Computer Network Technologies and Services	**February 24, 2020**	
Lastname.....Name.....	Student ID .....….....	

Answer Table

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**

i. NOTES The answers to all questions must be written **exclusively** on the answer table available above. Only the content of this table will be taken into account for the evaluation.
ii. During the exam, the use of any other sheet of paper beside those provided with the text is not allowed. Question sheets must be all returned — still stapled — at the end of the exam.
iii. Nothing else than what is needed to write (pen, eraser), a piece of ID, and possibly water and food can be taken to the seat where you take your exam. Having on oneself any other item (e.g., telephone, sheets of paper, books) results in the exam being voided. Please leave any other item you might have (coat, bag, phone, calculator, and any other object) at the front or back of the classroom.
iv. Multiple choice questions have only ONE correct answer.
v. A correct answer is not necessarily exhaustive and its content is not necessarily always and universally true under any condition (i.e. correctness does not imply generality).
vi. The score assigned to the answers of multiple choice questions is the following:
    a. 1 point for a correct answer
    b. 0 points if no answer is given
    c. – ½ point in case of wrong answer
vii. During the test, any communication with other classmates is prohibited and will cause the student to be sent away from the classroom
viii. The teachers and the assistants that are present during the test are there for the sole purpose of verifying proper progress of the exam. Their role is not giving any support to the interpretation of the text, neither helping the students to correctly formulate the answers. Please avoid any such request.
ix. In order to easily verify the correctness of the answers to multiple choice questions when the results will be published, it is suggested to fill out the slip reserved for such purpose. The slip must be removed from the sheet *when delivering the test at the end of the exam, at the presence of the exam assistant collecting the exam papers*.

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

Do not use

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Answers

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