

**1) When can a DHCP server relay IP addresses to clients on a network segment separated from the server's location?**

- a) DHCP server can only relay IP addresses to the clients found on the same network segment
- b) When the router separating them acts as a relay agent
- c) When the DHCP server uses the same IP address as the router that supports the network segment where the clients are located
- d) When there are more logical routes between the DHCP server and the subnetwork clients

**2) Choose the correct use of the Straight through and the Cross over cables:**

- a) Cross cable to connect a PC to a PC and straight through to connect a switch to a hub
- b) Cross cable to connect a router to a PC and straight through to connect a switch to a server
- c) Cross cable to connect a switch to a hub and straight through to connect a router to a switch
- d) Cross cable to connect a switch to a switch and straight through to connect a hub to a switch

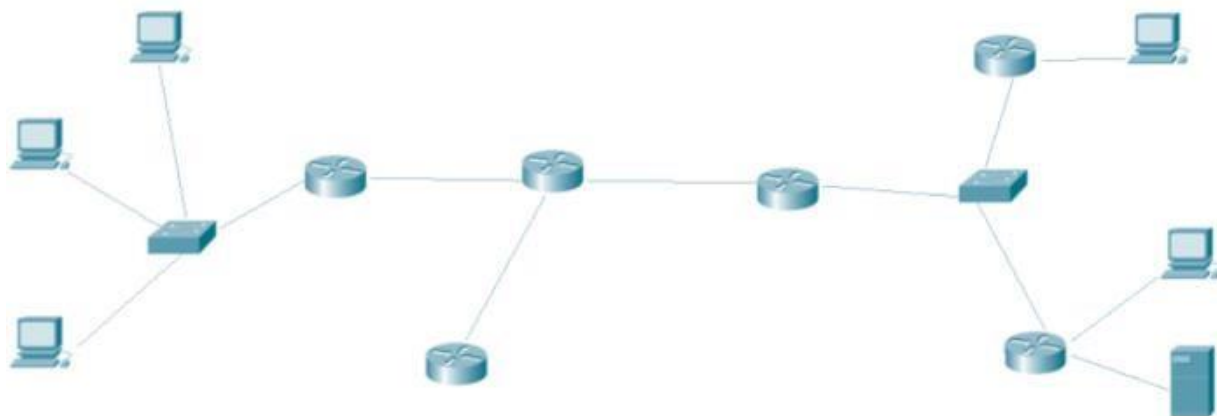
**3) Choose the correct use of the following cables:**

- a) Straight through to connect a hub to a switch or a hub to a PC
- b) Cross cable to connect a PC to a server or a PC to a router
- c) Straight through to connect a PC to a PC or a switch to a router
- d) Cross cable to connect a router to a router or a hub to a switch

**4) In what situation is a PC unable to ping another PC?**

- a) PCs are on two different network segments on the same network
- b) Firewall is disabled on both of the PC's
- c) One of the PC's is connected to the router by cross over cable
- d) Firewall is enabled on both computers

**5)**



**Determine how many subnets are found in the above given network:**

- a) 7
- b) 9
- c) 5
- d) 11

**6) Which of the following is not a characteristic of the IP protocol?**

- a) It affects packet routing
- b) It is considered an unreliable protocol
- c) It is a connection-oriented protocol
- d) It defines the Internet addressing system

**7) Having more than one DHCP server on the same subnet of a network is:**

- a) Possible, if all servers besides one are offline, so that the client requests for IP addresses only reach that server
- b) Possible, as long as they share the same address pool to give to the clients
- c) Possible only if each of them has a different pool of addresses, without sharing any address
- d) Not possible

**8) What is the main function of DNS?**

- a) Maps a known IP address to a MAC layer address
- b) Provides host names to TCP/IP address resolution
- c) Automatically assigns IP addresses to the devices across the network
- d) Provides network connectivity to a computer

**9) Gateways are used for:**

- a) Providing connectivity between two or more network segments
- b) Providing network connectivity to a computer
- c) Tracing the route taken by data from the router to the destination network
- d) Transfer files between different platforms

**10) What is the maximum number of hosts for a class C network?**

- a) 65.534
- b) 65.535
- c) 128
- d) 254

**11) What is the maximum number of networks in a class A network?**

- a) 126
- b) 128
- c) 16.384
- d) 254

**12) Which one of the following addresses is a public address?**

- a) 10.0.0.0/8
- b) 207.46.130.0/24
- c) 172.16.0.0/12
- d) 1.0.0.0/8

**13) NAT is:**

- a) A connection between computers and other network devices that are located within a small physical location
- b) A protocol providing a way for multiple computers on a common network to share a single connection to the Internet

- c) A protocol used by routers to send data from one network to another
- d) A set of protocol layers designed to make data exchange possible on different types of computer networks

**14) Which one is not true about classless routing protocols:**

- a) RIPv1 supports classless routing protocols
- b) RIPv2 supports classless routing protocols
- c) It is allowed to use a variable length mask
- d) It is allowed to use discontinuous network

**15) Which one of these is a RIPv2 characteristic?**

- a) Maintains a routing table as in RIPv1 without the mask information
- b) It is a classful routing protocol
- c) Supports maximum metric (hop count) value up to 15. Any router further than 15 hops is considered unreachable
- d) Does not support triggered updates or authentication of RIPv2 update messages

**16) Which one is true about RIPv1?**

- a) It is easier to configure than RIPv2
- b) It maintains a routing table as in RIPv2, including mask information
- c) It has a lower administrative distance than RIPv2
- d) It has the same timers as RIPv2

**17) An IP address has:**

- a) 64 bits
- b) 32 bytes
- c) 128 bytes
- d) 32 bits

**18) Which of the following are valid IP addresses to mark a sub network?**

- a) 177.91.107.144/29
- b) 177.91.107.0/32
- c) 177.91.107.1/25
- d) 177.91.154/30

**19) What is the range of network IPs in which the following given IP resides: 194.168.19.65/28?**

- a) 194.168.19.64 – 194.168.19.87
- b) 194.168.19.64 – 194.168.19.79
- c) 194.167.19.62 – 194.167.19.87
- d) 194.168.19.0 – 194.168.19.64

**20) Which of the following is the correct host range for the subnet in which we can find the IP address 192.168.168.188 255.255.255.192?**

- a) 192.168.168.129 – 191
- b) 192.168.168.128 – 190
- c) 192.168.168.128 – 192
- d) 192.168.168.129 – 190

**21) Which protocol does DHCP use at the Transport Layer?**

- a) IP

- b) UDP
- c) TCP
- d) ARP

**22) Which class of IP address has the most host addresses available by default?**

- a) A
- b) B
- c) C
- d) A and C

**23) Which protocol does Ping use?**

- a) TCP
- b) ARP
- c) ICMP
- d) IP

**24) Which of the following does not use TCP?**

- a) HTTP
- b) DHCP
- c) FTP
- d) SMTP

**25) Which of the following is a private IP address?**

- a) 12.0.0.2
- b) 168.172.19.40
- c) 172.15.14.36
- d) 192.168.24.43

**26) Which class of IP address provides a maximum of only 254 host addresses per network ID?**

- a) Class A
- b) Class B
- c) Class C
- d) Class B and C

**27) Which one is true about ICMP packets?**

- a) They are encapsulated within IP datagrams
- b) ICMP is encapsulated within UDP datagrams
- c) They do not provide hosts with information about network problems
- d) They guarantee datagram delivery

**28) Which of the following is considered to be the destination host before translation?**

- a) Inside local host
- b) Outside local host
- c) Inside global host
- d) Outside global host

**29) Which of the following is considered to be the address after translation?**

- a) Inside local host
- b) Outside local host

- c) Inside global host
- d) Outside global host

**30) Which of the following is not a way to configure NAT?**

- a) IP NAT pool
- b) Static
- c) Dynamic
- d) NAT overload

**31) Which one of the following is not an advantage of using NAT?**

- a) Conserves legally registered addresses
- b) Translation introduces switching path delays
- c) Increases flexibility when connecting to the Internet
- d) Reduces address overlap occurrence

**33) Which of the following is true about the IP address 10.16.3.65/23?**

- a) The subnet address is 10.16.3.0 255.255.254.0
- b) The last valid host address in the subnet is 10.16.2.254 255.255.254.0
- c) The broadcast address of the subnet is 10.16.3.0 255.255.254.0
- d) The lowest host address in the subnet is 10.16.2.1 255.255.254.0

**32) Which one is true about NAT?**

- a) Causes loss of end-to-end IP traceability
- b) Does not conserve legally registered addresses
- c) Decreases flexibility when connecting to the Internet and certain applications will not function with NAT enabled
- d) Increases address overlap occurrence

**34) Which of the following are valid subnet addresses?**

- a) 177.91.107.0, 177.92.107.97, 177.92.107.144
- b) 177.91.107.0, 1.0.0.0, 0.0.0.0
- c) 191.91.168.1, 177.91.107.152, 177.91.168.127
- d) 177.91.107.0, 177.91.107.144, 1.0.0.112

**35) What is the maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.224 subnet mask?**

- a) 14
- b) 15
- c) 16
- d) 30

**36) What does a mask /28 mean?**

- a) The maximum number of IP addresses that can be assigned to hosts is 16
- b) The maximum number of IP addresses that can be assigned to hosts is 14
- c) The maximum number of IP addresses that can be assigned to hosts is 8
- d) The maximum number of IP addresses that can be assigned to hosts is 30

**37) A submask /30 can be given to:**

- a) A subnet with 3 PC's, connected to a router by a switch

- b) A subnet with 2 PC's and a server, connected to a router by a switch
- c) A subnet with 2 PC's connected directly to the router
- d) A subnet with 2 routers connected

**38) You need to subnet a network that has 7 subnets, each with at least 16 hosts. Which classful subnet mask would you use?**

- a) 255.255.255.192
- b) 255.255.255.224
- c) 255.255.255.240
- d) 255.255.255.252

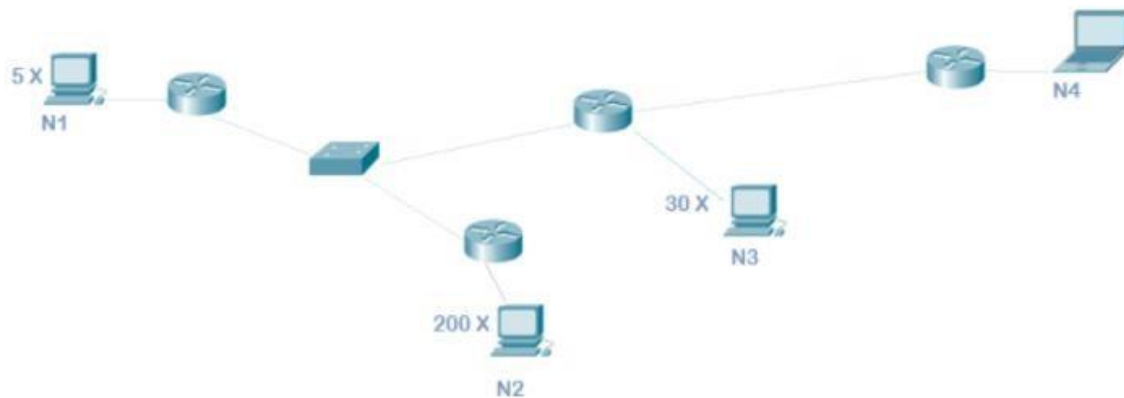
**39) You have an interface on a router with the IP address of 192.168.192.10/29. Including the router interface, how many hosts can have IP addresses on the LAN attached to the router interface?**

- a) 6
- b) 7
- c) 8
- d) 14

**40) The network address if 172.16.0.0/19 provides how many subnets and hosts?**

- a) 7 subnets, 30 hosts each
- b) 8 subnets, 8190 hosts each
- c) 8 subnets, 2046 hosts each
- d) 7 subnets, 2046 hosts each

**41)**



**Given the network above, choose which of the next are correct IP addresses for each subnet in the picture (N1, N2, N3, N4):**

- a) N1 -> 1.168.19.72/30, N2 -> 1.168.19.0/24, N3 -> 1.168.19.84/26, N4 -> 1.168.19.80/30
- b) N1 -> 1.168.19.72/29, N2 -> 1.168.18.0/24, N3 -> 1.168.19.0/26, N4 -> 1.168.19.80/30
- c) N1 -> 1.168.19.72/29, N2 -> 1.168.18.0/26, N3 -> 1.168.19.0/26, N4 -> 1.168.19.80/30
- d) N1 -> 1.168.19.72/29, N2 -> 1.168.18.0/24, N3 -> 1.168.19.144/26, N4 -> 1.168.19.80/30

**42) Which of the following affirmations about UDP is not true?**

- a) Writes packets of bytes
- b) No read bytes from a packet are lost

- c) Neither party can overflow the other. Traffic is controlled by the OS
- d) Not read bytes from a packet are lost

**43) Which one is not a principle to the OSI model?**

- a) A layer should be created where a different abstraction is needed
- b) Each layer should perform a well-defined function
- c) The layer boundaries should be chosen to maximize the information flow across the interfaces
- d) The function of each layer should be chosen with an eye toward defining internationally standardized protocols

**44) Which of the following layers controls the operation of a subnet and handles how packets are routed from source to destination?**

- a) The Network Layer
- b) The Transport Layer
- c) The Session Layer
- d) The Presentation Layer

**45) Which protocol handles mail exchange?**

- a) FTP
- b) TELNET
- c) SSH
- d) SMTP

**46) Which one of the following is a Natural Mask?**

- a) 255.255.255.255
- b) 255.255.255.0
- c) 255.255.255.128
- d) 255.255.255.64

**47) IP – best effort protocol – does its best effort to transport datagram from one machine to another with no guarantee of a:**

- a) Successful delivery
- b) Duplication / unicity
- c) Data integrity
- d) All of the above

**48) Which affirmation is not true about The Network Address Translation?**

- a) No need to be allocated range of addresses from ISP; just one IP address is used for all devices
- b) Can change addresses of devices in local network without notifying outside world
- c) Can change ISP only by changing addresses of devices in local network
- d) Devices inside local net not explicitly addressable, visible by outside world

**49) Which of the following affirmations about TCP is not true?**

- a) Client process must first be running
- b) Server must have created socket that welcomes client's contact
- c) Allows server to talk with multiple clients
- d) Source port numbers are used to distinguish clients

**50) IP Routing is based on the:**

- a) Source IP
- b) Destination IP
- c) Network address
- d) Broadcast address

**51) Which is not a Service of a Data Link Layer?**

- a) Framing and link access
- b) Flow control
- c) Error correction
- d) Traffic isolation

**52) Consider a network 60.20.30.0/24. Computers within the network have the default gateway 60.20.30.1, which is the IP of the router. The DNS server has the IP 60.20.30.2 and has the following entries in the DNS table:**

**Google.ro 120.30.4.5**

**Mywebsite.ro 60.20.30.3**

**A computer having the IP 60.20.30.4 opens the web browser and visits the website mywebiste.ro. What is the packet route through the network?**

- a) 60.20.30.4 -> 60.20.30.1 -> 60.20.30.3 -> 60.20.30.1 -> 60.20.30.3 -> 60.20.30.2 -> 60.20.30.4
- b) 60.20.30.4 -> 60.20.30.2 -> 60.20.30.1 -> 60.20.30.3 -> 60.20.30.4 -> 60.20.30.2 -> 60.20.30.4
- c) 60.20.30.4 -> 60.20.30.1 -> 60.20.30.2 -> 60.20.30.3 -> 60.20.30.1 -> 60.20.30.4
- d) 60.20.30.4 -> 60.20.30.1 -> 60.20.30.2 -> 60.20.30.1 -> 60.20.30.4 -> 60.20.30.1 -> 60.20.30.3 -> 60.20.30.1 -> 60.20.30.4

**53) What are the protocols involved in sending an email?**

- a) FTP
- b) SMTP
- c) TCP
- d) POP3
- e) HTTP

**54) TCP stands for...**

- a) Transfer Control Protocol
- b) Transmission Connection Protocol
- c) Transformation Central Protocol
- d) Transmission Control Protocol

**55) What is a datagram?**

- a) A structure used to get data from the user in order to synchronize the server
- b) A basic transfer unit used in packet-switched networks, providing a connectionless communication service
- c) Information that can harm your computer if you're not careful with it
- d) Millions of bytes configure in a big cluster which can be easily transferred



**56) ARP can be used for...**

- a) Mapping network addresses to physical (MAC) addresses
- b) Mapping public virtual addresses to private IP addresses
- c) Publishing websites to the Internet
- d) Sending emails very fast

**57) TCP, UDP and SCTP are part of:**

- a) Application Layer
- b) Internet Layer
- c) Transport Layer
- d) Link Layer

**58) TCP header contains the following entries:**

- a) Source Port, Destination Port, Sequence Number, Acknowledgement Number, Flags, Data Offset, Checksum, Urgent Pointer
- b) Source IP, Destination IP, Pointer to MAC Address, Connection unique identifier, Router IP, NAT tables
- c) Source Port, Destination Port, Length, Checksum
- d) Source MAC, Destination MAC, Connection Object, Checksum, Data hash

**59) A company has three departments: offices, public and managers. The offices have 123 computers, public relationship has 30 computers and managers have 6 computers. The company wants to make a network such that: every computer has access to internet, have minimum costs, it must be certainly known from which department some webpages are accessed from the HQ in another city. Provide a good configuration for these requirements:**

- a) 3 subnetworks, 192.168.0.0/24, 192.168.1.0/24, 192.168.2.0/24 for every department and connect every subnet directly to the internet, using NAT, through a different provider
- b) 3 subnetworks, 192.168.0.0/25, 192.168.0.128/27, 192.168.0.160/29 and connect them to a central router which translates all the IPs on 192.168.0.0/24 with the IP 30.0.0.5
- c) 1 subnetwork for all the company, 192.168.0.0/24, connect computers to internet through a router which translates every address IP to a public IP address with different class depending on department
- d) 3 subnetworks, 192.168.0.0/25, 192.168.0.128/27, 192.168.0.160/29, one router which translates first network to 30.0.0.1, second to 30.0.0.2, and third to 30.0.0.3

**60) What would be a network security recommendation?**

- a) Forwarding all traffic from the router ports to computer ports
- b) Activate firewall and use good firewall rules
- c) Use the default router password, everybody will expect that you change it, so not changing it is a good strategy
- d) Allow RDP connections on your computers

**61) What is DSL and what it is used for?**

- a) Digital Subscriber Line; used to give access to internet through telephone lines
- b) Digital Supplier Limit; verifies if the maximum connected users in a wi-fi network have been reached
- c) Describer Serial Link; used for serial cables to assure their connectivity in a network

- d) Destination Source Limit; limits the number of packets sent and received; used for security reasons

**62) What is the difference between a switch and a hub?**

- a) The hub sends a packet specifically to an end point or more, the switch broadcasts the message to all the network
- b) The switch sends a packet specifically to an end point or more, the hub broadcasts the message to all the network
- c) The hub can send packets on large distances, but the switch is generally for home usage
- d) There is no difference

**63) The last address of IP address represents?**

- a) Broadcast
- b) Network
- c) Unicast address
- d) Multicast

**64) Which of the following IP addresses class is multicast?**

- a) Class A
- b) Class B
- c) Class C
- d) Class D

**65) Which of the following is correct regarding Class B address of IP address?**

- a) Network 18, Host 16
- b) Network 14, Host 16
- c) Network 16, Host 14
- d) Network 12, Host 14

**66) How many layers are in TCP/IP?**

- a) 7 layers
- b) 4 layers
- c) 6 layers
- d) 5 layers

**67) Ipv4 Address is:**

- a) 64 bits
- b) 16 bits
- c) 48 bits
- d) 32 bits

**68) DNS is the abbreviation for:**

- a) Dynamic Network System
- b) Domain Name System
- c) Domain Network Server
- d) Dynamic Name System

**69) What is the size of a MAC address?**

- a) 16 bits

- b) 32 bits
- c) 48 bits
- d) 64 bits

**70) MAC address is the example of?**

- a) Transport layer
- b) Data link layer
- c) Application layer
- d) Physical layer

**71) For error detection in TCP/IP we use?**

- a) Bit sum
- b) Check sum
- c) Error flag
- d) Error bit

**72) The amount of data that can be carried in a given time is called?**

- a) Capacity
- b) Scope
- c) Bandwidth
- d) Limitation

**73) What is the size of the Host in Class B of an IP address?**

- a) 4
- b) 8
- c) 16
- d) 32

**74) What is the use of the ping command?**

- a) To test if your connection is wired or wireless
- b) To test if a device on the network is reachable
- c) To get your MAC address
- d) To get your IP address

**75) What is a normal mask for a Class C network?**

- a) 255.255.255.1
- b) 255.255.255.128
- c) 255.255.0.0
- d) 255.255.255.0

**75) What does a protocol define?**

- a) What data is communicated
- b) How data is communicated
- c) When data is communicated
- d) None of the above

**77) What is the use of Subnetting?**

- a) It divides one network into several smaller networks
- b) It divides a network into network classes

- c) It speeds up the network
- d) All of the above

**78)** ..... provides a connection oriented reliable service for sending data.

**79) What is TTL?**

- a) Time To Leave
- b) Total Time Limit
- c) Time To Live
- d) Time Tracking Limit

**80) The following system calls are/is optional at the level of a TCP client:**

- a) Socket()
- b) Listen()
- c) Bind()
- d) Connect()

**81) Which one/ones of the following addresses have to be identical for all computers located in the same local network (from a physical and logic point of view)?**

- a) Network address
- b) Broadcast address
- c) IP address
- d) MAC address

**82) The ARP protocol helps with:**

- a) Determining the IP address when the MAC address is known
- b) Determining the MAC address when the IP address is known
- c) Determining the IP address when the DNS server is known

**83) DHCP is a client/server protocol that automatically provides an Internet Protocol host with its:**

- a) IP address
- b) Subnet Mask
- c) MAC address
- d) Default gateway

**84) The maximum number of hosts a network with the mask 255.255.255.224 is capable of supporting is:**

- a)  $2^{(\text{number of zeros in netmask})}$
- b) 32
- c) 30
- d) 16

**85) The natural mask for a class A address is:**

- a) 255.255.255.0
- b) 255.226.255.0
- c) 255.0.0.0
- d) 255.255.0.0

**86) Consider the following netmask: 255.255.0.0, the network part (network length) is formed by a number of bits equal to:**

- a) 24
- b) 16
- c) 8
- d) Impossible to determine

**87) Which of the following describes 'big endian'?**

- a) Most significant byte first
- b) Most significant byte last
- c) Least significant byte in the middle
- d) Most significant byte in the middle
- e) None of the above

**88) Which of the following describes 'little endian'?**

- a) Least significant byte first
- b) Least significant byte last
- c) Least significant byte in the middle
- d) Most significant byte in the middle
- e) None of the above

**89) What is the in-memory representation of 56E2 in little endian?**

- a) 56E2
- b) E256
- c) 2E65
- d) 652E

**90) What is the in-memory representation of 56E2 in big endian?**

- a) 56E2
- b) E256
- c) 2E65
- d) 652E

**91) How many bytes does 'double' use?**

- a) 1 byte
- b) 4 bytes
- c) 8 bytes
- d) 16 bytes

**92) How many bytes does 'float' use?**

- a) 1 byte
- b) 4 bytes
- c) 8 bytes
- d) 16 bytes

**93) What does TCP/IP stand for?**

- a) Transport Control Protocol/Internet Protocol
- b) Transmission Check Protocol/Internet Protocol
- c) Transmission Control Protocol/Inverse Protocol
- d) Transmission Control Protocol/Internet Protocol

**94) What type of connection does SOCK\_STREAM indicate?**

- a) TCP connection
- b) UDP connection
- c) Closed connection
- d) Open connection

**95) What type of connection does SOCK\_DGRAM indicate?**

- a) TCP connection
- b) UDP connection
- c) Closed connection
- d) Open connection

**96) What does UDP stand for?**

- a) User Defined Protocol
- b) User Datalink Protocol
- c) User Datagram Protocol
- d) Utility Datagram Protocol

**97) What does DNS stand for?**

- a) Dynamic Name Server
- b) Dynamic Name System
- c) Domain Name Server
- d) Domain Name System

**98) How many different network layers are there (according to the OSI Reference Model)?**

- a) 7 layers
- b) 4 layers
- c) 5 layers
- d) 9 layers
- e) The number of layers can vary

**99) The 4-bottom network layer (according to the OSI Reference Model), in order, are the following:**

- a) Physical, data link, network, transport
- b) Physical, network, data link, transport
- c) Physical, data link, transport, network
- d) Data link, physical, network, transport

**100) What does FTP stand for?**

- a) File Transmission Protocol
- b) File Transfer Protocol
- c) File Translocation Protocol
- d) Folder Transmission Protocol

**101) What is FTP used for?**

- a) It is a protocol used to check if the datalink layer is working properly
- b) Transferring files over a network
- c) It is a protocol used by mail servers
- d) Accessing the WEB, sending HTML pages

**102) What does SSH stand for?**

- a) Secure Shell Hook
- b) Structured Shell Hook
- c) Secure Shell
- d) Structured Shell

**103) What is SSH used for?**

- a) Remote connection to the terminal/command line of another computer (remote command)
- b) Transferring files over a network
- c) It is a protocol used by mail servers
- d) Accessing the WEB, sending HTML pages

**104) What is SMTP used for?**

- a) Remote connection to the terminal/command line of another computer (remote command)
- b) Transferring files over a network
- c) It is a protocol used by mail servers (mail exchange)
- d) Accessing the WEB, sending HTML pages

**105) What does P2P stand for?**

- a) Peer to peer
- b) Point to point
- c) Point to peer
- d) Peer to point

**106) What is the maximum bandwidth, the maximum amount of data that the optical fiber can carry?**

- a) 100 mb/s
- b) 1000 mb/s
- c) 100 000 mb/s
- d) There is no maximum

**107) Since optical fiber has no limit in bandwidth, what is a plausible reason for your lower internet speed?**

- a) There is a limit to how much end devices can send and receive
- b) Your router/model is limited
- c) You don't use fiber
- d) The contract with your ISP limits your bandwidth
- e) All answers are correct

**108) If I have a zip of size 1024 bytes and a connection of 32 bits/second to the computer I want to send the zip to, how long would it take for the zip to be sent?**

- a) 256 seconds
- b) second
- c) 10 seconds
- d) 1024 seconds

**109) What kind of signal flows through the optical fiber cable have?**

- a) Electro-magnetic waves
- b) Light waves

- c) Both are of the above
- d) Electric current

**110) What type of physical signal does the wireless transmission use?**

- a) Electro-magnetic waves
- b) Light waves
- c) Both are of the above
- d) Electric current

**111) How long is an IPv4 address?**

- a) 4 bytes
- b) 32 bytes
- c) 16 bytes
- d) 8 bytes

**112) What does TLD stand for?**

- a) Total Level Domain
- b) Total Level Distribution
- c) Top Level Domain
- d) Top Level Distribution

**113) What does ISP stand for?**

- a) Internet Server Protocol
- b) Internet Service Protocol
- c) Internet Service Provider
- d) Internet Server Provider

**114) Which of the following is a valid domain name?**

- a) Nontendo.com
- b) Nds.nintendo.com
- c) Nds.nintendo.ro
- d) All answers are correct

**115) What does ROTLD stand for?**

- a) Romanian Top-Level Domain
- b) Russian Overview Top Level Domain
- c) Romanian Total Level Domain
- d) Romanian Top-Level Distribution

**116) What is the 'Whois Query' used for?**

- a) Checking if a domain name is already bought or not
- b) Checking if a domain name has a server active and running
- c) Checking if an IP is present on a network
- d) Getting the IP of a domain name

**117) Which of the following represents a FTP (File Transfer Protocol)?**

- a) The TCP/IP
- b) The SMB or SAMBA Protocol
- c) The SSH Protocol



- d) The SMTP

**118) What is HTML?**

- a) HTML is a language that is used to describe web pages
- b) HTML is a language used for server programming
- c) HTML is a language used for browser programming
- d) All of the above are true

**119) Which of the following is a correct MAC address?**

- a) 12-34-56-78-90-AB-CD
- b) G2-H3-24-13-12-3E
- c) G2-H3-24-13-12-3E-CD
- d) 12-34-56-78-90-AB

**120) What command would you use to find your network adapter's MAC address if you are on windows?**

- a) Ipconfig
- b) Arp/d
- c) Ipconfig/all
- d) All of the above would work

**121) What does ARP stand for?**

- a) Address Resolution Protocol
- b) Address Refresh Protocol
- c) Address Reconstruction Protocol
- d) Address Read Protocol

**122) What does LAN stand for?**

- a) Local Address Network
- b) Local Address Name
- c) Local Area Network
- d) Local Area Name

**123) What command would you use to test the Datalink Layer to see if it works (on Windows)? a) Arp/a**

- b) Ipconfig/all
- c) Ipconfig
- d) Arp/d
- e) All answers are correct

**124) Which of the following IP sets belong to 209.220.186.12/255.255.255.252 IP class?**

- a) 209.220.186.12, 209.220.186.13, 209.220.186.14, 209.220.186.15
- b) 209.220.186.13, 209.220.186.14, 209.220.186.15, 209.220.186.16
- c) 209.220.186.12, 209.220.186.13, 209.220.186.14, 209.220.186.15, 209.220.186.16, 209.220.186.17, 209.220.186.14, 209.220.186.18
- d) 209.220.186.10, 209.220.186.11, 209.220.186.12, 209.220.186.13, 209.220.186.14, 209.220.186.15, 209.220.186.16, 209.220.186.17

**125) Which of the following is a valid IP/Netmask combination?**

- a) 209.220.186.8/255.255.255.240

- b) 209.220.186.8/255.255.255.0
- c) 209.220.186.8/255.255.255.248
- d) 209.220.186.8/255.255.255.252
- e) C and D are both correct

**126) How many bits of zero does the following netmask have: 255.255.255.248?**

- a) bits
- b) bits
- c) bits
- d) 8 bits

**127) Which is the correct binary representation of the following netmask: 255.255.255.128?**

- a) 11111111 11111111 11111111 10000000
- b) 11111111 11111111 11111111 11110000
- c) 11111111 11111111 11111111 11000000
- d) 11111111 11111111 11111111 00000000

**128) What is the netmask for the following IP class: 192.168.0.0/24?**

- a) 255.255.255.128
- b) 255.255.255.0
- c) 255.255.0.0
- d) 255.0.0.0
- e) All netmasks are correct

**129) What is the netmask for the following IP class: 10.10.0.0/17?**

- a) 255.255.255.128
- b) 255.255.255.0
- c) 255.255.128.0
- d) 255.255.0.0
- e) All netmasks are correct

**130) How do you find the network address if you have the network mask and one random IP address in the network?**

- a) You 'and' the netmask and the random IP
- b) You 'or' the netmask and the random IP
- c) You add the netmask and the random IP
- d) You 'xor' the netmask and the random IP

**131) What will you get if you 'or' together the netmasks of a network and one random IP in the network?**

- a) The IP class
- b) The first IP in the class of the random IP
- c) The last IP in the class of the random IP
- d) Nothing significant

**132) What does NAT stand for?**

- a) Network Address Translation
- b) Name Address Translocation
- c) Network Area Translation

- d) Network Area Translocation
- e) Name Area Translocation

**133) Which of the following involve NAT?**

- a) Port forwarding
- b) Accessing the web from an internal network. Your PC's network will be translated to your public IP (i.e., home network)
- c) Both answers involve NAT

**134) Are MAC addresses guaranteed to be unique?**

- a) No, buying the same type of a network adapter twice (from an online store) means you get the same MAC address
- b) No, the MAC address is software related
- c) Depends on the network adapter you have
- d) Yes, because MAC addresses are burned into the ROM of the network adapter

**135) What is a private IP address?**

- a) It's an IP address that does not have a netmask
- b) It's an IP address that is reserved for internal use behind a router or NAT device, apart from the public
- c) It's an IP address that your device receives when connecting to public networks
- d) It's an IP address that has the following form: 127.0.x.x

**136) Which is the range for an IP address of class B?**

- a) 191 – 220
- b) 127 – 190
- c) 128 – 191
- d) 128 – 192

**137) What is the broadcast address of the following IP address 221.17.123.9 that has in its network 42 computers?**

- a) 221.17.123.255
- b) 255.255.255.255
- c) 221.17.123.63
- d) 221.17.123.65

**138) What is the use of the ARP protocol?**

- a) To determine the IP address when we know the MAC address
- b) To determine the MAC address when we know the IP address
- c) To determine the IP address when we knew the IP address of the DNS server
- d) To determine the MAC address when we know the default gateway

**139) What is the subdomain for the top-level domain for the following DNS server:**

**"linux.scs.ubbcluj.ro"?**

- a) "linux"
- b) "scs"
- c) "ubbcluj"
- d) "ro"

**140) What is the difference between bandwidth and throughput?**

- a) The bandwidth is the physical property of the transmission medium, while throughput represents the amount of data which we transmit
- b) There is no difference between them
- c) The bandwidth represents the amount of data which we transmit, while throughput is the physical property of the transmission medium

**141) What is a broadcast MAC address?**

- a) It's a logical address which identifies only one recipient
- b) It's a logical address which is used to identify all the computers within a network
- c) It's a logical identifier for a group of hosts in a computer network that are available to process datagrams

**142) In how many subclasses with the netmask 255.192.0.0 can be the class of minimal dimension containing both IP addresses: 78.79.80.81 and 79.80.81.82 be divided?**

- a) 7
- b) 10
- c) 8
- d) 9

**143) Which are the layers of the TCP/IP model?**

- a) Application layer, transport layer, session layer, network access layer
- b) Application layer, transport layer, internet layer, network access layer
- c) Application layer, presentation layer, session layer, transport layer, network layer, data-link layer, physical layer
- d) Application layer, internet layer

**144) Which of the following does not describe a socket?**

- a) An internal endpoint for sending or receiving data at a single node in a computer
- b) A door between the application process and end-to-end transport protocol
- c) A process that sends and receives data at a single node in a computer

**145) How do we obtain the starting address of a network from a given IP?**

- a) OR logic between IP given and NOT netmask
- b) AND logic between IP given and NOT netmask
- c) AND logic between IP given and netmask

**146) Which is the order of the five-layer Internet protocol stack?**

- a) Application, transport, network, link, physical
- b) Network, transport, application, link, physical
- c) Application, transport, link, network, physical

**147) UDP vs. TCP flow control: which statement is false?**

- a) UDP: one part can overflow, which results in lost packets
- b) TCP: Traffic is controlled by the OS
- c) TCP: one part can overflow but there are no lost packets

**148) What is the length of the TCP header?**

- a) 32
- b) 64
- c) 20

**149) What does a routing table contain?**

- a) Source address, destination address, gateway, interface
- b) Interface, netmask, destination address, gateway
- c) Source address, destination address, netmask, gateway

**150) What is Throughput?**

- a) Quantity of data which we send at some point through a transmission channel
- b) Quantity of data over quantity of time which we send at a given time through a transmission channel
- c) The capacity of data transportation that we send through a transmission channel

**151) What does traceroute?**

- a) Shows all IPs of the routers parsed until the current IP
- b) Shows all IP's parsed until the current router IP
- c) Shows the IP route of the last 5 parsed

**152) What is a congestion window?**

- a) A sender impose window implemented to avoid overrunning some routers in the middle of the network path
- b) A window managed by the receiver that grows when each segment is sent
- c) A window that controls flow moving of the sender

**153) Which of these addressed is not private?**

- a) 10.255.189.255
- b) 172.168.0.1
- c) 192.168.255.255

**154) What is checksum?**

- a) Is a 16-bit field used on the header and data to check for errors
- b) Is a 32-bit field used for error checking of data and IP address
- c) Is a 16-bit flag used for error checking of the header and data

**155) Which of the addresses is a valid private address?**

- a) 10.255.256.0/29
- b) 10.255.255.0/28
- c) 193.168.0.0/29

**156) Which is the third level in the OSI Reference Model Layer?**

- a) Network
- b) Session
- c) Transport

**157) Which is the network address of the second subnet of a network having 93 computers, where the first contains 22 computers, and starts from 192.168.0.0?**

- a) 192.168.0.33
- b) 192.168.0.32
- c) 192.168.0.24

**158) The natural mask for a class B address is:**

- a) 255.0.0.0
- b) 255.255.0.0

c) 255.255.255.0

**159)** The last network address is reserved for the .....

**160)** The size of a class C IP address per network is ..... hosts.

**161)** DHCP stands for .....

**162)** The network address of the third subnet of a network having 93 computers that starts from 192.168.0.0 where the first contains 22 computers and the second has 10 hosts is .....

**163)** The networks can be classified on the types of transmission as ..... switching and ..... switching.

**164) What is a property of a computer network?**

- a) All components are linked to a router
- b) All components are interconnected
- c) All components are linked using a coaxial cable
- d) It has only PCs and workstations

**165) Which of the following is NOT a computer network?**

- a) The Internet
- b) Worldwide telephone system
- c) A PC connected to headphones
- d) Telephone system

**166) If AB12 is represented in big endian as AB12, what is its representation in little endian?**

- a) 21BA
- b) 12BA
- c) BA21
- d) 12AB

**167) If 43ED is represented in big endian as 43ED, what is its representation in little endian?**

- a) DE34
- b) ED43
- c) DE43
- d) ED34

**168) What function call you don't find in an UDP server?**

- a) Recvfrom
- b) Bind
- c) Sendto
- d) Accept

**169) What happens with the bytes that are not read by a TCP server?**

- a) Are lost forever
- b) Are sent back to source
- c) Stay available for next read
- d) Are transferred to a special location in the network

**170) How many bits has an IP address?**

- a) 64
- b) 32

- c) 4
- d) 16

**171) Which of the following is NOT a valid IP netmask combination?**

- a) 168.220.186.8/255.255.225.252
- b) 156.198.186.8/255.255.255.254
- c) 209.198.186.8/255.255.255.246
- d) 168.220.186.64/255.255.255.240

**172) When you have an IP address and the network mask what operation you need to do in order to find out the network address?**

- a) Or between IP and netmask
- b) And between IP and netmask
- c) Divide the IP by the mask
- d) You can't find the network address

**173) Which of the following is NOT a valid IP netmask combination?**

- a) 168.220.186.8/225.255.225.252
- b) 156.198.186.16/255.255.255.254
- c) 209.198.186.8/255.255.255.248
- d) 168.220.186.8/255.255.255.240

**174) Which of the following is a class C IP address?**

- a) 10.10.14.118
- b) 135.23.112.57
- c) 191.200.199.199
- d) 204.67.118.54

**175) UDP packets are encapsulated in:**

- a) An Ethernet frame
- b) A TCP segment
- c) An IP datagram
- d) None of the above

**176) Which of the following functions does UDP perform?**

- a) Process to process communication
- b) Improve the data transfer rate of large files (compared to TCP)
- c) Assure that the sent messages arrive in the order that have been sent
- d) Protect the data sent against any corruption while transferring it

**177) Which of the following is not an application layer protocol?**

- a) HTTP
- b) IMAP
- c) SMTP
- d) TCP

**178) A one-to-all communication between one source and all hosts on a network can be classified as:**

- a) Unicast communication
- b) Broadcast communication

- c) Multicast communication
- d) Anycast communication

**179) The data link layer takes packets from ... and encapsulates them into frames for transmission.**

- a) Network layer
- b) Physical layer
- c) Transport layer
- d) Application layer

**180) FTP uses the following channels:**

- a) The delta channel
- b) The control channel
- c) The bearer channel
- d) The data channel

**181) Which IP address class can have 64000 subnets with 64000 hosts/subnet?**

- a) Class A
- b) Class B
- c) Class C
- d) Class D

**182) Which can be an Ethernet physical address?**

- a) 07:01:02:01:2C:4B
- b) 07:01:02:01:2C:4B:2C
- c) 07:02:01:2C:4B
- d) None of the above

**183) The underlying transport layer protocol used by SMTP:**

- a) TCP
- b) UDP
- c) Both TCP and UDP
- d) None of the above

**184) In HTTP Protocol, a client can directly connect to a server using:**

- a) Web
- b) Domain
- c) TELNET
- d) HTTP

**TRUE/FALSE:**

**185)** Internet API is a set of rules that the sending program must follow so that the Internet can deliver the data to the destination program.

**186)** UDP is used together with IP when small amounts of information are involved, but it uses more system resources than TCP.

**187)** When configuring email clients, an Internet address for an SMTP server must be entered.

**188)** File Transfer Protocol (FTP) provides the transmission in encrypted form to provide security for sensitive data.



- 189)** The Open System Interconnection (OSI) model defines a networking framework to implement protocols in layers, with control passed from one layer to the next.
- 190)** The Transport Layer manages the mapping between these logical addresses and physical addresses. In IP networking, this mapping is accomplished through the Address Resolution Protocol (ARP).
- 191)** The maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.224 subnet mask is 40.
- 192)** The subnetwork address of a host with an IP address of 172.16.66.0/21 is 172.16.64.0.
- 193)** To test the IP stack on your local host, you would ping the IP address 127.0.0.0.
- 194)** A switch does not keep a record of the MAC addresses of the devices connected to it.

**COMPLETE WITH THE CORRECT WORD/S:**

- 195)** The UDP ..... identifies the destination port and a reply port.
- 196)** TCP/IP allows a packet to be sent without waiting for the ..... of the previous packet.
- 197)** A 10/100 Mbps hub must share its ..... with each and every one of its ports. BANDWIDTH
- 198)** A router is typically connected to at least two networks, commonly two ..... or ..... or a LAN and its ISP'S network.
- 199)** ..... is a Computer Network diagnostic tool for displaying the route (path) and measuring transit delays of packets across an (IP) network.
- 200)** A ..... defines the format and the order of messages exchanged between two or more communicating entities.
- 201)** The TCP/IP ... is used to detect corruption of data over a TCP or IPv4 connection. CHECKSUM
- 202)** ... in a network may occur when the load on the network is greater than the capacity of the network.
- 203)** HTTP Protocol allows exchange of ..... and ..... .
- 204)** Address Resolution Protocol (ARP) is a protocol for mapping an ..... to a ..... that is recognized in the local network.

**TRUE/FALSE:**

- 205)** UDP guarantees datagram delivery.
- 206)** The socket type used by TCP is SOCK\_STREAM.
- 207)** With UDP, one party can overflow the other, which results in lost packets.
- 208)** The connect system call is normally called by the client process in order to connect to a server process.
- 209)** The listen system call indicates to the protocol that the client process is ready to accept new incoming connections on the socket.
- 210)** At the level of a TCP client, the bind system call is mandatory.
- 211)** The high order bits of an IP address represent the host part.
- 212)** All the hosts from the same network can physically reach each other without an intervening router.
- 213)** A network address can be determined based on an IP address from the network and the netmask.
- 214)** Always, in a class of addresses, the first and last IP addresses are reserved.
- 215)** For connecting a host with a private address to the internet, it has to be translated to a public address, process named ARP.

- 216)** 172.16.0.0/12 refers to a private address space.
- 217)** A DNS server is responsible with translating numerical IP addresses to domain names.
- 218)** The network address can be obtained from an IP address and the netmask using the logical operation "OR".
- 219)** When NAT is involved, the local network uses just one IP address as far as outside world is concerned.
- 220)** The number of IP addresses allocated for each subnet block has to be a power of 4.
- 221)** 209.220.186.8/255.255.255.248 is an invalid IP/netmask combination.
- 222)** The default gateway serves as an access point or IP router that a networked computer uses to send information to a computer in the same network or the Internet.
- 223)** A 255.255.255.240 netmask is capable of supporting 16 hosts.
- 224)** A computer uses HTTP to look up domain names and get the associated IP address.
- 225)** There is no routing based on MAC addresses.
- 226)** A proxy server acts as an intermediary for requests from clients seeking resources from other servers.
- 227)** The combination DNS server = default gateway is not possible.
- 228)** A collection of computers (PCs, Workstations) and other devices interconnected represent a computer network.
- 229)** Hosts (computers), links (coaxial cable, twisted pair, optical fiber, radio, satellite), switches/routers (intermediate systems) are all components of a computer system. TRUE
- 230)** Big endian means 'most significant byte first', while little endian means 'least significant byte first'.
- 231)** SOCK\_STREAM is used for UDP connections.
- 232)** SOCK\_DGRAM is used for UDP connections.
- 233)** The optical fiber cable theoretically has unlimited bandwidth.
- 234)** Every domain name that is not already in use is free to claim as your own.
- 235)** 255.255.255.128 starts with 1 zero and ends with 7 zeroes.
- 236)** 255.255.255.128 ends with 7 zeroes.
- 237)** Port forwarding is a use of NAT.
- 238)** MAC addresses are not guaranteed to be unique.

## **SWITCH**

- 239)** A switch has a lot of ports.
- 240)** A switch doesn't understand MAC addresses.
- 241)** A switch understands MAC addresses.
- 242)** A switch is more performant than a hub.
- 243)** A switch can transport UDP packets.
- 244)** A switch can't transport TCP packets.
- 245)** A switch can transport TCP packets.
- 246)** A switch can transport IP packets.
- 247)** A switch can't transport IP packets.

## **HUB**

**248)** A hub doesn't understand MAC addresses.

**249)** A hub is more performant than a switch.

**250)** A hub doesn't have many ports.

**251)** A hub understands MAC addresses.

**252)** A hub has many ports.

## **MAC ADDRESS**

**253)** The recvfrom() call sends data to the UDP server.

**254)** The MAC address is represented on 6 hexa digits.

**255)** The MAC address is represented on 6 groups of 2 hexa digits.

**256)** The MAC address is represented on 6 bytes.

**257)** The MAC address can't be changed.

**258)** The MAC address can be changed.

**259)** FF:FF:FF:FF:FF:FF is the broadcast MAC address.

**260)** 172.31.255.255 is not a private IP address.

**261)** 00:00:00:00:00:00 is not the broadcast MAC address.

**262)** The routers use MAC addresses to send frames to other networks.

**263)** 255.255.255.255 is the broadcast MAC address.

**264)** The MAC address is represented on 12 hexa digits.

**265)** 255.255.255.255 is not the broadcast MAC address.

**266)** FF:FF:FF:FF:FF:FF is the broadcast MAC address.

**267)** All the network cards have the same MAC address (Media Access Control Address).

**268)** FF:FF:FF:FF:FF:FF is not the broadcast MAC address.

**269)** The MAC address has 64 bits.

**270)** FF:FF:FF:FF:FF:FF is not the broadcast MAC address.

## **LEVEL LINK TRANSPORT APPLICATION NETWORK**

**271)** SSH is not on the Link Layer.

**272)** SSH is not on the Transport Layer.

**273)** SSH is not on the Network Layer.

**274)** SSH is on the Transport Layer.

**275)** SSH is on the Link Layer.

**276)** SSH is on the Network Layer.

**277)** SSH is not on the Application Layer.

**278)** SSH is on the Application Layer.

**279)** IP is on the Transport Layer.

**280)** IP is on the Application Layer.

**281)** IP is on the Network Layer.

**282)** IP is on the Link Layer.

**283)** IP is not on the Transport Layer.

**284)** IP is not on the Application Layer.

- 285)** IP is not on the Network Layer.
- 286)** IP is not on the Link Layer.
- 287)** HTTP is on the Transport Layer.
- 288)** HTTP is on the Application Layer.
- 289)** HTTP is on the Network Layer.
- 290)** HTTP is on the Link Layer.
- 291)** HTTP is not on the Transport Layer.
- 292)** HTTP is not on the Application Layer.
- 293)** HTTP is not on the Network Layer.
- 294)** HTTP is not on the Link Layer.
- 295)** SMTP is on the Transport Layer.
- 296)** SMTP is on the Application Layer.
- 297)** SMTP is on the Network Layer.
- 298)** SMTP is on the Link Layer.
- 299)** SMTP is not on the Transport Layer.
- 300)** SMTP is not on the Application Layer.
- 301)** SMTP is not on the Network Layer.
- 302)** SMTP is not on the Link Layer.
- 303)** DNS is on the Transport Layer.
- 304)** DNS is on the Application Layer.
- 305)** DNS is on the Network Layer.
- 306)** DNS is on the Link Layer.
- 307)** DNS is not on the Transport Layer.
- 308)** DNS is not on the Application Layer.
- 309)** DNS is not on the Network Layer.
- 310)** DNS is not on the Link Layer.
- 311)** FTP is on the Transport Layer.
- 312)** FTP is on the Application Layer.
- 313)** FTP is on the Network Layer.
- 314)** FTP is on the Link Layer.
- 315)** FTP is not on the Transport Layer.
- 316)** FTP is not on the Application Layer.
- 317)** FTP is not on the Network Layer.
- 318)** FTP is not on the Link Layer.
- 319)** TCP is on the Transport Layer.
- 320)** TCP is on the Application Layer.
- 321)** TCP is on the Network Layer.
- 322)** TCP is on the Link Layer.
- 323)** TCP is not on the Transport Layer.
- 324)** TCP is not on the Application Layer.
- 325)** TCP is not on the Network Layer.
- 326)** TCP is not on the Link Layer.

- 327)** UDP is on the Transport Layer.
- 328)** UDP is on the Application Layer.
- 329)** UDP is on the Network Layer.
- 330)** UDP is on the Link Layer.
- 331)** UDP is not on the Transport Layer.
- 332)** UDP is not on the Application Layer.
- 333)** UDP is not on the Network Layer.
- 334)** UDP is not on the Link Layer.

## **NETWORK ADDRESS**

- 335)** The address 192.168.0.255 can't be a network address.
- 336)** The address 127.0.0.1 can be a network address.
- 337)** The address 193.231.20.2 can be a network address.
- 338)** The address 193.256.20.0 can be a network address.
- 339)** The address 192.231.20.1 can be a network address.
- 340)** The address 192.231.20.3 can be a network address.
- 341)** The address 43.29.45.80/27 can be a network address.
- 342)** The address 192.168.2.160/24 can be a network address.
- 343)** The address 43.23.87.68/26 can be a network address.
- 344)** The address 192.168.2.160/25 can be a network address.
- 345)** The address 192.168.0.255 can be a network address.
- 346)** The address 193.255.20.0 can be a network address.
- 347)** The address 193.231.20.0 can be a network address.
- 348)** The address 193.231.20.4 can be a network address.
- 349)** The address 193.255.20.0 can be a network address.
- 350)** The address 192.168.2.32/27 can be a network address.
- 351)** The address 43.23.87.64/27 can be a network address.
- 352)** The address 192.168.2.128/25 can be a network address.
- 353)** The network address can be computed with the broadcast address and the netmask.
- 354)** The network address can be computed with the broadcast address and the IP address.
- 355)** The network address can't be computed with the broadcast address and the netmask.
- 356)** The network address can't be computed with the IP address and the netmask.
- 357)** The network address can't be computed with the broadcast address and the IP address.
- 358)** The network address can be computed with the IP address and the netmask.
- 359)** There is only one computer with the address 127.0.0.1.
- 360)** All the IP addresses in the class 172.0.0.0/8 are private.
- 361)** Not all the IP addresses in the class 172.0.0.0/8 are private.
- 362)** 168.168.168.168 is a private IP address.
- 363)** 168.168.168.168 is not a private IP address.
- 364)** 1.1.1.1 is a private IP address.

- 365)** Not all the IP addresses from the class 10.0.0.0/6 are private.
- 366)** 127.16.0.1 is not a private address.
- 367)** All the IP addresses from the class 172.0.0.0/12 are private.
- 368)** 127.16.0.1 is a private IP address.
- 369)** 172.32.0.1 is a private IP address.
- 370)** 1.1.1.1 is not a private IP address.
- 371)** 172.15.0.1 is not a private IP address.
- 372)** Not all the IP addresses in the class 192.168.0.0/8 are private.
- 373)** All the IP addresses from the class 172.16.0.0/12 are private.
- 374)** 172.16.0.1 is not a private IP address.
- 375)** 172.31.0.1 is not a private IP address.
- 376)** Not all the IP addresses in the class 192.168.0.0/16 are private.
- 377)** All the IP addresses from the class 10.0.0.0/16 are private.
- 378)** 192.168.168.168 is not a private IP address.
- 379)** 172.31.255.255 is a private IP address.
- 380)** 172.31.255.255 is not a private IP address.
- 381)** Not all the IP addresses from the class 10.0.0.0/8 are private.
- 382)** 10.10.10.10 is a private IP address.
- 383)** All the IP addresses from the class 10.0.0.0/8 are private.
- 384)** 172.16.0.1 is a private IP address.
- 385)** Not all the IP addresses from the class 172.16.0.0/12 are private.
- 386)** 192.168.168.168 is a private IP address.
- 387)** Not all the IP addresses from the class 10.0.0.0/16 are private.
- 388)** CLI comes from Command Line Interface.
- 389)** ARP means Address Resolution Protocol.
- 390)** MAC means Media Access Control.
- 391)** DNS means Domain Name System.
- 392)** Two computers from the Internet can have the same IP address if they have the same MAC address.
- 393)** LAN is an acronym for Limited Area Network.
- 394)** HTTP means Hyperspeed Transfer Protocol.
- 395)** HTTP means Hypertext Transfer Protocol.
- 396)** MAC means Media Address Control.
- 397)** CLI comes from Coding Line Interface.
- 398)** ARP doesn't mean Address Resolution Protocol.
- 399)** DNS means Domain Name Service.

## **TOPOLOGIES**

- 400)** There are only two standard network topologies: Bus and Star.
- 401)** Ring is a network topology.
- 402)** Ring is not a network topology.

- 403) Star is not a network topology.
- 404) There are more than two standard network topologies.
- 405) Bus is a network topology.
- 406) Star is a network topology.
- 407) Bus is not a network topology.

## **PROTOCOLS**

- 408) HTTP does not use the TCP protocol.
- 409) HTTP uses the UDP protocol.
- 410) DNS uses the TCP protocol.
- 411) DNS uses the UDP protocol.
- 412) HTTP uses the TCP protocol.

## **CONNECTION-ORIENTATION**

- 413) UDP is connection-oriented.
- 414) UDP is not connection-oriented.
- 415) TCP is connection-oriented.
- 416) TCP is not connection-oriented.

## **DEFAULT GATEWAY**

- 417) The dimension of an IP address class doesn't have to be a power of 2.
- 418) The dimension of an IP address class has to be a power of 2.
- 419) The dimension of a network is  $2^n$ , where n is the number of 0's in the IP.
- 420) The dimension of a network is  $2^n$ , where n is the number of 0's in the netmask.
- 421) The dimension of a network is  $2^n$ , where n is the number of 1's in the netmask.

## **COMPUTER**

- 422) A computer can have more network cards.
- 423) A computer can have only one network card.
- 424) There can't exist computers with the address 192.168.1.0.
- 425) A computer can have more IP addresses.
- 426) A computer can't have 2 gateways.
- 427) The DNS server configured on a computer has to be in the same network with the computer.
- 428) In a LAN there can't be more computers with the address 192.168.1.1.
- 429) There can be computers with the address 192.168.1.0.
- 430) 2 computers from the Internet can have the same IP address if they have the same MAC address.
- 431) A computer can have only one IP address.
- 432) A computer is connected to a switch through a Straight-Through cable.
- 433) 2 computers from the same network both physically and logically can't have different default gateways.
- 434) A router is connected to a computer with a Cross-Over cable.

## **SERVER**

- 435)** A web server can't run on ports different than 80.
- 436)** The DNS server configured on a computer can be in the same network with the computer.
- 437)** A DNS server can be default gateway.
- 438)** More websites can't be hosted on the same web server.

## **NETMASK**

- 439)** The netmask can't contain 0 bits embedded with 1 bits.
- 440)** The netmask can be determined using the IP address and the network address.
- 441)** The netmask can be determined using the IP address and the broadcast address.
- 442)** 0.0.0.0 represents a valid netmask.
- 443)** 255.255.224.0 represents a valid netmask.
- 444)** The netmask of a network with 1024 IP addresses is /10.
- 445)** 255.255.0.0 represents a valid netmask.
- 446)** A network with the netmask 255.255.255.0 can have max. 254 computers.
- 447)** The netmask of a network with 1024 IP addresses is /12.
- 448)** The netmask of a network with 512 IP addresses is /23.
- 449)** 0.0.0.0 is not a valid netmask.
- 450)** 255.254.0.0 is a valid netmask.
- 451)** The netmask can't be determined using the IP address and the network address.
- 452)** The netmask of a network with 1024 IP addresses is /22.
- 453)** The netmask can't be determined using the IP address and the broadcast address.
- 454)** A netmask is a binary number on 48 bits.
- 455)** A network with the netmask 255.255.255.0 has 128 IP's.
- 456)** 255.255.225.0 is a valid netmask.
- 457)** The netmask of a network with 512 IP addresses is /24.
- 458)** The netmask of a network with 1024 IP addresses is /23.
- 459)** The netmask can be computed using the broadcast address and the network address.
- 460)** The netmask can contain 0 bits embedded with 1 bits.
- 461)** 254.255.0.0 represents a valid netmask.
- 462)** A network with the netmask 255.255.255.0 can have max. 256 computers.
- 463)** A netmask is a binary number on 32 bits.
- 464)** There are other types of sockets besides TCP and UDP.
- 465)** There are only TCP and UDP sockets.
- 466)** There can't be more computers with the address 127.0.0.1.
- 467)** There are more computers with the address 127.0.0.1.
- 468)** The address 127.0.0.1 can be a broadcast address.
- 469)** 127.0.0.1 can't be configured on a system as default gateway.
- 470)** 127.0.0.1 can't be configured on a system as a DNS server.
- 471)** The localhost is not 172.0.0.1.
- 472)** The localhost is 172.0.0.1.



- 473)** The address 127.0.0.1 can't be a network address.
- 474)** 83.255.255.128.0 = /23
- 475)** 255.255.128.0 = /17
- 476)** 11111111 10000000 00000000 00000000 = 255.128.0.0
- 477)** 193.55.44.170 & 255.255.255.128 = 19355.43.128
- 478)** 11111111 10000000 00000000 00000000 = 255.1.0.0
- 479)** TCP is always faster than UDP.
- 480)** UDP is sometimes faster than TCP.
- 481)** TCP is sometimes faster than UDP.
- 482)** UDP is always faster than TCP.
- 483)** TCP is safer than UDP.
- 484)** The accept() call is mandatory in any TCP server.
- 485)** The accept() call is mandatory in any UDP client.
- 486)** The accept() call can be used in any TCP server.
- 487)** The accept() call is mandatory in any TCP client.
- 488)** The accept() call is not mandatory in any TCP client.
- 489)** The recvfrom() call reads data from the UDP server.
- 490)** The recvfrom() call reads data from the TCP server.
- 491)** The recvfrom() call sends data to the TCP client.
- 492)** The recvfrom() call sends data to the UDP client. FALSE
- 493)** The recvfrom() call doesn't send data to the TCP server.
- 494)** The recvfrom() call doesn't send data to the TCP client.
- 495)** The recvfrom() call sends data to the UDP server.
- 496)** The recvfrom() call sends data to the TCP server.
- 497)** The recvfrom() call doesn't send data to the UDP client.
- 498)** The recvfrom() call reads data from the UDP client.
- 499)** The recvfrom() call reads data from the TCP client.
- 500)** The connect() call is mandatory in any TCP server.
- 501)** The connect() call is mandatory in any UDP client.
- 502)** The connect() call can't be used in UDP clients.
- 503)** The connect() call can't be used in TCP clients.
- 504)** The connect() call can be used in UDP clients.
- 505)** The connect() call can be used in TCP clients.
- 506)** The connect() call is mandatory in any UDP server.
- 507)** The connect() call is mandatory in any TCP client.
- 508)** The sendto() call sends data to the UDP client.
- 509)** The sendto() call sends data to the UDP server.
- 510)** The sendto() call sends data to the TCP client.
- 511)** The sendto() call sends data to the TCP server.
- 512)** The listen() call is mandatory in any TCP client.
- 513)** The listen() call is not mandatory in any TCP client.

- 514) The listen() call is mandatory in any UDP server.
- 515) The listen() call can be used in any TCP server.
- 516) The listen() call is mandatory in any TCP server.
- 517) The bind() call can be used in UDP clients.
- 518) The bind() call can be used in TCP clients.
- 519) The bind() call can't be used in TCP clients.
- 520) The bind() call can't be used in UDP clients.
- 521) The bind() call is mandatory in any TCP server.
- 522) The bind() call is mandatory in any TCP client.
- 523) The bind() call is mandatory in any UDP server.
- 524) A /24 class can be divided in 2 /25 subclasses.
- 525) A class of IP addresses has to start at a multiple of the dimension of the class.
- 526) A class of IP addresses doesn't have to start at a multiple of the dimension of the class.
- 527) A /24 class can be divided in 2 subclasses of 128 IP's.
- 528) A /24 class can be divided in 3 subclasses of 128 IP's.
- 529) 192.168.2.155 is part of the 192.168.0.0/23 class.
- 530) 192.168.1.2/24 and 192.168.1.6/22 are part of the same network.
- 531) 531) A network with the mask 255.255.255.0 has 256 IP's.
- 532) A /24 class can be divided in 2 subclasses of 256 IP's.
- 533) 192.168.1.155 is part of the class 192.168.1.0/24.
- 534) A /24 class can be divided in 2 /25 subclasses.
- 535) The class 193.231.20.0/24 can be divided in 2 subclasses of 128 IP's.
- 536) 192.168.2.155 is part of the class 192.168.0.0/22.
- 537) A class /16 can't be divided in 16 /20 classes.
- 538) A /24 class can be divided in 3 /26 classes.
- 539) 192.168.1.155 is part of the class 192.168.1.0/25.
- 540) 192.168.1.155 is part of the class 192.168.0.0/24.
- 541) A /8 class can be divided in 4 /10 classes.
- 542) The class 192.231.20.0/24 can be divided in 3 subclasses of 128 IP's.
- 543) 192.168.0.2/24 and 192.168.1.6/24 are part of the same network.
- 544) A /16 class can be divided in 16 /20 classes.
- 545) 192.168.0.2/23 and 192.168.1.6/23 are part of the same network.
- 546) A /24 class can be divided in 3 /25 subclasses.
- 547) 192.168.1.155 is part of the class 192.168.0.0/23.
- 548) A /24 class can be divided in 2 subclasses of 512 IP's.
- 549) A /8 class can be divided in 4 /9 classes.
- 550) The subnetwork address for the station with the IP address 192.120.0.1/16 is 192.120.0.1.
- 551) The subnetwork address for the station with the IP address 192.120.0.1/16 is 192.120.0.0.
- 552) There can't exist computers with the address 192.168.1.0.
- 553) The network card acts as a physical interface between the computer and the network cable.
- 554) LAN is a global network.

- 555) LAN is not a global network.
- 556) Mobile phones can't connect to the internet without a network card.
- 557) The logical AND between the mask and IP address has as result the broadcast address.
- 558) The IP address can't be determined using the network address and the netmask.
- 559) UDP waits for the confirmation that the packets were received.
- 560) UDP is safer than TCP.
- 561) The routers use the IP addresses to transfer frames to other networks.
- 562) A wireless access point has a limited area coverage.
- 563) More websites can be hosted on the same web server.
- 564) An IP address is a binary number on 32 bits.
- 565) A router connects to a computer with a Straight-through cable.
- 566) TCP waits for the confirmation that the packets were received.
- 567) An IP address is a unique identifier for every computer in an IP network.
- 568) The network card doesn't transfer data to other computers.
- 569) A UDP socket is created with the parameters AF\_INET and SOCK\_DGRAM.
- 570) An IP address is a common identifier for more computers in an IP network.
- 571) The IP address can be determined with the network address and the netmask.
- 572) There can be more computers with the address 192.168.1.1 in a LAN.
- 573) A TCP is created with the parameters AF\_INET and SOCK\_DGRAM.
- 574) The DNS service runs on the TCP port 53.
- 575) The DNS service runs on the UDP port 53.
- 576) A UDP socket is created with the parameters AF\_INET and SOCK\_STREAM.
- 577) A TCP socket is created with the parameters AF\_INET and SOCK\_STREAM.
- 578) HTTPS transfers encrypted data.
- 579) HTTP transfers encrypted data.
- 580) A network card can have only one IP address.
- 581) A network card can have more IP addresses.
- 582) The address 87.35.15.63/26 can be a broadcast address.
- 583) The broadcast address can be computed using the network address and the netmask.
- 584) The broadcast address can be computed using the IP address and the netmask.
- 585) The address 83.35.15.8/28 can be a broadcast address.
- 586) The address 127.0.0.1 can't be a broadcast address.
- 587) The broadcast address can't be computed using the network address and the netmask.
- 588) The address 87.35.15.7/29 can be a broadcast address.
- 589) The broadcast address for the station with the IP address 192.120.0.1/16 is 192.120.255.255.
- 590) The network card can be external.
- 591) The BUS topology consists of a single cable which connects in series all the computers from the network.

**592) Which of the following involve NAT?**

- a) Accessing the web from an internal network. Your PC's network will be translated to your IP (i.e., home network).

b) Address Translation

c) Port Forwarding

**593)** Represent /26 in dotted decimal format: .....

**594)** How many hosts can be addressed on 10.0.0.0/16?

**595)** A computer connects to a switch using a Cross-Over cable.

**596)** A web server can run on ports different than 80.

**597)** Given the IP address 172.16.1.1 with a mask of 255.255.255.0, how many total subnets could be created?

**598) The time-to-live for a packet (TTL) is expressed in:**

a) The number of routers the packet has already passed through (incremented by 1)

b) Seconds

c) The number of routers the packet is allowed to pass

d) Routers/second

e) Milliseconds

**599) Choose the true statements:**

a) Using UDP protocols packets can be lost

b) UDP reads bytes from a packet

c) TCP writes stream of bytes

d) TCP reads bytes from a packet

**600)** Two computers from the Internet can have the same IP address if they use private IP addresses.

**601) Broadcasting is:**

a) A mechanism which is used when the transmission of a packet fails

b) When a transmitted packet is received by every machine on the network, but processed by none of them

c) When a transmitted packet is received by every machine on the network, but processed by only one of them

d) When a transmitted packet is received and processed by every machine on the network

## **Proposed Questions**

**1)** Which is the port number used by Network Time Protocol (NTP) with UDP?

**2)** Considering the OSI Reference Model, what is the first layer where we can talk about the IP Protocol?

**3)** What is the minimum number of interfaces a router should have?

**4)** What is a solution for "Flat Addressing"?

**5)** How many networks can we have in the class A of IP addressing?

**6)** Consider a block with 32 addresses. Can it begin with 193.226.40.96?

**7)** What is the netmask that we use to represent class B?

**8)** Consider the following network address: 192.0.2.64. How many net masks can it be used with?

**9) We can divide class B into:**

a) 7 subnetworks each of 8192 addresses

b)  $2^{16}$  subnetworks

c) 8 subnetworks each of 8190 addresses

d) 8 subnetworks each of 8192 addresses

**10) You are given the following IP address: 225.9.130.0/24 and the following number of computers are needed: N1 104, N2 80, N3 40, N4 24, N5 8. Can this be done using only the /24 netmask?**

**11) In the TCP paradigm, which of the following system calls are blocking calls?**

- a) accept()
- b) bind()
- c) connect()
- d) all of the above

**12) In TCP communication, what represents the value returned from the listen() system call?**

- a) The number of all incoming connections
- b) The number of all connections that arrive at the same time
- c) 0, if the call is successful, negative value if there is an error
- d) None of the above

**13) In TCP communication, what is the function call that changes the value of the port from the socket on which the call is made with a value on purpose?**

- a) socket()
- b) connect()
- c) bind()
- d) accept()

**14) In TCP communication, which of the following system calls are common to both server and client?**

- a) listen()
- b) close()
- c) bind()
- d) socket()

**15) Which of the following is not a server type?**

- a) Shared state server
- b) Iterative server
- c) Concurrent multiplexed server
- d) Concurrent server

**16) Which of the following communication protocols guarantees data delivery?**

- a) IP
- b) TCP
- c) UDP
- d) ARP

**17) Which of the following communication protocols guarantees data ordering delivery?**

- a) TCP
- b) UDP
- c) ARP
- d) IP

**18) Which of the following implementations of a concurrent TCP server have interdependent states between clients?**

- a) Fork/Processes

- b) Threads
- c) Select system call
- d) None of the above

**19) Which of the following statements are true?**

- a) TCP sockets are based on messages, not on a connection
- b) UDP sockets are based on messages, not on a connection
- c) In UDP, after a client has been connected, a continuous communication channel stays active between it and the server, until one of them closes the connection
- d) None of the above

**20) What is the main function of DHCP?**

- a) Transfer files between different platforms
- b) Provides network connectivity to a computer
- c) Automatically assigns IP addresses to the devices across the network
- d) None of the above

**21) Which of the following statements are true for Classless Inter Domain Routing?**

- a) The number of addresses in each block must be a power of 2
- b) The RIPv1 supports CIDR
- c) It is allowed to use discontinuous networks
- d) It is allowed to use a variable length mask

**22) Which of the following network components broadcasts the message to all the network?**

- a) Hub
- b) Router
- c) Switch
- d) DHCP server

**23) Which of the following system calls are optional at the level of a TCP client?**

- a) connect()
- b) socket()
- c) listen()
- d) none of the above

**24) Which of the following addresses are valid private addresses?**

- a) 192.168.255.0
- b) 172.16.10.0
- c) 172.168.10.0
- d) 10.255.189.255

**25) Which of the following is a valid IP netmask combination?**

- a) 168.220.186.8/225.255.255.192
- b) 156.186.192.8/255.255.255.252
- c) 89.56.43.192/255.255.255.0
- d) 7.68.3.128/255.255.255.192

**26) The maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.240 subnet mask is:**

- a) 16
- b) 8
- c) 14
- d) 30

**27) Which of the following are not contained by a routing table?**

- a) Interface
- b) Netmask
- c) Source address
- d) Gateway

**28) What is the loopback address?**

**29) TCP belongs to the:**

- a) Application layer
- b) Transport layer
- c) Internet layer
- d) Network Interface layer

**30) A wireless device can be connected to the network through a router. (T/F)**

**31) IP/RIP is a distance-vector routing protocol. (T/F)**

**32) DHCP can be set up on a router. (T/F)**

**33) 192.168.0.101 is from the class:**

- a) A
- b) B
- c) C
- d) D

**34) What is the default hostname for the address 127.0.0.1?**

**35) IPv6 uses:**

- a) 128 bits
- b) 32 bits
- c) 16 bytes
- d) 4 bytes

**36) What are the corresponding OSI Reference Model layers to the Application layer of the TCP/IP model?**

- a) Application
- b) Presentation
- c) Application and presentation
- d) Application, presentation, session

**37) Which is a true end-to-end layer in the OSI Reference Model?**

- a) Data link layer
- b) Transport layer
- c) Network layer
- d) Physical layer

**38) Which OSI Reference Model can be thought of as the one that maps bits to a certain signal:**

- a) Data link layer
- b) Physical layer
- c) Transport layer
- d) Session layer

**39) The 802.13 IEEE standard is used for:**

- a) Ethernet
- b) Wireless LANs
- c) Bluetooth
- d) It is unused

**40) Select and poll system calls are used in which of the following I/O modes:**

- a) Blocking I/O
- b) Nonblocking I/O
- c) I/O multiplexing
- d) Asynchronous I/O

**41) What protocol handles moving a datagram from source to destination?**

- a) RIP
- b) IPv4/IPv6
- c) Internet protocol
- d) PIM

**42) What is the minimum number of addresses from a B class of the class full addressing?**

- a) 255
- b) 257
- c) 2000
- d) 128

**43) The following is true about NAT:**

- a) ISP is not affected by changes in local network (changes that concern devices' addresses)
- b) Addresses in local network are not affected by changes in ISP
- c) Devices inside local network are not explicitly addressable
- d) All of the above

**44) An ISP has 4 organizations with networks: 200.23.16.0/24, 200.23.17.0/24, 200.23.18.0/24, 200.23.19.0/24. If we supernet the organizations we will get:**

- a) 200.23.19.0//25
- b) 200.23.16.0/20
- c) 200.23.16.0/22
- d) 200.23.20.0/24

**45) TTL defines:**

- a) The type of service an IP datagram is carrying
- b) The number of routers the packet can pass
- c) The actual data inside the datagram
- d) None of the above



**46) The maximum length (in bytes) of an IPv4 datagram is?**

- a) 32
- b) 1024
- c) 65535
- d) 512

**47) The IP network 192.168.50.0 is to be divided into 10 equal sized subnets. Which of the following subnet masks can be used for the above requirement?**

- a) 255.255.243.240
- b) 255.255.0.0
- c) 255.255.255.0
- d) 255.255.255.255

**48) Which of the following addresses belong to class A?**

- a) 121.12.12.248
- b) 130.12.12.248
- c) 128.12.12.248
- d) 129.12.12.248

**49) What IP address class allocates 8 bits for the host identification part?**

- a) A
- b) B
- c) C
- d) D

**50) The physical layer translates logical communication requests from the ... into hardware specific operations.**

- a) Data link layer
- b) Network layer
- c) Transport layer
- d) Application layer

**51) The Internet Protocol:**

- a) Deals with moving a datagram from source to destination
- b) Has the task of delivering packets from the source host to the destination
- c) Has a routing function
- d) None of the above

**52) Transport layer protocols deal with:**

- a) Application to application communication
- b) Process to process communication
- c) Node to node communication
- d) Man to man communication

**53) The OSI Model does not have seven layers. (T/F)**

**54) Header of a frame generally contains:**

- a) Destination address
- b) Source address

- c) The message to be delivered
- d) Acknowledgment field

**55) With TCP, one party can overflow the other. (T/F)**

**56) The listen system call is normally called by the client process in order to connect to read from a server. (T/F)**

**57) The recvfrom() system call returns the source socket. (T/F)**

**58) What layer from the OSI model has frames as data units?**

- a. Transport layer
- b. Network layer
- c. Datalink layer
- d. Physical layer

**59) The natural mask for a class E address is:**

- a) 255.255.255.0
- b) 255.255.0.0
- c) 0.0.0.0
- d) None of the above

**60) Which of the following is a valid IP/netmask combination?**

- a) 209.220.186.16/255.255.255.240
- b) 209.220.186.9/255.255.255.0
- c) 209.220.198.8/255.255.255.248
- d) 209.220.186.10/255.255.255.252

**61) What is a characteristic of a transport that encourages use of UDP?**

- a) Need for low latency
- b) Data loss needs to be avoided
- c) Bandwidth-intensive transport
- d) None of the above

**62) What is the in-memory representation of 12FE4h in little endian? (on 3 bytes)**

- a) E42F10
- b) 4EF201
- c) E42F01
- d) 012FE4

**63) How many bits are reserved for the fragment offset in an IP datagram?**

- a) 12
- b) 13
- c) 16
- d) 8

**64) What is the data unit of a TCP connection?**

- a) Datagram
- b) Packet
- c) Stream
- d) Letter

**65) Which of the following is not done by TCP?**

- a) Delivery confirmation
- b) Flux control
- c) Broadcasting
- d) Keeping the order of the bytes sent

**66) In the layer hierarchy, as the data packet moves from the upper to the lower layers, headers are:**

- a) Added
- b) Removed
- c) Rearranged
- d) Modified

**67) A ..... is the physical path over which a message travel.**

- a) Path
- b) Medium
- c) Protocol
- d) Route

**68) Which of this is not a network edge device?**

- a) PC
- b) Smartphones
- c) Servers
- d) Switch

**69) A ..... is a set of rules that governs data communication.**

- a) Protocol
- b) Standard
- c) RFC
- d) Server

**70) Three or more devices share a link in ..... connection.**

- a) Unipoint
- b) Multipoint
- c) Point to point
- d) Simplex

**71) Two devices are in the same network if:**

- a) A process in one device is able to exchange information with the process in another device
- b) A process is running on both devices
- c) PIDs of the processes running on different devices are the same
- d) A process is active and another is inactive

**72) In a computer network, a node is:**

- a) The computer that originates the data
- b) The computer that routes the data
- c) The computer that terminates the data
- d) All of the above

**73) Communication channel is shared by all the machines on the network in:**

- a) Broadcast network
- b) Unicast network
- c) Multicast network
- d) Anycast network

**74) A ..... is a device that forwards packets between networks by processing the routing information included in the packet.**

- a) Bridge
- b) Firewall
- c) Router
- d) Hub

**75) Network congestion occurs:**

- a) In case of traffic overloading
- b) When a system terminates
- c) When connection between two nodes terminates
- d) In case of transfer failure

**76) OSI stands for:**

- a) Open system interconnection
- b) Operating system interface
- c) Optical service implementation
- d) Open service internet

**77) Which address is used on the internet for employing in the TCP/IP protocols?**

- a) Physical address and logical address
- b) Port address
- c) Specific address
- d) All of the above

**78) Data communication system within a building or campus is:**

- a) LAN
- b) WAN
- c) MAN
- d) PAN

**79) A local telephone network is an example of a ..... network.**

- a) Packet switched
- b) Circuit switched
- c) Bit switched
- d) Line switched

**80) Which of the following is false with respect to TCP?**

- a) Connection-oriented
- b) Process-to-process
- c) Transport layer protocol
- d) Unreliable

**81) In TCP, sending and receiving data is done as:**

- a) Stream of bytes

- b) Sequence of characters
- c) Lines of data
- d) Packets

**82) To achieve reliable transport in TCP, ..... is used to check the safe and sound arrival of data.**

- a) Packet
- b) Buffer
- c) Segment
- d) Acknowledgment

**83) The value of acknowledgment field in a segment defines:**

- a) Sequence number of the byte received previously
- b) Total number of bytes to receive
- c) Sequence number of the next byte to be received
- d) Sequence of zeros and ones

**84) What allows TCP to detect lost segments and in turn recover from that loss?**

- a) Sequence number
- b) Acknowledgment number
- c) Checksum
- d) Both sequence and acknowledgment number

**85) During error reporting, ICMP always reports error messages to:**

- a) Destination
- b) Source
- c) Next router
- d) Previous router

**86) During debugging, we can use the ..... program to find if a host is alive and responding.**

- a) Traceroute
- b) Shell
- c) Ping
- d) Java

**87) On windows, ..... can be used to trace the route of the packet from the source to the destination.**

- a) traceroute
- b) tracert
- c) ping
- d) locater

**88) Which field helps to check rearrangement of the fragments?**

- a) Offset
- b) Flag
- c) TTL
- d) Identifier

**89) Two connected routers are configured with RIP routing. What will be the result when a router received a routing update that contains a higher-cost path to a network already in its routing table?**

- a) The updated information will be added to the existing routing table
- b) The update will be ignored and no further action will occur
- c) The updated information will replace the existing routing table entry
- d) The existing routing table entry will be deleted from the routing table and all routers will exchange routing updates to reach convergence

**90) Network layer firewall works as a:**

- a) Frame filter
- b) Packet filter
- c) Content filter
- d) Virus filter

**91) ICMP is used in:**

- a) Ping
- b) Traceroute
- c) Ifconfig
- d) Ping and traceroute

**92) What is an access point in a wireless LAN?**

- a) Device that allows wireless devices to connect to a wired network
- b) Wireless devices itself
- c) Both device that allows wireless devices to connect to a wired network and wireless devices itself
- d) All the nodes in the network

**93) To join the internet, the computer has to be connected to a:**

- a) Internet architecture board
- b) Internet society
- c) Internet service provider
- d) Different computer

**94) Which protocol assigns IP address to the client connected in the internet?**

- a) DHCP
- b) IP
- c) RPC
- d) RSVP

**95) In case three duplicate acks are received:**

- a) Congestion is present, the congestion window is cut in half and grows linearly
- b) Congestion is not present
- c) Congestion is present, the congestion window is cut in half and grows exponentially
- d) Congestion is present, the congestion window is set to 1 and grows linearly

**96) In the TCP Slow Start mechanism, the rate is given by:**

- a)  $RTT / CongWinSize$  (s/bytes)
- b)  $RTT / CongWinSize$  (s/bits)
- c)  $CongWinSize / RTT$  (bytes/s)
- d)  $CongWinSize / RTT$  (bits/s)

**97) RIP represents a:**

- a) Centralized static routing mechanism
- b) Centralized dynamic routing mechanism
- c) Decentralized static routing mechanism
- d) Decentralized dynamic routing mechanism

**98) The SOA header of a DNS record contains the following entries:**

- a) Serial no, refresh interval, update entry, expiry, minimum or TTL
- b) Serial no, ack id, update entry expiry, maximum or TTL
- c) Serial no, copy pointer, update entry, retirement, urgent pointer
- d) Serial no, IP address, port, message length, message

**99) SMTP is:**

- a) An offline protocol
- b) Built on top of TCP
- c) Built on top of UDP
- d) On the same level as FTP, HTTP and DNS

**100) If the client requires multiple files, FTP provides:**

- a) A control connection and a data connection for each request
- b) A control connection and multiple data connections
- c) Multiple control connections and one data connection
- d) None of the above

**101) If a DNS server is not authoritative for a host name, then the server will contain a Type NS record for the domain that includes the hostname, and also a Type ..... record that provides the IP address of the DNS server in the Value field of the NS record. A**

**102) The select statement will select a readable socket when:**

- a) There is data to be read on that socket
- b) A new connection was established (socket was in listening mode)
- c) Enough space is available for writing
- d) There is an error pending

**103) When a new client connects to a network with DHCP, the following steps will be taken by the DHCP protocol:**

- a) DHCP Server Discovery, DHCP Server Offer(s), DHCP Request, DHCP Ack
- b) DHCP Request, DHCP Server Discovery, DHCP Server Offer(s), DHCP Ack
- c) DHCP Server Discovery, DHCP Request, DHCP Ack, DHCP Server Offer(s)
- d) DHCP Server Offer(s), DHCP Server Discovery, DHCP Request, DHCP Ack

**104) IPv4 address 127.0.0.1:**

- a) cannot be a broadcast address because it is a private address
- b) cannot be a broadcast address because there is no usable network that can end with that address
- c) can be a broadcast address
- d) cannot be a broadcast address because the last bit is odd

**105) If a DNS Server is authoritative for a given host name, then the DNS Server will contain a:**

- a) Type A record
- b) Type NS record and type SOA record

- c) Type CNAME record
- d) Type MX record

**106) One difference between HTTP and SMTP is that:**

- a) one is built over TCP and the other over UDP
- b) HTTP is a pull protocol while SMTP is a push protocol
- c) HTTP is a push protocol while SMTP is a pull protocol
- d) HTTP requires data to be in 7-bit ASCII format, while SMTP does not

**107) Consider two organizations each with their own mail servers (S1 and S2 respectively). User A belongs to the first organization and user B to the second. A sends a mail to B. The following process takes place:**

- a) A's user agent sends the mail to S2's queue, S2 sends the message to recipient B
- b) A cannot send a mail to B since they belong to different organizations
- c) A's user agent sends the mail to S1's queue, S1 sends the message to S2's queue, recipient
- d) B requests the mail from S2 using POP3 or IMAP Protocols
- e) A's user agent sends the mail to S1's queue, S1 sends the message to S2's queue, S2 sends the message to recipient B

**108) Which is NOT a TCP characteristic?**

- a) Reliable transport
- b) Connection-oriented
- c) Flow control
- d) Datagram based

**109) Which of the following affirmations is/are true?**

- a) A process is identified on the source and destination machines of TCP/IP communication solely by the IP address
- b) Different servers on the Internet can have the same name
- c) UDP provides reliable data transfer
- d) UDP doesn't require "listen" and "accept"

**110) How is congestion manifested?**

- a) Lost packets
- b) Packets arrive at the wrong destination
- c) Long delays
- d) False error messages are sent

**111) A class A network:**

- a) Has the most significant bit 0
- b) Has the most significant bits 10
- c) Has the natural mask 255.0.0.0
- d) Has the natural mask 255.255.255.0

**112) NAT:**

- a) Stands for Network Address Transmission
- b) Is an Internet Protocol
- c) Makes it possible for all devices in a LAN to use the same IP address when communicating with the outside



- d) Makes devices not explicitly addressable by the outside world

**113) In a network with mask 255.255.255.248:**

- a) Has 8 useable addresses
- b) Has 6 useable addresses
- c) Has 3 bits for the host part
- d) Has 3 bits for the network part

**114) Which of the following affirmations about routing algorithms is/are true?**

- a) Dijkstra's algorithm is used when all routers have complete topology
- b) The distance vector routing algorithm outputs the routing table for a single node
- c) Dijkstra's algorithm has linear time complexity
- d) Both Dijkstra's and the distance vector algorithm are iterative

**115) Which protocol is used for delivery and storage of electronic mail to receiver's server?**

- a) HTTP
- b) SMTP
- c) IMAP
- d) POP

**116) Which of the following affirmations about sockets is/are true?**

- a) It is host-local
- b) It is OS-controlled
- c) It is an interface into which the application process can only send messages to another
- d) application process
- e) It can be used in client/server applications

**117) Which of the following affirmations about Web caching is/are true?**

- a) Web caching can satisfy the client request without involving the origin server
- b) Cache acts as both client and server
- c) Web caching increases response time for client request
- d) Web caching increases traffic on an institution's access link

**118) Which of the following affirmations about Cookies is/are true?**

- a) Cookies can bring recommendations
- b) Advertising companies obtain info through cookies
- c) Cookies do not allow sites to learn more about the user
- d) The cookie file is kept on the user's host

**119) Which of the following affirmations about TCP retransmission is/are true?**

- a) TCP might drop packets that are not received
- b) TCP retransmits a message that did not reach the destination
- c) TCP builds an average delay time for a packet to be sent and received
- d) TCP uses ACK for acknowledgement of received packets

**120) The HTTP Protocol:**

- a) Is a mail exchange protocol
- b) Allows exchange of HTML and Web data
- c) Allows exchanging files between two machines
- d) Allows for offline message exchanging

**121) Do routers need to recompute IP checksums at every hop?**

**122) When computing the checksum, the value of the checksum field is:**

- a) 0
- b) 0xffff
- c) 65535
- d) 42

**123) If a packet is larger than the MTU (Maximum Transmission Unit) it is fragmented in:**

- a) More TCP packets
- b) More HTTP packets
- c) More IP packets
- d) More UDP packets

**124) IP packets that have been segmented will be reassembled at:**

- a) The destination
- b) The next hop with a large enough MTU
- c) The default gateway

**125) Which of the following is the TCP handshake?**

- a) SYN, ACK/FIN
- b) SYN/ACK, SYN, FIN
- c) SYN, SYN/ACK, ACK
- d) SYN, SYN/ACK, FIN

**126) The traceroute command works by:**

- a) Using RIPv2 queries
- b) Gradually increasing TTL
- c) Using ARP messages
- d) Receiving ICMP Time Exceeded

**127) TCP and UDP can use the same port at the same time. (T/F)**

**128) When are we guaranteed to receive the data in a UDP packet in the same order it was sent?**

- a) Never
- b) When the length of the packet is below the minimum MTU in the route
- c) Always
- d) When the destination is on the same network as the source

**129) DHCP is implemented over:**

- a) TCP
- b) IP
- c) ICMP
- d) UDP

**130) WHOIS is:**

- a) A system command that shows the username of the user that calls it
- b) A protocol used to query domain name information
- c) A system command and protocol that shows info about a local or remote user

**131) APIs are:**

- a) Primitives that allow communication between processes on different computers
- b) Set of functions called at the Operating System layer allowing us to create and use a socket

- c) Pseudo-files to read/write from/to

**132)** The bind() call sets up the connection between server and client. (T/F)

**133)** The listen() call is used to wait for connection requests from clients. (T/F)

**134) Which call creates a new socket?**

- a) Socket()
- b) Bind()
- c) Accept()

**135)** Threads use less memory than processes. (T/F)

**136)** Send() is not a blocking call by default. (T/F)

**137) What values can the send() call return?**

- a) A number greater than 0, equal to the number of bytes sent
- b) A number smaller than 0 if an error has occurred
- c) 0 if the operation was successful

**138) Which of the following layer of OSI model also called end-to-end layer?**

- a) Presentation layer
- b) Transport layer
- c) Network layer
- d) Data link layer

**139)** Each IP packet must contain both the source and destination addresses. (T/F)

**140) The layers of the TCP/IP Model are:**

- a) Application Layer
- b) Network Layer
- c) Transport Layer
- d) Internet Layer
- e) Physical layer
- f) Link Layer

**141) The order in which these actions happen in a TCP/IP app is:**

- a) Server sends answers, listens to the client's requests and executes them
- b) Server executes requests, it listens to client's request and sends answers
- c) Server listens for client's requests, executes them and answers

**142) Servers can handle:**

- a) Only one client at the same time
- b) No clients
- c) Multiple clients at the same time

**143) The Transport Layer:**

- a) Controls the operation of a subnet
- b) Accept data from upper layers
- c) Traffic regulation
- d) Ensure that packets arrive correctly to the other end

**144) To identify a process:**

- a) The IP address is enough
- b) The port is enough

- c) We need both the IP address and the port
- d) None of the above answers

**145) How is a server on the Internet named?**

- a) HostName.TLD.Domain
- b) HostName.Domain.TLD
- c) TLD.Domain.HostName
- d) Domain.HostName.TLD

**146) FTP client contacts FTP server at port:**

- a) 19
- b) 20
- c) 21
- d) 22

**147) In the Client-Server Paradigm, a host can be implemented both sides of a service, both as client and as server. (T/F)**

**148) What is the prefix for a class D address and what are class D addresses used for?**

- a) 0, used for IP addressing
- b) 10, they are experimental addresses
- c) 1110, used to diffuse messages to a subset of machines, similar to distribution with subscription
- d) 110, they are assigned to private networks

**149) In the case of class full IP Addressing, what is the largest routing table we can have?**

- a) 232
- b) 216
- c)  $2^7 + 2^{14} + 2^{21}$
- d)  $2^8 + 2^{16}$

**150) What is the disadvantage of class full IP Addressing?**

- a) Address space exhaustion
- b) Not enough addresses available in a class
- c) Inefficient use of address space
- d) Too large routing tables

**151) Broadcast can get through a router. (T/F)**

**152) Why would an ISP aggregate smaller networks into a larger one?**

- a) It does not ever aggregate networks
- b) In order to have one entry in the routing table of the router connecting the ISP to the
- c) Internet
- d) It can't store information about each network individually
- e) In order to group all networks for a specific client together

**153) What is the more common name of the MAC Layer?**

- a) Internet layer
- b) Session layer
- c) Physical layer
- d) Data link layer

**154) What is TTL and on how many bytes is it represented?**

- a) a component of the application layer represented on 8 bytes
- b) it stands for time to live and it is represented on 1 byte
- c) the number of routers allowed to pass until discarded, represented on 1 byte
- d) the transport time layer and it is represented on 8 bytes

**155) Frames get reassembled before reaching their destination. (T/F)**

**156) IP checksum is a type of error correction code. (T/F)**

**157) How does ARP find a destination MAC address?**

- a) Using multicast
- b) through broadcast in the LAN
- c) it isn't used to find destination MAC addresses
- d) using the default gateway in the LAN

**158) What are exchange units called at the level of the Application layer?**

- a) Frames
- b) Datagrams
- c) Packets
- d) Data structure

**159) How many bytes does the header take in an IP datagram?**

- a) 4
- b) 16
- c) 20
- d) 8

**160) What happens to a packet if it has its DF flag set to 1?**

- a) It is fragmented when needed
- b) It is not allowed to be fragmented and if there is a need to fragment it, the packet is dumped
- c) A message is sent to the source address if the packet doesn't fit the MTU of a passing data link layer
- d) It is fragmented only when reaching the destination

**161) Which is the lowest layer of the OSI stack?**

- a) Physical
- b) Network
- c) Application
- d) Data link

**162) Which of the following has the largest number of bits?**

- a) IPv4 address
- b) IPv6 address
- c) MAC address

**163) Which is not a layer of the OSI stack?**

- a) Physical
- b) Application
- c) Network

d) UDP

**164) What is the unit exchanged at network level in the OSI stack?**

- a) Packet
- b) Bit
- c) Frame
- d) APDU

**165) A DHCP server can assign MAC addresses to computers in its network. (T/F)**

**166) TCP retransmits lost packages. (T/F)**

**167) UDP data is:**

- a) Reliable
- b) Ordered
- c) Lightweight

**168) Which one of the following services is loss-tolerant?**

- a) E-mail
- b) Real time video
- c) File transfer
- d) Instant messaging

**169) Sliding window protocol is used by ..... .**

**170) Choose the correct statement(s):**

- a) A switch works in Data Link Layer
- b) A router works in Transport Layer
- c) A switch works in Physical Layer
- d) A router works in Network Layer

**171) A router:**

- a) forwards data packets between computer networks
- b) builds the map of the network in the form of the routing table
- c) can be configured as a DHCP Server
- d) can be configured as a DNS Server

**172) Choose the correct statement(s):**

- a) Public IP comes with a cost
- b) You can't have the same 2 private IPs in different local area networks
- c) Private IPs can be used in WAN
- d) IPV6 has 64-bit addresses

**173) DNS primarily uses ..... .**

**174) An Access Point:**

- a) It is wired connected to a router
- b) Is a wireless network device that allows devices to connect to the local area network via WIFI
- c) It manages the local area network
- d) All of the above

**175) A DNS doesn't:**

- a) provide host names to TCP/IP addresses

- b) translate a TCP/IP address to another TCP/IP address
- c) provide an IP address to a device
- d) use TCP at all

**176) This is true for packet switching:**

- a) each data stream is divided into packets
- b) has a fixed connection path between the source and the destination
- c) packets move one hop at a time
- d) uses bandwidth division into pieces

**177) Which of the following use TCP?**

- a) HTTP
- b) FTP
- c) Ping command
- d) All of the above

**178) A Hub:**

- a) operates on the physical layer
- b) it is a smarter version of a switch
- c) can't store MAC addresses
- d) has software for administration

**179) What protocols use UDP?**

- a) ARP
- b) FTP
- c) SSH
- d) DNS

**180) Which elements are on the network level on TCP/IP stack?**

- a) UDP
- b) Router
- c) IP address
- d) Switch

**181) On which part of the TCP/IP stack is the Wi-fi placed?**

- a) Network
- b) Application
- c) Data link
- d) Transport

**182) Which of the following are correct if you look at the TCP/IP stack in descending order?**

- a) DNS, UDP, FTP, TCP, IP address, Router, Switch, Hub, UTP cable
- b) DNS, FTP, Router, UDP, TCP, IP address, Switch, Hub, UTP cable
- c) DNS, FTP, UDP, TCP, IP address, Router, Switch, Hub, UTP cable
- d) DNS, UDP, TCP, IP address, Router, Switch, Hub, UTP cable, FTP

**183) Which one is correct for to UDP/TCP protocols?**

- a) UDP is faster than TCP
- b) TCP can lose data
- c) UDP verifies the packages

- d) TCP is used for broadcasting

**184) Which of the following traffic types are valid?**

- a) Unicast
- b) Multicast
- c) Dual-traffic

**185) What information about Switches and Hubs are correct?**

- a) Hubs have processors and memory
- b) Switches are “smarter” than Hubs
- c) With Hubs there still are collisions
- d) With Switches there still are collisions

**186) What is the metric of a route when the destination is in the same network?**

**187) Which of the following messages are transmitted via ICMP?**

- a) no memory left
- b) destination host undefined
- c) destination host unreachable
- d) bad IP header

**188) What does the abbreviation ICANN stand for?**

- a) International Corporation for Allocating Names and Numbers
- b) I CAN
- c) Internet Corporation for Assigned Names and Numbers
- d) Interactive Communication Among Network Names

**189) What's the primary port on which SMTP works?**

**190) Which of the following are DNS resource record types?**

- a) SOA = start of authority
- b) MS = mail server
- c) MX = mail exchange
- d) RNAME = canonical (real) name

**191) What is the number of duplicate acknowledgements that indicates a congested network?**

**192) How many bits do the flags occupy in the TCP header?**

**193) What is the main reason why DNS servers should be situated in different places (geographically)?**

- a) because the domain costs are cheaper
- b) because if one of them fails due to a natural disaster, the others are not be affected
- c) because each will serve the requests coming from its own region, so the total computational cost is divided
- d) there is no such requirement

**194) A socket is:**

- a) an OS-controlled interface
- b) a hardware part of the network
- c) a „door” to send and receive messages to/from processes
- d) a Data link layer protocol

**195) A DNS Server translates IP addresses to domain names. (T/F)**

**196) For RIPv2:**



- a) it supports only class full networks
- b) does not provide trigger updates
- c) it's hop count limit is 15
- d) it is configured on the router

**197) The Traceroute tool uses IP TTL to trace packet paths. (T/F)**

**198) Which one is true about Trunk Links?**

- a) They connect the end devices to the first switch or router
- b) They connect switches to switches
- c) They have a bigger capacity than access links
- d) They cannot be made out of optical fiber

**199) In the TCP Programming API, the socket function call needs as one of the parameters:**

- a) The family of the socket
- b) The local IP
- c) A port
- d) The type of the socket

**200) Which one is not part of the OSI Reference Model?**

- a) Physical Layer
- b) Network Access Layer
- c) Network layer
- d) Session layer

**201) Which one is a characteristic of the Data Link Layer?**

- a) Turns the raw transmission into an error free communication line
- b) Defines rules about data representation
- c) Controls the operation of a subnet
- d) It is a true end to end layer

**202) FTP is a protocol that is part of the:**

- a) Physical Layer
- b) Data Link Layer
- c) Transport Layer
- d) Application Layer

**203) In the TCP 3-way handshake process:**

- a) In the first step the client sends a segment with SYN to the server
- b) In the first step the client sends a segment with ACK to the server
- c) In the second step the client acknowledges the response of the server
- d) In the third step the server receives from the client a segment with  $Ack = server\_isn + 1$

**204) DNS resource records contain:**

- a) Host Name
- b) Domain Name
- c) Time To Live
- d) Flags

**205) In which application(s) is data loss tolerated?**

- a) file transfer
- b) real-time audio
- c) instant messaging
- d) interactive games

**206) The Select system call returns:**

- a) -1 on error
- b) 0 on error
- c) 0, if timeout
- d) Positive count of ready descriptors

**207) Which of the following interconnection devices don't have Ethernet switches?**

- a) traffic isolation
- b) cut through
- c) plug and play
- d) optimal routing

**208) Which layer from the OSI Reference Model handles flow control?**

- a) Application
- b) Session
- c) Presentation
- d) Data link

**209) When is the TCP syn flag set to 1?**

**210) Which of the following are advanced TCP I/O Models?**

- a) blocking I/O
- b) nonblocking I/O
- c) signal driven I/O
- d) Asynchronous I/O

**211) Which protocols from the following are not application-level protocols?**

- a) HTTP
- b) SMTP
- c) DNS
- d) RIP

**212) Which port is used for the SMTP Protocol?**

- a) 20
- b) 21
- c) 25
- d) 26

**213) ICMP type for ping:**

- a) 0
- b) 4
- c) 8
- d) 12

**214) A mobile user, passing through multiple access points has ..... .**

**215) Which of the following are considered DNS design goals?**

- a) Local Control Over Local Resources
- b) Distributed Design to Avoid Bottlenecks
- c) Application Universality
- d) All of the above

**216) What type of link(s) are used to connect switches with one another?**

- a) Access link
- b) Fiber link
- c) Trunk link
- d) High link

**217) Which of the following statements are true about Statistical Multiplexing?**

- a) Only works in a local area network
- b) Sequence of packets do not have fixed pattern
- c) Inefficient use of resources
- d) Can accommodate bursty traffic

**218) The physical layer transfers raw bits. (T/F)**

**219) What is the maximum port number?**

**220) Which of the following statements are not true about the UDP API?**

- a) It read bytes from one packet
- b) Listen and accept are required
- c) Doesn't guarantee for datagram delivery or ordering
- d) Bytes not read from the packet stay available for the next read

**221) Which of the following statements about DNS are true?**

- a) The correct naming configuration is: Domain.HostName.TLD
- b) DNS is an application layer protocol
- c) DNS stands for Dynamic Naming System
- d) A DNS server can be a default gateway

**222) What is the maximum data rate for a 2 kHz channel with binary signals?**

**223) Which of the following are part of the TCP/IP Model?**

- a) Application
- b) Presentation
- c) Data link
- d) Physical

**224) How many bits does the source IP address occupy in the IP Datagram?**

- a) 64
- b) As many as the destination IP address does
- c) As many as the Header Internet Checksum does
- d) 32

**225) Which statements are true about the SMTP?**

- a) It allows for online message exchanging
- b) It stands for Simple Mail Transfer Protocol
- c) Its server port is 25

**226)** ICMP Echo and Reply are used by Ping in order to determine if a host is up. (T/F)

**227) What happens after receiving one duplicate Acknowledgment?**

- a) Congestion Window is cut in half
- b) Congestion Window is set to 1 MSS
- c) Congestion Window is doubled
- d) None of the answers

**228) When the Congestion Window is below the Threshold:**

- a) The window grows linearly
- b) The window is set to 1 MSS
- c) The window grows exponentially

**229)** What is the port on which the HTTP works?

**230) Which of the following statements about FTP are true?**

- a) It uses 4 channels: control, data, active, passive
- b) It uses 2 channels: control, data
- c) It uses 2 channels: active, passive
- d) It uses 3 channels: control, active, passive

**231) Which port(s) are used in the FTP?**

- a) 20
- b) 25
- c) 30
- d) 21
- e) 31

**232) 127.0.0.1 can be:**

- a) A network address
- b) A broadcast address
- c) Set as default gateway
- d) Set as DNS server

**233)** Are public WIFIs (ex: wi-fi from a local pub) using public IP addresses (i.e., not private IP addresses)?

**234) Which statements are true about TCP/IP and TCP?**

- a) Both are a conceptual model and a set of communications protocols
- b) TCP/IP is composed of only TCP and IP
- c) TCP/IP is composed of TCP, IP and many more protocols
- d) TCP/IP is just another name for TCP

**235) Which layer from the OSI Reference Model deals with bit-wise error correction?**

- a) The Physical layer
- b) The Correction layer
- c) The Network layer
- d) The Data Link layer

**236) What happens if the Gateway in a Routing table entry is 0.0.0.0?**

- a) This is not possible
- b) All routes will be directed to 0.0.0.0

- c) The router puts the packet on the current network interface

**237) How does a server handle multiple clients on the same port (e.g., HTTP: port 80)?**

- a) it is not possible
- b) by using a UDP connection
- c) the server assigns a new port for each client

**238) What are the first 4 bits of Class E?**

**239) What are the 3 levels of hierarchy of IP Subnet?**

- a) network, subnet, host portions
- b) network, masks, host portions
- c) host, subnet, network portions
- d) host, masks, network portions

**240) About the OSI Model, the following are not true:**

- a) The Transport Layer passes the data to the Data Link Layer
- b) The Data Link Layer takes the packets from the Network Layer and puts the data into frames
- c) The Physical Layer works with raw bits
- d) The Session Layer handles flow control

**241) Regarding the TCP Segment, the following are false:**

- a) Some of the header fields are: checksum, source IP, acknowledgment number, options
- b) The destination IP field contains 16 bits
- c) The header contains at least 3 flags
- d) The header contains at most 5 flags
- e) The acknowledgment number field deals with flow control

**242) The following are calls that use DNS:**

- a) `gethostbyport(...)`
- b) `gethostbymac(...)`
- c) `gethostbyaddr(...)`
- d) `gethostbyip(...)`
- e) `getnameinfo(...)`
- f) `getaddrinfo(...)`
- g) `getipinfo(...)`

**243) Which of the following is not true?**

- a) If a `sendto()` operation returns n bytes, then for sure n bytes will reach destination
- b) If a `send()` operation returns n bytes, then for sure n bytes will reach destination
- c) A `sendto()` call provides no error signaling for undelivered data
- d) A `send()` call provides no error signaling for undelivered data
- e) A `send()` operation will be consumed by exactly one `recv()` operation
- f) A `sendto()` operation will be consumed by exactly one `recv()` operation

**244) Regarding the IP Datagram, which of the following is not true?**

- a) The header has 14 fields, and they are all required
- b) The flags field has a size of 3 bits
- c) The checksum field checks the 16 bits parts of the header
- d) A datagram is discarded when the TTL field reaches value -1

- e) If the datagram reaches a smaller MTU than its size and the DF is set to 1, the datagram will be fragmented and MF will be set to 1

**245) What does ICMP stand for?**

- a) Internal Classless Mask Protocol
- b) Internet Communication Management Protocol
- c) Internet Control Message Protocol
- d) Internet Control Management Protocol

**246) During the two-way handshake TCP process:**

- a) in the first step, the SYN flag is set to 1
- b) in the first step, the ACK flag is set to 1
- c) in the second step, ACK=client\_isn+1
- d) none of the above

**247) Which of the following is not false, regarding the UDP Datagram?**

- a) The checksum field protects both the data and the header section
- b) The header contains 32 bytes
- c) The header contains 4 fields, of 8 bytes each
- d) In IPv4, the length may exceed, in some cases, 128 Kb
- e) The minimum length is 8 bytes

**248) Regarding the TCP/IP Model layers and their specific data exchange units, which of the following is true?**

- a) UDP Datagrams belong to the Internet Layer
- b) Data Structures belong to the Application Layer
- c) Frames belong to the Internet Layer
- d) TCP Segments belong to the Datalink Layer

**249) The location of a resource on the internet is given by its .....**

**250) When the TTL is 0, the IP diagram is discarded and:**

- a) a message will be sent to the destination
- b) a message will be sent to the source
- c) a message will be sent to the destination and source
- d) no messages will be sent

**251) ICMP is used to transport data. (T/F)**

**252) If the IP diagram has been altered it is:**

- a) Discarded
- b) Sent back to the source
- c) Used anyway

**253) In the Data Link Layer, which of the following MAC addresses need to be found:**

- a) source MAC address
- b) destination MAC address
- c) both source and destination MAC addresses
- d) neither

**254) The TTL is incremented when passing through a router. (T/F)**

**255)** When using NAT, if the addresses in the local network are changed, the outside world needs to be noticed. (T/F)

**256)** When using NAT, all datagrams leaving the local network have the same:

- a) source NAT IP address
- b) port number
- c) source NAT IP address and port number
- d) both are different

**257)** Pick from the following to which is best suited TCP over UDP?

- a) E-mail
- b) File transfer
- c) Audio call
- d) Video streaming

**258)** Which layer sets the data in frames?

- a) Physical layer
- b) Data link layer
- c) Network layer
- d) Transport layer

**259)** Which is the maximum value set for TTL?

**260)** Which of the following messages are due to ICMP?

- a) destination host unreachable
- b) destination host unknown
- c) sender host unreachable
- d) request timed out

**261)** A TCP header is larger than a UDP header by how many bytes?

**262)** Choose the correct statement:

- a) the server needs to know the client's IP and port before a connection is made to ensure it knows how to send the responses
- b) the client needs to know the server's IP and port before a connection is made to ensure it knows how to send the requests
- c) the server doesn't need to know the client's IP and port because it will receive them via the accept socket call
- d) the client doesn't need to know the server's IP and port because it will receive them via the connect socket call

**263)** The checksum in the IP header is computed:

- a) When passing through each switch and hub in order to ensure consistency
- b) On the source and destination hosts
- c) On each router
- d) Every time a router believes the packet has been altered

**264)** Which is the correct expression for the length of UDP datagram payload?

- a)  $\text{UDP length} = \text{UDP length} - \text{UDP header's length}$
- b)  $\text{UDP length} = \text{IP length} - \text{IP header's length} - \text{UDP header length}$
- c)  $\text{UDP length} = \text{UDP length} + \text{UDP header's length}$

d) UDP length = IP length + IP header's length

**265) What happens if the Gateway in a Routing table entry is 0.0.0.0?**

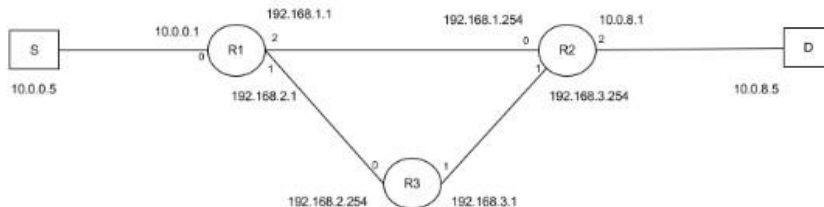
- a) This is not possible
- b) The router puts the packet on the associated network interface with this route
- c) All packets will be directed to 0.0.0.0
- d) The router drops the packet as there is no such gateway IP address

**266) Consider one SWITCH and 10 PCs connected to it. Which of the following is false?**

- a) when PC1 sends a message to PC5, the message will be received by all the PC's but only PC5 process it; the answer will be also received by all the PC's but only PC1 will process it
- b) when PC1 sends a message to PC5, the message will be received by all the PC's, but only PC5 process it; the answer is sent back and received only by PC1
- c) when PC1 sends a message to PC5, the message will be received by all the PC's, each of them sending back an answer
- d) when PC1 sends a message to PC5, the message will be received and processed just by PC5 and the answer of PC5 will be received and processed just by PC1

**267) A TCP connection is terminated through:**

- a) a 4-way handshake
- b) none of the answers are correct
- c) a 2-way handshake
- d) a 3-way handshake



R1 Dest	Mask	Gateway	Intf
10.0.0.0	/24	0.0.0.0	0
192.168.2.0	/24	0.0.0.0	1
192.168.1.0	/24	0.0.0.0	2
0.0.0.0	/0	192.168.2.254	1

R2 Dest	Mask	Gateway	Intf
192.168.1.0	/24	0.0.0.0	0
192.168.3.0	/24	0.0.0.0	1
10.0.4.0	/22	0.0.0.0	2
0.0.0.0	/0	192.168.1.1	0

R3 Dest	Mask	Gateway	Intf
192.168.3.0	/24	0.0.0.0	1
192.168.2.0	/24	0.0.0.0	0
0.0.0.0	/0	192.168.3.254	1

**268)** Given the network diagram above and the routing tables for routers R1, R2, R3 - provide the first 4 IP addresses displayed by executing on host S - traceroute 10.0.8.5.(addresses will be written separated only by comas with no spaces or other characters)

**269) What are the values of the network address and the netmask in the default route?**

- a) 255.255.255.255 0.0.0.0
- b) 255.255.255.0
- c) 0.0.0.0
- d) 127.0.0.1 255.255.255.0



- 270) Which of the following address can be a valid host IP that can be allocated to a host:**
- a) 18.19.20.255
  - b) 223.245.256.17
  - c) 193.231.21.0
- 271) What netmask is needed to split a network with address 133.25.0.0/16 in 1000 subnets of 14 hosts each?**
- a) /19
  - b) /28
  - c) /15
  - d) /21
- 272) Which of the following is true about the IP address 10.16.3.65/23?**
- a) The lowest host address in the subnet is 10.16.2.1
  - b) The subnet address is 10.16.3.0/255.255.254.0
  - c) The last valid host address in the subnet is 10.16.2.254
  - d) The broadcast address of the subnet is 10.16.3.254
- 273) What does a mask /29 mean?**
- a) Is equivalent to 255.255.255.248
  - b) The maximum number of IP addresses that can be assigned to hosts is 29
  - c) The maximum number of IP addresses that can be assigned to hosts is 6
  - d) The maximum number of IP addresses that can be assigned to hosts is 8

**Computing problems:**

- 1) Write the network mask (only as /x.y.z.t) of the minimum sized network that contains both 80.81.82.83 and 80.83.84.85.**
- 2) Which of the following are valid subnetwork addresses?**
- a) 177.91.154.2/30
  - b) 177.91.107.144/29
  - c) 177.91.107.0/30
  - d) 177.91.107.1/25
- 3) What is the last valid host on the network that 10.215.81.114 / 255.240.0.0 is a part of?**
- 4) Write as [network address]/[xx] - in the most compact and ordered way - the addressing space 62.255.254.224...63.64.0.31. (if multiple combinations are needed write them separated by comas without spaces or other characters)**
- 5) In which host range is the IP address 175.156.68.80 255.255.255.192?**
- a) 175.156.68.65-126
  - b) 175.156.68.64-128
  - c) 175.156.68.65-128
  - d) 175.156.68.64-126
- 6) Which one of the following addresses is a public IP address assignable to a computer?**
- a) 10.5.125.4
  - b) 225.46.130.1

- c) 1.0.0.1
- d) 172.16.23.201

**7) Which of the following IP addresses cannot be broadcast addresses?**

- a. 200.0.0.33
- b. 10.0.1.254
- c. 192.168.0.255
- d. 25.0.2.31

**8) 255.192.0.0 is a valid netmask for the network**

- a. 192.128.0.0
- b. 132.128.0.0
- c. None of the choices
- d. 192.193.1.0

**9) Which of the following addresses can be valid network addresses provided appropriate network masks?**

- a) 193.231.20.1
- b) 193.231.20.3
- c) 193.231.20.0
- d) 193.231.20.4
- e) 193.231.20.2

**10) Which of the following cannot be a broadcast address?**

- a) 22.21.20.19
- b) 10.20.30.255
- c) 21.20.19.18
- d) 20.19.18.17
- e) 192.168.1.255

**11) What is the netmask of the minimum sized network that has as broadcast 70.71.79.255 and also contains the host IP address 70.71.79.240?**

**12) Consider the following network address: 192.0.2.64. How many net masks can it be used with?**

**13) What is the netmask of the largest network with the address 84.176.0.0? (as x.y.z.t)**

**14) What is the broadcast address for IP combination 132.45.99.0/19?**

**15) Given the address 137.25.28.0/255.255.254.0 provide the maximum number of valid subnets that can be obtained from splitting this network.**

**16) What is the network address and mask of the smallest subnet that fits these two IP addresses: 180.181.182.183 and 180.186.12.180? (addr/x.y.z.t format)**

**17) How many /27 networks are needed such that they can be super netted to a /24 network?**

**18) 193.231.20.0/24 can be divided in exactly X subnets of equal sizes. X=?**

- a) 7 subnets
- b) 14 subnets
- c) 5 subnets
- d) 8 subnets
- e) 4 subnets