    B) Make the routers aware of the quality of service requests made by the applications

    C) Reserve compute resources on servers that share their processors

    D) Check for delays and losses experienced by multimedia application packets on the network

Questions by Topics

VPN

1. **To build a VPN using MPLS , at level 3 according to the peer model, you can:**

   A. Use an appropriately modified version of the BGP
   B. Use a suitably modified version of the TCP
   C. Use a suitably modified version of the RIP
   D. Use an appropriately modified version of the RTP

2. **The GRE protocol aims to:**
   A. Protect packets against eavesdropping

   B. Manage the encapsulation of packets to be transported through a tunnel
   C. Authenticate the sender of the packets
   D. Check the integrity of incoming packets

3. **The GRE protocol is used for:**

   A. Encapsulate packets in other IP headers, so they can be sent over a tunnel
   B. Ensure the confidentiality of communications
   C. Ensure the authenticity of packages
   D. Reserve some bandwidth for communication

4. **PPTP protocol is commonly used for:**

   A. Allow to create a tunnel in an access VPN
   B. Allowing you to tunnel into an overlay-type site-to-site VPN
   C. Allowing you to tunnel into a peer-type site-to-site VPN
   D. Allow you to tunnel into a layer 4 VPN

5. **In a packet traveling over a GRE tunnel , how many headers can there be?**
   A. Only one, otherwise the addressing is ambiguous
   B. Two headers, but the internal one can only contain private addresses

C. Two headings, without particular limitations
D. Two headers, but the outer one can only contain private addresses

6. **Why is it useful to use GRE encapsulation protocol as opposed to IP**
   A. Because it provides encryption mechanism

   B. Because it is possible to encapsulate lower levels protocols (e.g. data link layers) in IP datagrams
   C. Because the resulting packet is shorter
   D. Because is possible to authenticate the sender

7. **In what situation is it possible for a packet to have two IP headers?**
   A. The packet went through an inbound firewall
   B. The packet is in the public network, having passed through a NAT outbound
   C. The packet is on the public network after passing through a firewall outbound

   D. The packet is in the public network in transit over an IP tunnel connecting two segments of an IP-based VPN

8. **In a user station connected to a VPN with centralized access , direct messages to**
   stations outside the VPN pass through:

   A. The site of the VPN to which the user machine is connected
   B. It is not possible to reach stations outside the VPN
   C. A specialized router for these packets
   D. They are sent directly from the user station to the external recipient

9. **The feature of a centralized access VPN is that**

   A. Traffic not directed to the VPN is still passed through the VPN gateway
   B. User authentication for VPN access is delegated to the ISP
   C. Traffic not directed to the VPN is not forced to go through the VPN gateway
   D. User authentication is not done by the VPN gateway

10. **Layer 3 virtual private network (VPN) solutions across an MPLS backbone are**
    characterized by

A. Particularly high levels of security thanks to the use of cryptographic techniques

B. Good level of automation and integration between the public backbone and private networks

C. Layer 3 tunneling mechanisms, ie inside IP packets

D. Direct management by the user, without operator intervention

11. **What is a feature of a layer 3 VPN (virtual private network) implemented using an MPLS network?**

A. High security standards

B. High level of scalability

C. It does require a NAT (network address translation) when private addresses are used

D. QoS guaranteed for a flow travelling across the VPN

12. **The solutions for the realization of VPN (virtual private network) of level 3 through a dorsal MPLS are characterized by**

A. Particularly high levels of security

B. High scalability

C. Unlike all the other proposed solutions, they do not require the use of NAT (network address translator) when dealing with private addresses

D. The provision of a guaranteed quality service to the traffic passing through the VPN

13. **Why IPsec standard is used in some VPN (virtual private network)?**

A. It is used only to verify the authentication credentials of remote users with a data exchange with an authentication server

B. It is only used to allow remote user to send username and password to access the VPN

C. It is used to setup a secure tunnels between different sites of the same enterprise using a public network

D. It is used to overcome problems connected with the use of private networks

14. **The IPsec standard is used in VPNs for**
    A. Verify authentication information provided by remote users through a information with an authentication server
    B. Allow the sending of authentication information (user and psw via challenge) by of users of an access VPN
    C. The creation of tunnels through a public IP network through which it is possible carry packets to a private network regardless of the routing plan used on that private network

    D. The automatic creation of encrypted connections between company offices over a network
    public, on which communication is therefore intrinsically unsafe

15. **The so-called VPN (virtual private network) access solutions or virtual dial-up VPN**
    currently most common are based on:

    A. Dial-up connections.

    B. Tunneling through an IP network.
    C. Using an existing cabling infrastructure to provide wide access services band
    D. New line protocols (data-link layer).

16. **What is the distinctive feature of a VPN implementing a overlay model?**

    A. The network provider does not know that we are implementing a vpn
    B. The user devices at the edge of the vpn may ignore that we are using a VPN
    C. It is not possible to have a secure connection
    D. I cannot be implemented without the intervention network provider

17. **What can be done with a VPN (virtual private network) based on SSL (secure socket layer)?**
    A. To distribute, in secure way, over several servers the workload related to a web based application
    B. To implement clusters of private networks
    C. To implement a backbone of an internet service provider for providing an

interconnection service, in a simple and effective way

D. It is possible for an enterprise to make available in a secure way some applications aver the corporate network

18. **What is the goal of PPTP**
A. To implement site to site VPNs

B. To implement access VPN
C. To implement VPN with centralized access
D. To implement VPN with distributed access.

19. **What is the role of GRE protocol?**
A. It allows to increase addressing space

B. It introduces an encryption mechanism for the packets

C. It allows to encapsulate a layer 2 frame into an IP packet
D. It allows the encapsulation but it is not possible to encapsulate units of lower layers into a layer 3 packet

20. **What is the typical role of IPSec in VPNs?**
A. To distribute in a secure way the key required by other protocols to open a tunnel
B. To allow the transmission of authentication information (e.g. username and password) by users of access VPN

C. To open a managed secure tunnel across the public internet
D. To verify the user identity to allow other protocols to open tunnels only with authorized parties.

21. **Why access virtual Private networks are used?**
A. They are used to allow access to public internet using a private access network
B. They are used to allow an existing cabling infrastructure to provide wide-band services

C. They are used to build a private infrastructure by using a public one
D. They are used to connect two sites of an organization by using a dedicated line

22. **The virtual private networks (VPN) are used for**

    A. Transporting private traffic over a shared infrastructure creating the same conditions that one would have by using a private infrastructure
    B. Dividing a local area network of a company in a set of different subnetworks for different business activities (sales, purchases, engineering, marketing)
    C. Partitioning a private network (for example the network of the main company with a number of secondary business units) in different network virtually divided

QoS

1. **The scheduling algorithms are used:**
   A. On access routers, to ensure that the traffic generated by a user complies with the traffic profile contracted with your service provider.
   B. In firewalls, to delay packets entering a corporate network from the Internet network with the aim of preventing certain types of security attacks

   C. In routers, to decide the order in which packets should be transmitted in waiting at an interface
   D. In routers, to properly schedule the list of configuration commands given by the user in order to minimize the disruption caused by the time needed for application of the changes
2. **How QoS is managed in SIP?**
   A. Is natively used managed by sip
   B. the RTCP protocol is used to obtain QoS
   C. It is optional

   D. Sip does not provide any mechanism for QS
3. **In the DiffServ architecture , the PHB allows to:**

   A. Treat the various classes of service differently.
   B. Monitor the maximum traversal time of a single router for each flow through it
   C. Provide the end-to-end guarantee of the QoS required by each stream.
   D. Ensuring the QoS required by each stream passing through a router.

4. **What is a feature of the DiffServ (Differentiated Services) architecture?**
   A. Sophisticated signaling protocols for resource reservation.

   B. Possibility to provide guaranteed QoS for packet flow explicitly requesting it.
   C. A mechanism to provide different type of treatment to packets belonging to different service classes.
   D. Sophisticated signaling protocols to make sure that each flow will receive a guaranteed QoS.

5. **DiffServ differs from IntServ because:**
   A. DiffServ tends to provide a guarantee on QoS which IntServ does not give.
   B. DiffServ introduces new protocols to allow the reservation of resources for the purpose of get a QoS date.
   C. IntServ tends to provide a guarantee on QoS which DiffServ does not give.

   D. DiffServ tends to guarantee a maximum traversal time, while IntServ tends to provide a guaranteed minimum bandwidth

6. **Where queue scheduling policies are used?**
   A. In access routers to make sure that the traffic profile generated by a user is conforming with the agreed with the service provider.
   B. In firewall, to delay packets entering the enterprise network from internet in order to prevent some kinds of attacks

   C. In a router to decide the order of transmission of the packets waiting at each interfaces

   D. In a router to schedule the list of the configuration commands issued by the user in order to minimize the impact on normal operations caused by the applications of configurations changes.

7. **Where scheduling algorithms are used?**
   A. They are used in access routers to check that the traffic generated by the users is according what they negotiated with the provider.
   B. They are used in firewalls to delay packets entering to an enterprise network in order to lessen risk of denial of services attacks.

C. They are used in routers to decide the order of transmission of the pending packets
D. They are used in routers to sequence correctly the configuration commands.

8. **What is the use of policing mechanisms?**
   A. They are used by the user to agree with the supplier on the level of QoS to be obtained.

   B. They are used by the service provider to verify that the traffic entered by the customer is in accordance with the agreements made.
   C. They are used by the user to verify that the traffic arriving from the provider complies with the agreements made.
   D. They are used in the various routers to guarantee a maximum crossing time for each of them

9. **The algorithm RED (Random Early Deletion)**
   A. Manages the internal queues of routers by transmitting packets from the various queues in rotation.
   B. Allows the inbound marking of traffics belonging to different classes.

   C. Manages the internal queues of routers, starting to discard packets with probability growing when the tail reaches a minimum length
   D. Allows control of the maximum burst size.

IPv6

1. **The IPv6 addressing scheme:**
   A. It only provides for addresses uniquely assigned by a responsible body.
   B. Provides for each entity (eg company) to be globally assigned a set of addresses, which become his property for an unlimited time.

   C. Provides that the first 64 bits of an address are normally identified as the prefix network, at least on the LANs.
   D. It does not foresee the existence of multicast addresses.

2. **Stateless autoconfiguration in IPv6 requires:**
   A. A server DHCPv6 (Dinamic Host Configuration Protocol version 6).
   B. A server present on the local network.

C. A server on the corporate network (intranet).

D. It is possible even if there is no server or router present

3. **A difference of version 4 IP, version 6:**
   A. It does not have an associated ICMP version
   B. It does not allow you to discover the MAC address of another station, knowing its address ROPE

   C. It has no broadcast addresses
   D. It has no time-to-live (TTL) field equivalent
4. **In IPV6 protocol, IP packet header**
   A. Is always authenticated through the utilization of proper encryption algorithms in order to increase the security of transmissions
   B. Has a small size with respect to IPV4, in order to increase the bandwidth efficiency by reducing protocols overhead

   C. Includes only fixed size fields that carry the required information in each packet
   D. Includes some fields available in IPV4 only as options to offer features that turn to be largely used along the time
5. **What are the differences between the transmission types in IPV4 and IPV6**
   A. No difference

   B. IPV4 does not include anycast (included in IPV6) and it does include broadcast (not included in IPV6)
   C. IPV4 does not include multicast included in IPV6
   D. IPV4 does not include anycast and multicast both included in IPv6
6. **Does exist a version of DHCP for IPV6?**
   A. It does not exist because stateless auto configuration alone solves the same problem.
   B. It does not exist because stateless auto configuration and router advertisement solve the same problem

   C. It exists a DHCP IPV6
   D. It Does not exist because it is more secure it the host is configured manually

7. **Is fragmentation allowed in IPV6?**

   A. Datagrams may only be fragmented by the sender and re-assembled at the final destination
   B. The mechanism is similar to the one included in IPv4
   C. It is not possible to fragment datagrams, both for routers and for the sender
   D. Fragmentation is allowed only in routers whenever necessary.

8. **A difference of version 4 IP, version 6:**

   A. It has no variable-length header
   B. It does not allow you to discover the MAC address of another station, knowing its IP address
   C. It has no time-to-live (TTL) equivalent
   D. Disallows the use of IPsec

9. **In IPv6 what disappears from the headers , compared to IPv4?**
   A. The life time of the package
   B. The sender and recipient addresses
   C. The indication of which heading is next

   D. The checksum of the header

10. **The link-local addresses**
    A. They are valid within an organization that can use them to assign addresses to machines in the various subnets of your intranet (they are the counterparts of the private addresses of IPv4).
    B. They cannot be assigned to routers.

    C. They are usually built automatically by the station starting from the MAC address of your card, which is prefixed with a predefined prefix.
    D. They are used to identify machines that perform a certain service (for example server DNS)

11. **What is the role of link-local IPV6 address**

    A. It can be used to enable the communication between hosts in the same subnetwork when other type of IPV6 addresses are not available
    B. It is used to physically connect 2 host over a local link

C. It is the only address that can be used to communicate over a LAN
D. It is the only address to communicate to routers

12. **A link-local address:**

    A . It can be used to allow communication between stations on local links (e.g. a LAN) in the absence of other IPv6 addresses.
    B . It is used to physically connect two stations on a local link.
    C . It is the address used by stations on a LAN to exchange data.
    D . It is used in all communications between local stations.

13. **What is the function of the "scope" associated with IPv6 addresses?**

    A. Serves to resolve, in particular cases, the ambiguity regarding the sender.
    B. There is no scope associated with IPv6 addresses.
    C. Used to use global addresses.
    D. It is needed in order to use anycast addresses.

14. **What is a feature of the IPv6 addressing scheme?**
    A. The whole address is assigned by a single authority.

    B. Addresses are distributed in order to make it easy to aggregate them in the backbone router forwarding tables.
    C. Multicast addresses are not used.
    D. Variable length addresses are used.

15. **In the IPv6 protocol :**
    A. Routing protocols (eg packet format) do not change with respect to IPv4
    B. The ARP protocol is incorporated into ICMPv6, but maintains exactly the scheme of previous operation (broadcast request, unicast reply)

    C. There is the possibility for a station on a network segment to configure itself by listening to Router Advertisement messages
    Q. Like IPv4, IPv6 has no router reconfiguration mechanisms

16. **The autoconfiguration stateless IPv6 presents problems of confidentiality?**
    A. There are no particular problems
    B. Does not allow encryption of the load

C. It is possible to find the same interface, if you connect to the internet from various providers

D. Disallows the use of security headers (IPsec type)

17. **What is the feature of IPV6 address?**
A. They allow communication between host with IPV4 and IPV6 addresses without additional mechanism

B. They keep the same flexible division between subnet and host fields

C. They rigidly organized in network, subnetwork and host fields

D. They include a unique broadcast address

18. **Which mechanism is used to forward IPV6 packets over the LAN?**
A. A neighbor discovery mechanism is not used because there is an algorithm to map any possible address onto a MAC address

B. The neighbor discovery is not used for IPv6 multicast and broadcast packets because
an algorithm exists to map those IPV6 address onto MAC address

C. The neighbor discovery mechanism is used for all the possible types of IPV6 address.

D. The neighbor discovery mechanism is not used for IPV6 multicast packets because
an algorithm exist to map those IPV6 address onto MAC address

19. **What is a feature of stateless auto-configuration in IPv6?**
A. It is based on DHCPv6 (Dynamic Host Configuration Protocol version 6)

B. It uses a standard prefix followed by an host number 64 bit long, derived from the MAC address

C. It is mandatory to have a router in the sub-network to get the network prefix (the most significant 64 bits) with a message of router solicitation

D. It is mandatory to have a router in the sub-network to get the network prefix (the most significant 64 bits) with a message of router advertisement

20. **An IPv6 host on reboot will acquire the following address:**
A. It is not possible to know precisely the address itself, since the IPv6 address it is regenerated each time with a random number as regards the reserved part all Interface ID.

B . A FE80 :: / 32 address

C . As for the link-local address, it will assume the same IPv6 address as owned before the reboot
D . The address depends entirely on the configuration it will acquire from its default router.

VOIP

1. **What ENUM standard is used for?**
   A. It is used to call a sip user from a telephone set connected to the public telephone
   number

   B. It is used to call a telephone in the public switched telephone network from a computer,
   using SIP

   C. It is used to transmit the voice streams of a sip calls
   D. It is used to implement e-presence in SIP
2. **The RTP protocol is capable of:**
   A. Limit the variations in delay (jitter) experienced by packets in routers.
   B. Let routers know the traffic profile generated by a station.
   C. Reserve compute resources on servers that share their processors.

   D. Encapsulate the audio / video data with headers containing information about them
   coding
3. **The RTP protocol is able to:**
   A. Limit the variations in delay (jitter) experienced by packets in routers.
   B. Gather information on how the transmission is progressing.
   C. Reserve resources in the network to obtain some QoS.

   D. Encapsulate audio video data with headers containing encoding information
4. **What is one of the possible uses of RTP (Real-time Transport Protocol)?**

A. To carry a timestamp related to the block of samples transmitted in a packet
B. To implement real-time application for industrial plant control.
C. It can be used in multimedia applications to limit the packet transit time across the network
D. It is possible to distinguish different streams (e.g. audio + video) addressed to the same host,
by means of the field PT (Payload Type).

5. **In the RTP protocol , when is it possible to change the encoding of the data carried by a stream?**
   A. Once the audio / video stream transmission has started, it is no longer possible to change the
   coding
   B. It is possible to change the encoding when an appropriate signaling of is made
   control using RTCP.

   C. It is possible to change the encoding for each packet sent.
   D. It is possible to change the encoding, only if you are using an RTP mixer.
6. **What is possible to do with the RTCP protocol?**
   A. It is possible to limit the jitter.
   B. It is possible to communicate to other routers the profile of the traffic generated by a
   transmitter.
   C. It is possible to reserve resources to obtain guaranteed QoS.

   D. It is possible to monitor the number of losses of a specific flow of packets.
7. **Which of the following statement applies to sip trapezoid?**
   A. It is mainly used to sends SUBSCRIBE-NOTIFY (e-presence) message
   B. It is an obsolete mechanism of SIP, since manly current SIP implementations use a more efficient mechanism
   C. It is the standard mechanism to send REGISTER Messages

   D. It is a standard mechanism to setup a call.
8. **The functions of a voice gateway (or VoIP gateway) include:**
   A. Forward IP packets between a public IP network and an IP corporate

network (intranet).

B. Translate voice streams generated over a packet network (such as via SIP or H.323) into
telephone calls on a traditional telephone network (plain old telephone system - POTS).

C. Encrypt a voice signal from a traditional telephone network first forwarding over the Internet - notoriously insecure - so that this signal does not
can be understood if intercepted.
D. Translate the SS # 7 telephone reporting into SIP reporting

9. **IP Telephone provides:**

A. The use of voice gateways to allow communication with users connected to networks traditional(POTS)
B. Upgrading the IP network cabling to connect each telephone user via optical fiber
C. To equip each user's computer with voice over IP with telephony software for
communicate with other IP telephony users, and a traditional telephone to communicate
with traditional telephone users.
D. The installation of a network in IP technology parallel to the data one, dedicated to the transport of
voice

10. **The SIP messages are characterized by:**
A. Don't have a payload, there are just commands / responses and headers.

B. Have, in some cases, a payload consisting of session description protocol).

C. Have a checksum code that allows error detection.
D. Have base 2 numerical coding.

11. **The main reason why a "telephone" operator like Skype is able to provide a**
telephone service at very low prices:

A. It is due to the fact that the phone calls travel on the IP network (for example ADSL), the costs of which
they are already paid by the user when he enters into a “flat” contract and therefore the packages
vowels travel virtually “free” for most of their journey
B. It is due to the fact that it has made interconnection agreements with the Telecom Providers that
they pay Skype a fee based on the percentage of traffic generated
C. It is mainly due to the advertising that is offered with the service.

12. **What is a feature of the Session Initialization Protocol (SIP)?**
A. It is necessary that the media stream is established with the help of server called Media
relay.
B. It is not scalable, because it does not specify how to find users in different domain than the
caller.
C. It is necessary that User Agent is always associated to the same IP address

D. It is possible to use a server to register a User Agent, so that the server know the mapping
between the username and its current IP address.

13. **Having to carry VoIP traffic with "toll-quality" guarantees:**

A. You need to create your own IP network and give priority to voice traffic. Furthermore, it is necessary to ensure that the percentage of voice traffic does not exceed a certain threshold
B. It is possible to use the Internet, Skype proves that this approach works definitely good.
C. You need to create your own IP network and give priority to voice traffic.
D. It is necessary to create a dedicated IP network, in which there is no data traffic.

14. **Using the coin-operated bucket (or laundry bucket) algorithm of capacity B token e**
filling speed r token / s can be controlled:

A. That the crossing time does not exceed rB seconds.

B. The number of packets per second entered does not exceed r , and the maximum burst does not exceed B.

C. The number of packets per second entered does not exceed B , and the maximum burst does not exceed r .

D. The jitter does not exceed B / r .

15. **In the coin-operated bucket mechanism you can check:**
    A. The maximum traversal time of a router.
    B. Internal queue management with WFQ.
    C. The minimum speed of data entry.

    D. The maximum burst size and average data entry rate.

16. **If we apply to a flow of packets the token bucket (or leaky bucket) algorithm with capacity K and inserting token every 1/W sec, what is the final effect?**
    A. The maximum burst size allowed is W.
    B. All the packets of this flow will be routed on the same path (i.e. out of order arrival is
    eliminated).
    C. It will be possible to implement traffic engineering mechanisms to this flow of packets.

    D. The maximum burst size allowed is K

17. **In the coin bucket algorithm:**
    A. Bucket capacity is related to long-term average speed.

    B. The capacity of the bucket is related to the maximum burst size.
    C. The capacity of the bucket has a direct relationship with the band
    D. Serve per implementare il weighted fair queuing.

18. **When it is necessary to design a new network for integrated data and voice traffic, which is the highest priority requirement to fulfill?**
    A. Mechanism to achieve deterministic characteristics for the voice calls
    B. Mechanisms to reduce jitter as much as possible.
    C. Mechanisms to obtain transit time for the voice packets as short as possible

D. Routing protocols to find alternative paths in order to avoid call interruption, in case of
failure

19. **What is a feature of the SIP protocol?**
A. It is only implemented in “soft phones”, that is software packages that are used for PC to PC calls.
B. It is based on ASN.1, it is extremely complex and it is used for implementing signaling
operations in IP networks.

C. Often, It requires a server for each SIP domain.
D. It is used to implement the transmission of voice streams over an IP network.

20. **Is user mobility covered in the SIP protocol?**
A. It is not treated
B. Yes, no mobility restrictions are imposed on the user.
C. Yes, as long as the user always reconnects with an internal IP address provider.

D. Yes, as long as the user does not change their IP address during a SIP session.

21. **In a SIP-based VoIP system , what can happen if I make a call to a recipient not connected to the Internet?**

A. You can ask to be notified when the desired user returns to being known to
system

B. You can only come back and try later.
C. You can be notified of the appearance of the desired user, only if both are in the
same SIP domain (we have the same operator).
D. You can be notified of the appearance of the desired user, only if he reconnects from
one of the IP addresses known to the SIP domain.

22. **The SIP user is characterized by the fact that**
A. It has a specific public IP to which it needs to be connected.

B. Has a domain to which it belongs
C. It has an IP which can vary, but which cannot be private.
D. It is always connected to the Internet.

23. **What is the reason of diffusion of VoIP among domestic users?**

A. The reduced cost associated to the possibility of VoIP technologies to compress voice
channels, which require much less bandwidth the analog telephony, with a big reduction of
bandwidth used in the backbone.

B. The reduced costs caused by higher costs in maintaining an high quality channel (the twisted
pair) that is more expensive that physical lines used for data transmission.
C. Costs are often comparable with traditional telephony, but it is not necessary to pay an extra
fee for each phone call, in addition to the flat rate tariff of the ADSL line.
D. Quality of the calls are higher in VoIP, because the providers adopt suitable QoS mechanisms
to offer high standards of quality for the phone calls.

24. **Which of the following mechanisms apply to SIP?**

A. A voice gateway may be used to allow the communication between two IP phones
connection to different physical networks

B. It is necessary to update the access network to fiber connection
C. Signaling protocols are used to setup a call and to negotiate its parameters
D. It’s necessary to provide each user with a computer for sip cells and is normal phone
set for calls from/to public switched network

25. **Which of the following statement applies to sip protocol?**

A. It is based on a distributed architecture where each domain should have a server to
manage the domestic users

B. It is based on a centralized architecture with only one server to manage communications
C. It is based on a hierarchical organization where each level manages a particular area
of the network
D. It is bases on a peer to peer architecture to enable a dynamic behavior for the users

26. **Why the combination of a token bucket (or a leaky bucket) and weighted fair queuing**
(WFQ) is used?

A. It is used to have a maximum guarantee transversal time for a single router
B. It is used to have a maximum guarantee transversal time for a NAT
C. It is used to have a maximum guarantee transversal time for a flow of packets

D. It is used to obtain a guarantee jitter for packets

27. **The combination of token bucket (or laundry bucket) and Weighted Fair mechanisms**
Queueing (WFQ) serve a garantire:

A. A maximum traversal time of a router.
B. A maximum traversal time of a NAT.
C. A maximum bandwidth for each packet stream.
D. A maximum burst of consecutive packets, for each stream.

28. **What is the role of NAPTR record in sip?**
A. They are used which server are available in a domain with their relative priorities.

B. They are used which services are available in a domain with their relative priorities

C. They are used to verify the identity of the users during the registration phase.
D. They are used to possible change the voice encoding when two UAs do not have the
same codec.

29. **The SIP Protocol:**

A. It is based on a distributed architecture, in which each domain must have a server that is
responsible for its users

B. It is based on a strictly centralized architecture, with a single server to manage the
communications
C. It is based on a hierarchical architecture in which each level of the hierarchy is responsible for one
particular area of the network
D. It is based on a peer-to-peer architecture to facilitate user dynamism

30. **What is the role of Session Description Protocol?**

A. It is used to negotiate the parameters to setup a call
B. It is used to select the use of sip or H.323 for the session being open
C. It is used to Exchange authentication information at the beginning of a session
D. It is used to select if a record routing should be selected or not, for the current SIP
Session

31. **If you are using the SIP protocol, what types of information can be stored in the
DNS?**

A. No information other than the usual DNS RR records.
B. Translation for all user names into IP addresses.

C. New record types describing the SIP services available in a domain and related
server.

D. Information on the telephone numbers to use to call SIP users.

32. **Which function is performed by a voice gateway (or VoIP gateway)?**
A. It forwards packets between the public internet and a corporate network.

B. It translates packets carrying voice samples into signals understandable in a plain old
telephone system (POTS)

C. It encrypts voice signals arriving from a classical telephone network, before they are
forwarded to internet, so that the signal cannot be understood by an eavesdropper.
D. It translates SS #7 signaling into SIP signaling messages

33. **Which of the following features are part of a voice gateway (or VoIP) Gateway?**
A. It forwards packets from a public IP network to a private one

B. It translates voice streams generated over a packet network (e.g. using SIP or H232) into
telephone calls over a traditional telephone network

C. It encrypts a voice signal arriving from a traditional telephone network before forwarding
it over to the internet.
D. It synchronizes different RTP stream (lip synch)

34. **What is the SDP role in SIP telephony?**

A. It is used to carry the description of the main parameters of the conversation that
is about to start.

B. It is used to reserve the required resources to obtain the quality of services
needed to call
C. It is used to locate the IP address of the called user
D. It is used to encapsulate the audio/video sample during the phone call

35. **What is the role of the NAPTR records in SIP?**

A. They are used to discover the names of the sip servers of a given domain

B. They are used to discover the SIP services available in a given domain

C. They are used to translate the name into the IP addresses of the SIP server.

D. They include the IP address of the called SIP user

36. **What is the role played by RTCP?**

A. It provides control mechanism for RTP

B. It may be used to reserve the resources required to obtain a certain quality of services

C. It may be used to change the payload type of an RTP stream without restarting it

D. It may be used to distinguish between two streams (e.g. audio and video) with the same
destination.

37. **What is the role of Enum standard?**

A. To Locate the sip server in all the inter domains calls

B. To translate a phone number into a Sip user name

C. To translate Sip user name into phone number

D. To register the users with the SIP servers

38. **The codec specifically engineered for voice encoding:**

A. They tend to create large packets to maximize network efficiency.

B. They tend to create small packets to minimize end-to-end delay.

C. Always add redundancy bits to reduce damage in case of loss of packages

D. I am also able to operate with different VoIP sources (for example modem or FAX).

MPLS

1. **LSPs (label switched paths) in the MPLS (multi-protocol label switching) architecture**
   A. They represent alternate routes maintained in a router's table for forwarding
   packets to a destination.
   B. They are exchanged by routers to build a network map.
   C. They are the shortest path to a destination.

   D. They are created (set up) for the transport of packages belonging to a class of
   forwarding equivalence class (FEC).

2. **The multi-protocol label switching (MPLS) architecture is characterized by**
   A. A particularly advanced support to provide guaranteed quality services
   B. A different mechanism (compared to pure IP) to decide the outbound interface to which
   a package needs to be forwarded.

   C. Routing protocols that are particularly quick to update routing tables later to topological changes in order to recover faults quickly.

   D. Intelligent network terminals capable of personalizing the services received from the network

3. **Which operations can be performed on a label by a single MPLS router?**
   A. Add a label in any position (PUSH), drop one label in any position (POP), change the value of a label in any position (SWAP).

   B. Add an external label (PUSH), drop the external label (POP), change the content of the external (SWAP
   C. Add a label if the router is the ingress one (only 1 label is allowed) (PUSH), drop the only label if the router is the egress one (POP), e change the content of the only label present (SWAP).
   D. Labels cannot be manipulated by MPLS routers.

4. **The importance of MPLS (multiprotocol label switching) today’s networks derives**

from one of the following features.

A. It is possible to transport efficiently IP packet over ATM networks
B. It is possible to have a high speed connections between servers and their disk units
C. It is possible to implement efficient and effective traffic engineering operations
D. It is possible to implement devices that do not need complex configuration operation

5. **How can MPLS be used to build a VPN?**
   A. To make an access VPN.
   B. MPLS cannot be used to build VPNs.
   C. Can provide all routing mechanism in overlay or link networks point-to-point in peer networks.

   D. Can provide point-to-point links in overlay networks or the whole mechanism routing in peer networks .

6. **Why MPLS is important?**
   A. In such networks, it is possible to implement routers with a specific support to guarantee the required quality of services.

   B. It is possible to have a single control plane for different switching technologies
   C. It is possible to implement devices that should not be configured
   D. It is possible to distribute the traffic among several equivalent servers

7. **MPLS (Multiprotocol Label Switching) architecture is characterized by**
   A. End System that are able to negotiate with the network the label of packets generated
   B. Intelligent terminals that can personalize service received from the network
   C. Routing protocols that are extremely fast in updating routing tables when a topology changes occur in order to ensure fast fault recovery.

   D. A different mechanism (with respect to pure IP) for selecting the output interface toward which packet should be forwarded.

VAN

1. **In a frame relay network the minimum transmission unit is:**
   A. The 53-byte cell.

   B. The level 2 transmitting unit.
   C. The virtual circuit.
   D. The IP packet.

2. **ATM networks are often used for:**
   A. Interconnect several LAN sections within the same campus.
   B. Create VLANs.

   C. Interconnect the terminations of the ADSL channels with the service provider's networkchosen by the user
   D. Building VoIP systems.

3. **The transport of IP packets over ATM networks**

   A. It is currently used, although in danger of "extinction", on the ridges geographical areas of the operators.

   B. It's not possible
   C. It is essential for real-time traffic transport (for example video) water IP
   D. It is considered an optimal solution whose use is growing rapidly.

4. **What is a feature of ATM networks?**
   A. They do not allow fragmentation of long packets
   B. They provide a datagram based packet forwarding.
   C. They allow a unified control plane with IP networks.

   D. They use a fixed size cell, as unit of transmission.

5. **Where ATM networks are still used today?**
   A. In some LANS
   B. In some connections between homes and the closest DSLAMs

   C. In private networks
   D. In some networks connecting DSLAMs with ISP networks (POP)

6. **How popular is the transport of IP over ATM networks?**

   A. It is possible and currently used, but this technique is going to disappear
   B. It is not possible
   C. It is only available solution for real time traffic (e.g. video = over IP)
   D. It is considered a good solution and it will become more popular

7. **Transmission in SONET / SDH is characterized by:**
   A. Flexibility in the use of the band
   B. Mechanisms for congestion control.
   C. Equal time on all channel types for the transmission of a single byte, whatever the
   link speed.

   D. Frames whose duration is always 125 microseconds, whatever the speed of the connections

8. **What is one of the problems with SONET/SDH networks?**

   A. Bandwidth management is rigid
   B. They are not suitable for an implementation based on optical fibers.
   C. They are not suitable to implement ATM or frame Relay networks.
   D. They cannot achieve high transmission speed.

9. **One of the main features of the SONET / SDH lines is that:**
   A. The allocation of the transmission slots takes place according to the needs of the moment
   various stations.

   B. The various transmission frequencies are multiple of each other
   C. The transmission takes place after the execution of a channel contention mechanism
   determines who has the right to broadcast.
   D. The transmission takes place in wavelength division

10. **To ensure quality of service in packet-switched networks**

    A. Network nodes must have appropriate mechanisms in place that regulate packet service
    (for example scheduling algorithms)

B. Applications must be able to encode the information to be transferred according to
levels (layers) of different importance
C. Packets must be transported over a cell-switched infrastructure (eg ATM)

11. **In a Frame Relay network, what is the Committed Information Rate?**

A. The maximum number of bits that can be sent to the network, in a specified time interval
B. The minimum bandwidth guaranteed.
G. The maximum length of a packet that can enter the network.
H. The maximum transit time.

Previous Exams

Exam February 24, 2020

1. **Two hosts A and B belong to the same physical network and have IP addresses**
   130.192.1.1/25 and 130.192.1.129/24, respectively.

   A. A directly communicates with B and vice versa
   B. A directly communicates with B but not vice versa

   C. A can communicate with B only by means of a router
   D. A cannot communicate with B

2. **Two IP networks 130.192.0.0/24 and 130.192.2.0/24 can be aggregated in:**
   A. 130.192.0.0/23
   B. 130.192.2.0/23
   C. They cannot be aggregated

   D. 130.192.0.0/22

3. **The IGMP protocol**

   A. Allows an IPv4 router to discover which multicast groups are present in a directly
   connected network

   B. Allows an IPv4 host to create a new multicast group
   C. Allows an IPv4 router to discover which multicast groups are active in the Internet
   network at a given instant of time
   D. Is a new version of the ICMP protocol

4. **In an IPv4 network**
   A. A host is reached by a multicast packet related to a specific group only if it joined that
   group, whichever is the layer 2 technology adopted in the network

B. A host can be reached by a multicast packet related to a specific group even if it did
not join that group before

C. A host always deliveries to the application layer all the multicast packets received
D. A host cannot understand a multicast IPv4 packet

5. **The Neighbor Discovery procedure in IPv6**

A. Is based on a multicast ICMPv6 packet
B. Is based on a broadcast ICMPv6 packet
C. Is based on ARPv6
D. Needs the network to support IPv4

6. **The ICMPv6 Router Advertisement packet**

A. Enables device autoconfiguration without a DHCP protocol intervention
B. Is sent as a reply to an ICMPv6 Neighbor Solicitation packet
C. Is sent periodically by a router to all the other routers of the Internet network
D. Is a broadcast packet

7. **IPv6 Private addresses**

A. Are defined in such a way that they are globally unique with high probability, but they
cannot anyway be used on a global level

B. Are used only for on-link communications
C. Are used only on routers
D. Are used to interconnect private networks through a public network

8. **IPv6 Site Local addresses**
A. Are automatically setup by IPv6 devices for on-link communications
B. Are assigned by a central authority that guarantees their global uniqueness
C. Do not exist

D. Are deprecated but they can be used in IPv6 networks

9. **The IPv6 address FE80::0201:06FF:FEA5:3A4C is:**

   A. An address that can be used on a host with MAC address 00:01:06:A5:3A:4C for communicating with another host on the same link

   B. An address that can be used on a server with MAC address 00:01:06:A5:3A:4C to offer a service on the public IPv6 Internet

   C. An address that can be used by more than one device on the same link

   D. An address currently not available in IPv6

10. **Which of these techniques is not a solution for the IPv4-IPv6 transition?**

    A. 6over4

    B. 6to4

    C. 6mix4

    D. Teredo

11. **In the DS-Lite solution for the IPv4-IPv6 transition**

    A. The NAT feature is implemented for all users on proper ISP devices

    B. The NAT feature is implemented on the user CPE

    C. The NAT feature is implemented on both the CPE and the ISP devices

    D. The NAT feature is not available

12. **The entries of the filtering database of an Ethernet switch**

    A. Have all an infinite lifetime

    B. Have a lifetime, which generally can be set by the switch administrator

    C. Have a lifetime, which is always less than 1 second in order to properly manage device mobility

    D. Have a lifetime, which varies over time, depending on the number of received frames

13. **A consequence of the deployment of VLANs in a local area network is:**

    A. The creation on virtual interfaces on switches, which, since virtual, cannot have failures

B. The broadcast traffic is bounded to the VLAN where it has been generated
C. The network security increases as frames are encrypted
D. Users must be authenticated before connecting to the VLAN

14. **Two hosts connected to an Ethernet switch**
A. Can communicate only if they belong to the same VLAN, for any network configuration

B. Can communicate even if they belong to different VLANs, it depends on the network
configuration

C. Must be able to communicate without an intermediate router, always
D. Cannot communicate through an intermediate router since they are connected to the
same switch

15. **Two hosts connected to a Switched Ethernet network through ports configured in Access**
mode

A. Can communicate only if they belong to the same VLAN
B. Cannot communicate
C. If they belong to different VLANs, they can communicate only if they are connected
to different switches and the link between the switches is configured in Trunk mode

D. If they belong to different VLANs, it is possible that they can communicate even if
they are connected to different switches and ports on switches are configured in
Access mode

16. **The metric (cost) used by a routing algorithm**

A. Expresses the weight assigned to a link (channel) in the path selection
B. Expresses the probability to use the shortest path

C. Expresses the complexity of the algorithm in performing the path computation

17. **BGP is used in the Internet for**

    A. The exchange of routing information between routers belonging to different
    autonomous systems

    B. Communicating to neighboring routers the state of the links of a router
    C. Discovering neighboring (bordering) routers on a local are network
    D. Find out the geographic position of a host based on its IP address

18. **The difference between link state and distance vector routing algorithms can be**
    summarized as follows:

    A. Link state algorithms send global information to all nodes in the network; distance
    vector algorithms send local information only to neighboring nodes
    B. Link state algorithms send local information only to neighboring nodes; distance
    vector algorithms send global information to all nodes in the network

    C. Link state algorithms send local information to all nodes in the network; distance
    vector algorithms send global information only to neighboring nodes

19. **RIP is characterized by**
    A. The usage of a link state routing algorithm
    B. The suitability to both interdomain and intradomain routing
    C. The possibility to operate on large networks thank to its capability to function in a
    hierarchical way

    D. Frequent instability and inclination to create circular forwarding paths (i.e., routing
    loops)

20. **The IS-IS protocol**
    A. Is an obsolete routing protocol no longer used due to its low

performance

B. It is a protocol based on the link state routing algorithm widely used in large networks
C. It is a protocol used by Ethernet switches to create a routing tree in the network
(spanning tree) removing closed paths (i.e., loops)
D. It is a protocol derived as an evolution of BGP for the exchange of information
between routers belonging to different autonomous systems

21. **RSVP (Resource reSerVation Protocol) allows:**
A. To limit the delay variation (jitter) experienced by packets in routers

B. Routers to know the requirements of an application in terms of quality of service
C. Servers to reserve computing resources in their shared processors
D. To monitor delay and loss experienced in the network by packets of multimedia
applications

22. **In DiffServ, a "class of service" identifies:**
A. A set of packets that belong to the same VoIP session

B. A set of packets that are handled the same way by routers (for example, all VoIP
traffic)

C. A working mode of border routers that have to classify and mark incoming packets

23. **The importance of MPLS (multi-protocol label switching) in today's and future computer**
networks stems from the possibility to

A. Realize switches with specific support to guarantee quality of service

B. Have a single control plan for different switching technologies
C. Realize devices that can operate without needing to be configured
D. Balance traffic across a server farm

24. **One of the protocols used in MPLS for label distribution is:**
A. OSPF
B. IS-IS
C. L2TP

D. BGP

25. **In the MPLS (multi-protocol label switching) architecture, LSPs (label switched paths)**
A. Represent alternative paths for forwarding packets towards a given destination kept
by a router in its routing table
B. Are exchanged by routers to create a map of the network
C. Consist in the shortest path towards a given destination

D. Are set up by network nodes that agree on the labels to be used for packets
belonging to a specific forwarding equivalence class (FEC)

26. **The operations that an MPLS router can perform on labels are:**
A. Add a label in any position of the MPLS header (PUSH), remove a label from any
position in the MPLS header (POP), change the content of any label (SWAP)

B. Add a label in most external position of the MPLS header (PUSH), remove a label
from most external position in the MPLS header (POP), change the content of the
external label (SWAP)

C. Add a label only if there are no others in the MPLS header (only one label is allowed)
(PUSH), remove the only allowed label from the MPLS header (POP) upon the
packet exiting the MPLS network, change the content of the label (SWAP)
D. Labels cannot be changed by routers

27. **Optical networks are specifically and uniquely characterized by devices capable of:**
A. Transmitting optical signals on optical fiber links

B. Switching an optical channel from an input port to an output port
C. Routing packets by processing their header with optical circuits (rather than
electronic ones)
D. Transporting large amounts of data thanks to their capability of switching traffic
according to information contained in a label, carried by a special packet header

28. **VPNs (virtual private networks) are used to**

A. Transport private traffic through a shared infrastructure while creating the same
conditions the traffic would undergo through a private infrastructure

B. Divide a corporate local area network in a set of separate subnets, each for a
different corporate function (e.g., sales, procurement, engineering, marketing)
C. Partition a private network (for example the one of a parent company with various
subsidiaries) in multiple networks virtually separated

29. **The Layer 3 VPN (virtual private network) solutions based on MPLS are characterized by**
A. Particularly high security thanks to the deployment of cryptographic techniques

B. A good level of automation and integration between the public backbone and private
networks

C. Layer 3 tunneling mechanisms, namely within IP packets

30. **The IPsec "Tunnel Mode" encompasses the encryption of**
A. Only the payload of the internal packet

B. The IP header, TCP/UDP header, and payload of the internal packet
C. Only the TCP/UDP header and payload

D. The whole external packet, header included

Exam Februrary 13, 2021

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
    B) The low inclination of network operators to modify the configuration of their own networks

    C) The possible inefficiency of the private IPv4 addressing
    D) 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

Exam September 9, 2024 - Answered with ChatGPT by considering 24/25 AY's slides

1. **When two nodes share the same Solicited Node Multicast Address**

   A) Both reply with the Neighbor Advertisement

   B) Only one node replies with the Neighbor Advertisement, but it could be the wrong one

   C) Only one node (the correct one) replies with the Neighbor Advertisement

   D) It is not a possible scenario in IPv6

2. **The shortcut IPv6 address 1070:5::1:2A4:E8:7782:BB59 corresponds to which of the following full-length addresses?**

   A) 1070:0005:0000:0001:2A40:E008:7782:BB59

   B) 1070:0005:0000:0001:02A4:00E8:7782:BB59

   C) 1070:5000:0000:1000:2A40:E800:7782:BB59

   D) 1070:5001:0000:0000:02A4:E008:7782:BB59

3. **The term "frequency reuse" in a cellular network refers to**

   A) The reuse of the same frequency when the terminal moves from a cell to another

   B) The reuse of the same frequency in cells that are sufficiently far from each other

   C) The reuse of the same frequency for different phone calls initiated by the same terminal

   D) The reuse of the same frequency in different cellular technology generations

4. **The IPv4-IPv6 transition**

   A) Will take place at a specific point in time, with the simultaneous switch-on of the new IPv6 devices

   B) Is important to ensure the scalability of the Internet, which is growing in size and requires more IP addresses

   C) Finished in 2011, with the assignment of the last /8 IPv4 block

   D) Has been stopped by the IETF because of security issues

5. **The MAC address of an ICMPv6 Neighbor Solicitation packet is**

A) A multicast address

B) An anycast address

C) A broadcast address

D) A unicast address, the one of the host to reach

6. **Indicate the true answer among the below statements about VPNs (Virtual Private Networks)**

   A) In a Customer-provisioned solution, all VPN functionalities are implemented in a customer's device

   B) In a Customer-provisioned solution, a VPN is SSL-based

   C) With the Overlay mode, the routing is always optimized

   D) In a Provider-provisioned solution, the packet authentication is mandatory

7. **The IPv6 addresses are**

   A) 32 bits long, with a network part followed by a host part

   B) 128 bits long, with a prefix followed by an interface ID, which might be derived by the MAC address

   C) 128 bits long, with an Interface ID followed by a suffix defined according to the position of the node in the ISP

   D) Of variable length, which depends on the size of the MAC address

8. **Modern Ethernet networks are**

   A) Usually based on hubs as interconnection devices, exclusively using, if necessary, multiple segmentation

   B) Usually based on switches as interconnection devices and if necessary only virtually segmented by means of VLANs

   C) Usually based on hubs as interconnection devices and, if necessary, only virtually segmented

   D) Usually based on switches as interconnection devices, exclusively using, if necessary, multiple physical segmentation

9. **Multicast communications in an IPv4 network**

   A) Are not possible without the deployment of additional protocols in the network

B) Are always possible, IGMP only makes them more efficient

C) Are possible only within a single LAN, even if additional protocols are used

D) Are possible at a global scale, it is only required to enable the IGMP protocol in the network

10. **Centralized routing**

    A) Mandates that network nodes do not exchange routing information

    B) Consists in one network node computing routes for other network nodes and providing the computed routes

    C) Is an obsolete solution that is never used in modern networks

    D) Mandates that traffic traverses a specific network node

11. **Given a network based on several physical networks interconnected by routers and a range of IP addresses, 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

    B) Assigning to the various physical networks distinct network IDs selected within the address range, proceeding in a decreasing order of network size

    C) Splitting the network in areas and defining, within the given address range, smaller distinct address ranges

12. **In the RTS-CTS exchange foreseen by the 802.11 protocol in infrastructure mode, the CTS frame is sent**

    A) By the terminal closest to the sender of the RTS frame

    B) By the access point

    C) By the hidden terminal

    D) By every terminal receiving the RTS frame

13. **The IPv6 address FF02:0:0:0:0:1:ff44:AA is a:**

    A) Embedded IPv4 address

    B) Link-local address

    C) Global Unicast address

    D) Solicited Node Multicast address

14. **An optical switch is a device capable of switching**

    A) An optical channel on a given wavelength from a given input fiber to a given output fiber

    B) Different optical channels on a given wavelength on different input fibers to a given wavelength on a given output fiber

    C) Packets arriving on a given optical channel from a given input fiber to different optical channels

    D) An optical channel on a given wavelength from a given input fiber to different wavelengths

15. **An IPv6 router that receives a datagram bigger than the MTU**

    A) Forwards it on its destination route with the “Packet Too Big” flag set

    B) Fragments it using the Fragment Extension Header of IPv6

    C) Discards it and returns a “Packet too Big” ICMP Error message

    D) Redirects it to a router with a suitable MTU using an ICMP Redirect message

16. **The paging procedure in a cellular network**

    A) Is based on a message broadcasted within the location area where the terminal is

    B) Is based on a message broadcasted in the entire cellular network

    C) Refers to the procedure used by terminals for updating their current location

    D) Refers to the procedure used by terminals for managing internal memory

17. **A 48-port Ethernet switch is used for interconnecting 47 hosts belonging to three different VLANs. 10 hosts belong to VLAN 3, 17 hosts belong to VLAN 4. All the 47 ports of the switch connected to the hosts are configured in Access mode.**

    A) It is not possible to enable the communication among all the hosts because, being them connected to three VLANs, more ports would be needed

    B) The 47 hosts can communicate without any further change to the network configuration

C) It is possible to enable the communication among all the hosts using the single port that is still available

D) It is not possible to enable the communication among all the hosts because at least two available ports would be needed

18. **Without considering possible options and extension headers, the IPv6 header, with respect to the IPv4 one,**

A) Has a lower length (measured in bytes) and this simplifies its processing

B) Has a lower number of fields and this simplifies its processing

C) Has a lower length (measured in bytes) but a larger number of fields, and this complicates its processing

D) Has a larger length (measured in bytes) and a larger number of fields, and this complicates its processing

19. **An 802.11 frame has four MAC addresses, of which:**

A) One is the MAC address of the Access Point

B) None is the MAC address of the Access Point

C) One is the MAC address of the switch attached to the Access Point

D) One is always a broadcast address

20. **The IPv6 private addresses**

A) Can be routed only in private networks, although each of them is worldwide unique with high probability

B) Cannot be routed, their validity is within the single link

C) Do not exist because the number of global unicast addresses is so high that private addressing does not make sense

D) Can be routed in the public internet, since each of them is worldwide unique with high probability

21. **In a cellular network operating according to the Frequency Division Multiple Access (FDMA) technology**

A) Voice calls are not possible. The network is used for data traffic

B) Only one frequency is adopted for the entire network

C) Available frequencies are divided among a group of neighboring cells and then reused sufficiently far away

D) Frequencies to use are randomly selected by mobile terminals

22. **Concerning the DiffServ (Differentiated Services) standard and practice of traffic engineering**

    A) They can be used in conjunction to perform per-class traffic engineering, which enables a more efficient utilization

    B) They are two different tools to do the same

    C) They both rely on information included in the IP header

    D) They are completely independent and unrelated solutions that are never used in conjunction

23. **The IPv6 Aggregatable Global Unicast addresses are**

    A) Globally unique, substantially equivalent to the IPv4 public addresses

    B) Usable in a global IPv6 network only with proper Network Address Translation (NAT) techniques

    C) Aggregable only in very small address ranges, in order to favor the precision of routing path evaluations

    D) Usable only on devices belonging to the same local area network

24. **In topology-based control-driven label binding**

    A) MPLS routers must deploy BGP

    B) Forwarding tables in MPLS routers are manually configured

    C) Traffic belonging to different applications executing on the same host is transported on different LSPs

    D) An LSP (Label Switched Path) is set up as a result of discovering a route to a destination

25. **Label distribution in MPLS (Multi-Protocol Label Switching)**

    A) Is not needed when network nodes deploy the BGP (Border Gateway Protocol) routing protocol

    B) Involves both network nodes and hosts

    C) Can be performed with the RSVP (Resource ReSerVation Protocol)

    D) Can be performed implicitly through the routing protocol OSPF (Open Shortest Path First)

26. **The IPv6 Extension Headers are**

A) Padding techniques adopted to make the IPv6 packet of fixed size equal to 40 bytes

B) Header chains that can be added to the main IPv6 header in order to offer additional features

C) 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 acknowledgments)

D) Padding techniques adopted to fix the size of the Layer 2 frame containing the IPv6 packet

27. **Indicate the false claim among the below statements about an Autonomous System**

A) It is a subnet configured by leveraging static routing

B) It is identified by means of a 2-byte long ID

C) It is a set of subnets with short topological proximity and managed by a single organization unit

D) Autonomous Systems use the Exterior Gateway Protocol to distribute information among them

28. **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 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 range of B

B) Is not sent

C) Arrives to A only if the network is based on a shared medium (e.g., an Ethernet hub)

D) Is sent to the MAC address of A

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

A) The separation between physical and logical channels

B) The use of a circuit-switching technique

C) The use of a switching technique based on virtual circuits

D) The use of IP tunnels connecting terminals with elements of the EPC

30. **A university has to design the IP networks for two teaching labs: Lab1 (120 hosts) and Lab2 (64 hosts). Which of the following solutions is WRONG?**

    A) Lab1: 192.168.0.0/25 - Lab2: 192.168.0.128/25

    B) Lab1: 192.168.0.0/24 - Lab2: 192.168.1.0/25

    C) Lab1: 192.168.0.0/25 - Lab2: 192.168.0.128/26

    D) Lab1: 192.168.0.0/24 - Lab2: 192.168.1.0/24

31. **Which of these procedures/messages cannot be used to configure the address prefix of an IPv6 host?**

    A) Interaction with a DHCPv6 server

    B) Manual configuration

    C) EUI-48 to EUI-64 mapping

    D) Exchange of Router Solicitation/Advertisement messages

32. **The smallest valid aggregation for the two IP networks 130.192.2.32/27 and 130.192.2.64/28 is**

    A) 130.192.2.32/26

    B) 130.192.2.0/24

    C) 130.192.2.0/25

    D) 0.0.0.0

33. **The context of VPNs (Virtual Private Networks) traffic encryption is**

    A) An essential component that is the basis of every VPN solution

    B) An important component of the VPN solution, but it is not strictly necessary and it is not supported in a few VPN solutions

    C) An important component of the VPN solution, but it is not strictly necessary and it is available, at least as a non-mandatory solution

    D) Not utilized in any VPN solution

Exam January 24, 2025 - Answered with ChatGPT by considering 24/25 AY's slides

1. **The term handover in cellular networks refers to:**

A) The movement of a mobile terminal from a cell to another without the interruption of an active communication (e.g., a call)

B) The movement of a mobile terminal from a cell to another, even if in that moment there are no active communications

C) The turn-on of the mobile terminal after a long period of inactivity

D) The use of a mobile terminal in the network of a different operator with respect to the one the SIM card installed in the terminal belongs to

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

   A) The use of switching technique based on virtual circuits

   B) The separation between physical and logical channels

   C) The use of a circuit switching technique

   D) The use of IP tunnels connecting terminals with elements of the EPC

3. **An optical switch is a device capable of switching:**

   A) Different optical channels on a given wavelength on different input fibers to a given wavelength on a given output fiber.

   B) Packets arriving on a given optical channel from a given input fiber to different optical channels to different output fibers based on information in the header of each packet.

   C) An optical channel on a given wavelength from a given input fiber to different wavelengths on different output fibers.

   D) An optical channel on a given wavelength from a given input fiber to a given output fiber.

4. **An IPSec-based VPN (Virtual Private Network)**

   A) The encryption is mandatory

   B) Is based on a specific cryptographic algorithm defined by the IPsec standard itself.

   C) Deploys tunneling to allow encryption and/or authentication of IP packets exchanged.

   D) Requires that all communicating hosts support the IPsec protocol.

5. **The shortcut IPv6 address 1070:5::1:2A4:E8:7782:BB59 corresponds to which of the following full-length addresses?**

A) 1070:5001:0000:0000:02A4:E008:7782:BB59

B) 1070:0005:0000:0001:2A40:E008:7782:BB59

C) 1070:5000:0000:1000:2A40:E800:7782:BB59

D) 1070:0005:0000:0001:02A4:00E8:7782:BB59

6. **A packet with destination IP address 180.3.13.223 will have a longest match in which of the following lines belonging to a routing table?**

   A) 180.3.13.224/28

   B) None of the proposed solutions

   C) 180.3.13.208/29

   D) 180.3.13.192/28

7. **The Solicited Node Multicast Address:**

   A) Is a special multicast group that can contain one or more nodes. These nodes receive and process the ICMP Neighbor Solicitation, but only one will reply with an ICMP Neighbor Advertisement.

   B) Is a special multicast group that contains all nodes of a given Link, as it replaces the broadcast address in the IPv6 context. All nodes receive and process the ICMP Neighbor Solicitation, but only one will reply with an ICMP Neighbor Advertisement.

   C) Is an obsolete Neighbor Discovery technique, now replaced by a more efficient solution based on ARP.

   D) Is a special multicast group that contains only one node. This node receives and processes the ICMP Neighbor Solicitation, and then it will reply with an ICMP Neighbor Advertisement.

8. **OSPF-TE and ISIS-TE include enhancements to traditional routing protocols OSPF and ISIS that have been standardized in the context of MPLS in order to:**

   A) Allow the independence of control plane and data plane in MPLS routers, which ultimately enables traffic engineering.

   B) Ensure faster convergence and enhanced stability.

   C) Enable the distribution of additional information (named constrained data) in support of constraint-based routing.

   D) Include adequate fields in routing messages to support explicit routing.

9. **The IPv6 Aggregatable Global Unicast addresses are:**

   A) Globally unique, substantially equivalent to the IPv4 public addresses

   B) Aggregable only in very small address ranges, in order to favor the precision of the evaluation of routing paths

   C) Usable in a global IPv6 network only with proper Network Address Translation (NAT) techniques

   D) Usable only on devices belonging to the same local area network

10. **The smallest aggregation that can contain the IP networks 130.192.0.0/25 and 130.192.1.0/25 is**

    A) 130.192.1.0/23

    B) 130.192.0.0/24

    C) 130.192.0.0/23

    D) 130.192.1.0/24

11. **The IPv6 address 2001:4600::0201:06FF:FEA5:3A4C is:**

    A) An address that can be used on a server to offer a service over the public IPv6 Internet

    B) An address currently not valid in IPv6

    C) An address that can be used by a host only to perform communications with another host on the same link

    D) A private address

12. **Which of the following choices is not an Adaptive Routing algorithm?**

    A) Isolated Routing

    B) Link State

    C) Centralized Routing

    D) Selective Flooding

13. **One of the reasons that are favoring the spread of the IPv6 protocol is:**

    A) The possible inefficiency of the private IPv4 addressing

    B) The low inclination of network operators to modify the configuration of their own networks

    C) The lack of MAC addresses

D) The more and more widespread need to use multicast applications

14. **In order to setup a label switched path (LSP):**

    A) MPLS routers on the path must identify a label that is unused on all links of the path.

    B) MPLS routers on the path must perform a mapping operation

    C) Final destinations of IP packets traveling on the LSP must support MPLS

    D) The same layer-two protocol must be deployed on all links on the path

15. **The adoption of the MAC address as Interface ID of an IPv6 host:**

    A) Allows the host to perform a direct communication without the need to insert a Layer 2 header

    B) Is not possible due to privacy issues

    C) Is part of one of the possible autoconfiguration solutions available in IPv6

    D) Is the only possible solution available in IPv6 for the Interface ID configuration

16. **One of the functions of the IPv4 protocol suite that was replaced by ICMPv6 is:**

    A) IPsec

    B) PPP

    C) OSPF

    D) IGMP

17. **The static routing:**

    A) Consists in the automatic learning of routes without exchanging routing information

    B) Consists in one network node computing routes for other network nodes and providing the computed routes to them

    C) Consists in the network administrator manually configuring routing information

    D) It is an obsolete technology no longer deployed since dynamic routing is preferred

18. **The configuration of a switch port in access mode is used for:**

A) Assigning a packet sent through that port to a specific VLAN

B) Assigning a packet received on that port to a specific VLAN

C) Enabling the access to the network

D) Allowing the access to the switch only to specific flows that are not considered

19. **The IPv6 Extension Headers are:**

    A) Header chains that can be added to the main IPv6 header in order to move to the network some features that are typically of the transport layer (e.g., the transmission of acknowledgments)

    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

    D) Padding techniques adopted to fix the size of the layer 2 frame containing the IPv6

20. **The GRE (Generic Routing Encapsulation) protocol is utilized for:**

    A) Encapsulation of any protocol into an IP packet

    B) Exchanging routing information in various protocol architectures

    C) Multiple transmission operations

    D) Implementing encrypted tunneling in secure VPNs (Virtual Private Networks)

21. **A Layer2 Ethernet switch is used for interconnecting 47 hosts belonging to three different VLANs:**

    A) It is not possible to enable the communication among all the hosts because at least two available ports would be needed

    B) It is possible to enable the communication among all the hosts using the single port that is still available in addition to proper network devices

    C) It is not possible to enable the communication among all the hosts because, being them connected to three VLANs at least three available ports would be needed

    D) The 47 hosts can communicate without any further change to the network configuration

22. **In LTE networks the use of tunnels facilitates:**

    A) The encryption of traffic between operators

    B) The connectivity between operators

    C) The compression of control packet headers

    D) The mobility of users between cells

23. **Why is label-based forwarding less complex (and hence can be implemented using simpler hardware with lower power consumption) than IP address-based forwarding?**

    A) Because label's validity is local to a link, while IP address's validity is global across the network

    B) Because label-based forwarding can be implemented with an exact match in a table, while address-based forwarding requires a longest prefix match

    C) Because labels can be chosen by routers, while IP addresses must be chosen by network administrators

    D) Because labels don't need to be unique, while IP addresses must be unique across the network (unless NAT is deployed)

24. **What is a typical operation of an all-optical switch?**

    A) Process and switch individual bits transmitted on wavelengths belonging to the optical portion of the spectrum

    B) Route an optical channel (at a specific frequency) from an input port to an output port

    C) Switch packets received from an optical channel to different optical channels

    D) Multiplex over a single outgoing optical channel data received over different incoming channels

25. **Why is label-based forwarding less complex (and hence can be implemented using simpler hardware with lower power consumption) than IP address-based forwarding?**

    A) Because label's validity is local to a link, while IP address's validity is global across the network

B) Because label-based forwarding can be implemented with an exact match in a table, while address-based forwarding requires a longest prefix match

C) Because labels can be chosen by routers, while IP addresses must be chosen by network administrators

D) Because labels don't need to be unique, while IP addresses must be unique across the network (unless NAT is deployed)

26. **When an MPLS frame has multiple labels, routers:**

A) Only process the most external label to decide how to forward the frame

B) Only can swap the most external and the next label with each other

C) Only process the most internal label to decide how to forward the frame

D) Can swap any of the labels

27. **In IEEE 802.11 networks, the "hidden terminal problem" refers to:**

A) A security threat caused by an intruder in the BSS

B) The use of the same MAC address by more than one node in the same BSS

C) The possibility that two or more wireless nodes can interfere with each other without being able to detect one another

D) A failure in the association to an Access Point during the passive scanning procedure

28. **Concerning the DiffServ (Differentiated Services) standard and practice of traffic engineering:**

A) They both rely on information included in the IP header

B) They are completely independent and unrelated solutions that are never used in conjunction

C) They are two different tools to do the same

D) They can be used in conjunction to perform per-class traffic engineering, which enables efficient utilization of network capacity

29. **Multicast communications in an IPv4 network:**

A) Are not possible without the deployment of additional protocols in the network

B) Are possible at global scale, it is only required to enable the IGMP protocol in the network

C) Are always possible, IGMP only makes them more efficient

D) Are possible only within a single LAN, even if additional protocols are used

30. **Which of the following methods is used by Content Delivery Networks (CDNs) to handle content updates efficiently while minimizing disruptions to users?**

A) Multi-path TCP (MPTCP): Utilizing multiple TCP connections simultaneously to enhance performance and reliability between clients and origin servers

B) Compression Algorithms: Applying real-time compression to reduce the size of content from the origin server

C) Edge Caching: Storing frequently accessed content on servers located closer to end users with cache invalidation policies to ensure content freshness

D) Dynamic Content Acceleration: Optimizing the delivery of dynamically generated content by bypassing the CDN cache and fetching content directly from the origin server

31. **When MPLS was standardized, what was the main motivation for having labels pushed into packets by network nodes (specifically by Label Edge Routers) rather than end hosts?**

A) End hosts are less trusted than network nodes because they can be more easily hacked

B) End hosts don't need to be aware of MPLS, which made the introduction of MPLS less problematic

C) Pushing the label requires modifying the layer two header that is not present when a packet is transmitted and received by an end host

D) Network nodes have higher performance than end hosts

32. **A network interface with both an IPv4 and an IPv6 address can receive:**

A) Only IPv6 packets encapsulated in IPv4, according to the approach called "tunneling"

B) Only IPv4 packets encapsulated in IPv6, according to the approach called "tunneling"

C) Both IPv4 and IPv6 packets

D) Only IPv6 packets, since in such kind of configuration the operating system considers IPv4 as obsolete

33. **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) 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 in a decreasing order of network size

C) Splitting the network in areas and defining, within the given address range, smaller distinct address ranges to use in each area

Exam February 2, 2025

1. **The Count to Infinity**

   A) Is a Link State-based algorithm to prevent the generation of loops

   B) Happens when the Distance Vector algorithm converges

   C) Is a possible event of the Distance Vector algorithm

   D) None of the other answers is correct

2. **The paging procedure in a cellular network is used for**

   A) Storing the user position in a database

   B) Forcing the mobile terminal to apply proper memory sharing policies

   C) Notifying the mobile terminal that it is going to change the cell

   D) Notifying the mobile terminal that it has to be contacted

3. **The link-local addresses**

A) Are valid only within an organization, that can utilize them to assign addresses to the hosts in the several subnets of its Intranet (they are equivalent to private addresses in IPv4)

B) Are built automatically by the network station, usually starting from the MAC address of its own network card and adding a predefined prefix (FE80/64)

C) Cannot be assigned to routers

D) Are used for identifying network stations that operate a certain service (for example, DNS servers)

4. **In the layer 3 MPLS-based VPN solution based on BGP packets traveling through the MPLS backbone have two labels;**

   A) The internal label is used by internal (P) routers to forward packets towards a PE router

   B) The external label is used by internal (P) routers to forward packets towards a PE router

   C) Internal (P) routers never change (swap) the external label

   D) Both labels are used by internal (P) routers to forward packets towards a PE router

5. **Virtual LANs (VLANs) are**

   A) Virtually distinct local area networks but created over a single physical infrastructure

   B) Networks that are able to emulate on a given LAN the presence of a remote device, usually created by means of tunneling techniques

   C) Very high performance wireless networks

   D) Networks created only among Virtual Machines (VMs)

6. **When an MPLS frame has multiple labels, routers**

   A) Can swap any of the labels

   B) Only process the most internal label to decide how to forward the frame

   C) Only process the most external label to decide how to forward the frame

   D) Only can swap the most external and the next label with each other

7. **The routing table of an IPv6 router**

   A) Has a structure and the operating principles that are completely different with respect to IPv4

   B) Follows the same operating principles used in IPv4

   C) Never uses route aggregations, because they are not allowed by the IPv6 standard

   D) Contains only static routes because the "v6" routing protocols have not been standardized yet

8. **The basic idea of MPLS (Multi-Protocol Label Switching) consists in**

   A) Associating a label to each packet so that network nodes can use it to determine how to handle such packet

   B) Associating a label to each packet so that the destination can identify the data flow the packet belongs to, independently of the protocol being used (multi-protocol)

   C) Inserting a label in IP packets to enable routing protocols to take constraints into account when computing routes

   D) Inserting a label in layer two frames so that network nodes can use it to identify the various higher-layer protocols (multi-protocol) encapsulated in the frame

Moodle Example Quiz

1. **VPNs(Virtual Private Networks) are used to**

- Transport private traffic through a shared infrastructure while creating the same conditions the traffic would undergo through a private infrastructure

2. **The Layer 3 VPN(Virtual Private Network) solutions based on MPLS are characterized by**

- A good level of automation and integration between the public backbone and private networks

3. **The IPsec “Tunnel Mode” encompasses the encryption of**

- The IP Header, TCP/UDP header, and payload of the internal packet

4. **Two hosts A and B belong to the same physical network and have IP addresses 130.192.1.1/25 and 130.192.1.129/24 respectively**

- A can communicate with B only by means of a router

5. **Which of these techniques is not a solution for the IPv4-IPv6 transition?**

- 6mix4

6. **In the DS-Lite solution for the IPv4-IPv6 transition**

- The NAT feature is implemented for all users on proper ISP devices

7. **The entries of the filtering database of an Ethernet switch**

- Have a lifetime which generally can be set by the switch administrator

8. **A consequence of the deployment of VLANs in local area network is:**

- The broadcast traffic is bounded to the VLAN where it has been generated

9. **Two hosts connected to an Ethernet switch**

- Can communicate even if they belong to different VLANs, it depends on the network configuration

10. **Two hosts connected to a Switched Ethernet Network through ports configured in Access mode**

- If they belong to different VLANs, it is possible that they can communicate even if they are connected to different switches and ports on switches are configured Access mode

11. **The metric(cost) used by a routing algorithm**

- Expresses the weight assigned to a link(channel) in the path selection

12. **BGP is used in the Internet for**

- The exchange of routing information between routers belonging to different autonomous systems

13. **The difference between link state and distance vector routing algorithms can be summarized as follows:**

- Link state algorithms send local information to all nodes in the network; distance vector algorithms send global information only to neighboring nodes

14. **RIP is characterized by**

- Frequent instability and inclination to create circular forwarding paths(i.e routing loops)

15. **Two IP networks 130.192.0.0/24 and 130.192.2.0/24 can be aggregated in:**
    - 130.192.0.0/22
16. **The Integrated IS-IS protocol**
    - Is a protocol based on the link state routing algorithm widely used in large networks
17. **RSVP(Resource ReSerVation Protocol) allows:**
    - Routers to know the requirements of an application in terms of a quality of service
18. **In DiffServ, a "class of service" identifies:**
    - A set of packets that are handled the same way by routers(for example, all VoIP traffic)
19. **The importance of MPLS(multi-protocol label swithcing) in today's and future computer networks stems from the possibility to**
    - Have a single control plan for different switching technologies
20. **One of the protocols used in MPLS for label distribution is:**
    - BGP
21. **In the MPLS(multi-protocol label switching) architecture, LSPs(label switched paths)**
    - Are set up by network nodes that agree on the labels to be used for packets belonging to a specific forwarding equivalence class(FEC)
22. **The operations that an MPLS router can perform on labels are:**
    - Add a label in most external position of the MPLS header(PUSH), remove a label from most external position in the MPLS header(POP), change the content of the external label(SWAP)
23. **Optical networks are specifically and uniquely characterized by devices capable of:**
    - Transmitting optical signals on optical fiber links
24. **The IGMP protocol**
    - Allows an IPv4 router to discover which multicast groups are present in a directly connected network

25. **In an IPv4 network**
    - A host can be reached by a multicast packet related to a specific group even if it did not join that group before
26. **The Neighbor Discovery procedure in IPv6**
    - Is based on a multicast ICMPv6 packet
27. **The ICMPv6 Router Advertisement packet**
    - Enables device autoconfiguration without a DHCP protocol intervation
28. **IPv6 Private addressess**
    - Are defined in such a way that they are globally unique with high probability, but they cannot anyway be used on a global level
29. **IPv6 Site Local addresses**
    - Are deprecated but they can be used in IPv6 networks
30. **The IPv6 address FE80::0201:06FF:FEA5:3A4C is**
    - An address that can be used on a host with MAC address 00:01:06:A5:3A:4C for communicating with another host on the same link

Notes From Past Exams

General Concepts

- **GRE (Generic Routing Encapsulation)** – Used for identifying the protocol wrapped in an IP packet.
- **DWDM (Dense Wavelength Division Multiplexing)** – A technology that allows multiplexing/demultiplexing of optical signals (at different wavelengths) on the same optical fiber.
- **MPLS Label Binding** – Associates a label with a **Forwarding Equivalence Class (FEC)**.
- **IPv6 Extension Headers** – Header chains that can be added to the main IPv6 header to provide additional functionality.
- **DiffServ Standard** – Adds a value in the IP packet header to indicate the **class of service** a packet belongs to.

Multicast in IPv4 & IPv6

- **IPv4 Multicast Groups** – Identified by special IP addresses that **cannot be assigned to individual stations**.
- **Multicast Communication in IPv4** – Requires **additional protocols** for functionality.
- **IPv6 Multicast Addresses**:
  - **All nodes**: `FF02::1`
  - **All routers**: `FF02::2`
  - **Solicited node multicast**: `FF02:1:FF:<24_bit_less_significant_ipv6> /104`
  - **Multicast MAC Address**: `01-00-5E-0(bit) + 23_bit_least_significant_IP`
  - **IPv6 Multicast**: `FF00::/8 - FFFF:[...]:FFFF`

Extranets & VPNs

- **Extranet** – A private network that includes networks of independent organizations (e.g., multiple corporate networks).

- **VPN & Centralized Internet Access** – Can result in **non-optimal routing** when accessing external stations (e.g., Internet).
- **SSL-Based VPNs** – Allows an enterprise to **securely expose certain applications** on the corporate network.
- **IPSec in VPNs** – Used to **open a secure tunnel** across the public Internet.

IPv6 Addressing & Tunneling

- **IPv6 Public Internet Address Example** – `2001:4600:0201:06FF:FE45:3A4C` (can be used for public services).
- **IPv4-Compatible IPv6** – `::/96`
- **6to4 Addressing** – `2002::/48` (Used to encapsulate IPv6 in IPv4).
- **Mapped IPv4 in IPv6** – `0:0:0:0:0:FFFF::/96`
- **Tunnel Broker** – `2002::/16`
- **ULA (Unique Local Addressing)** – `FC00::/7`
  - `FC00::/8` reserved for future use
  - `FD00::/8` used for private addressing

OSPF (Open Shortest Path First)

- **OSPF Protocol** – Used by IP routers to calculate a **shortest-path routing tree** for each destination.
- **OSPF Hierarchy** – OSPF is **hierarchical**, while IGRP is **not**.
- **OSPF Area Border Router (ABR)** – Knows details of the **backbone area**.
- **OSPF Metrics** – Can be **customized** by the network manager.
- **Fully Operational OSPF** – Each router maintains a **database describing its area**.

Routing Algorithms & Techniques

- **Link-State Algorithms** – Send **local topology** information to all nodes.
- **Distance-Vector Algorithms** – Send **entire network** information only to neighbors.
- **Path Vector Algorithm (BGP)**:

    - Stores **Autonomous Systems (AS) path information**.
    - Each record contains **destination, distance, and AS path**.
- **Routing vs. Forwarding**:
    - **Routing** – Identifies the best path from sender to recipient.
    - **Forwarding** – Determines the **best exit port** at each hop.
- **Source Routing** – The sending node must have at least **partial knowledge** of network topology.

MPLS & Label Switching

- **Multipath = Label Swapping**
- **MPLS in VPNs** – Can provide **point-to-point connections** in overlay networks or handle routing in peer networks.
- **Label Swapping & Path Setup** – May require a **"Path Setup" phase** before transmission.

Routing Security & Loop Prevention

- **Split Horizon Technique** – Prevents a prefix from being announced to the neighbor that represents the **next hop**.
- **RIP Protocol Loop Prevention** – Uses:
    - **Split Horizon**
    - **Hold-Down Mechanisms**

Network Providers & Peering

- **Tier 1 Network Provider** – An **Autonomous System (AS)** connected **only to other Tier-1 ASes** via **peering agreements** (no paid transit).
- **NAP (Neutral Access Point)**:
    - Several **Autonomous Systems** connect at **Layer 2** to exchange routing information.
    - **Devices in a NAP** communicate via **Layer 2 connections**.

Additional Networking Concepts

- **Selective Flooding** – Reduces the number of **packet retransmissions** in a network.
- **IPv6 Address Structure** – Maintains a **flexible division** between subnet and host fields.