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)
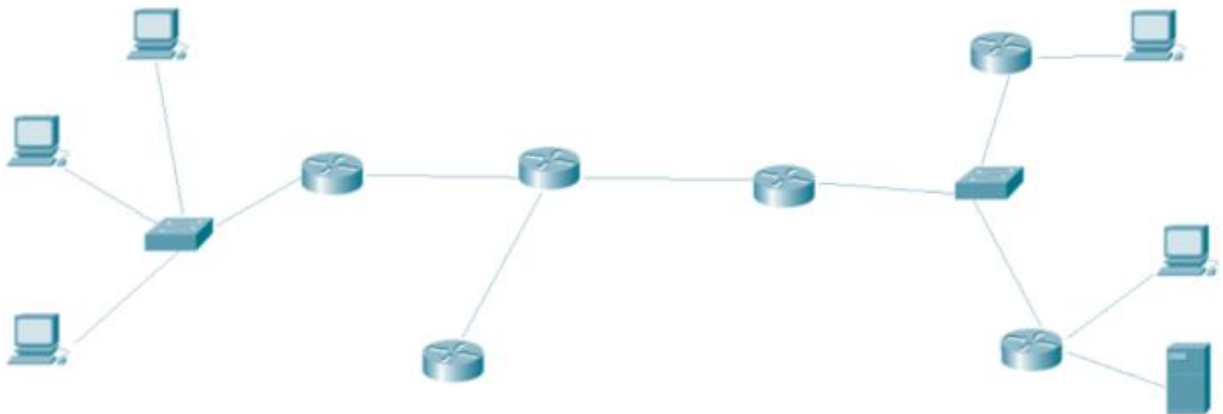
Determine how many subnets are found in the above given network:
   a) 7
   b) 9
   c) 5
   d) 11
6) Which of the following is not a characteristic of the IP protocol?
   a) It affects packet routing
   b) It is considered an unreliable protocol
   c) It is a connection-oriented protocol
   d) It defines 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

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

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

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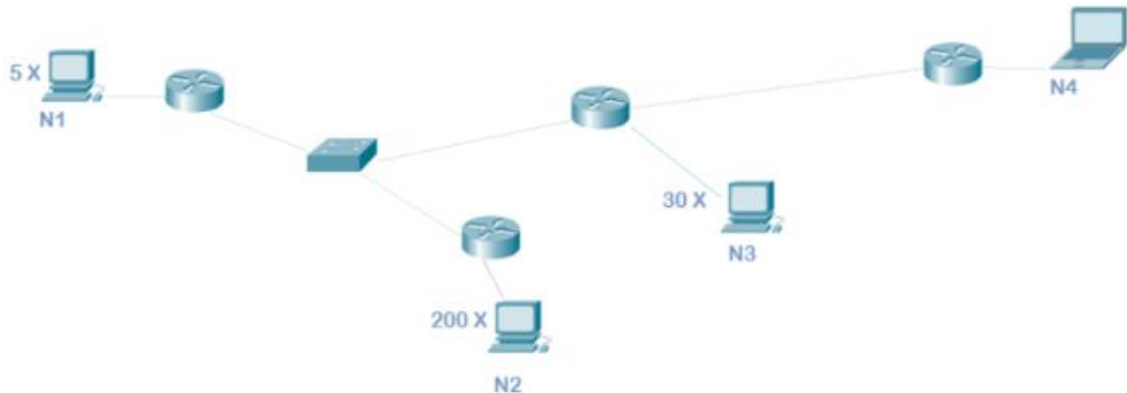
Given the network above, choose which of the next are correct IP addresses for each subnet in the picture (N1, N2, N3, N4):

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

76) 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. (R: TCP)

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^(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) <mark>255.0.0.0</mark>
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) <mark>16</mark>
   c) 8
   d) Impossible to determine

87) Which of the following describes 'big endian'?
   a) <mark>Most significant byte first</mark>
   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) <mark>Least significant byte first</mark>
   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) <mark>E256</mark>
   c) 2E65
   d) 652E

90) What is the in-memory representation of 56E2 in big endian?
   a) <mark>56E2</mark>
   b) E256
   c) 2E65
   d) 652E

91) How many bytes does 'double' use?
   a) 1 byte
   b) 4 bytes
   c) <mark>8 bytes</mark>
   d) 16 bytes

92) How many bytes does 'float' use?
   a) 1 byte
   b) <mark>4 bytes</mark>
   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) <mark>Secure Shell</mark>
   d) Structured Shell

103) What is SSH used for?
   a) <mark>Remote connection to the terminal/command line of another computer (remote command)</mark>
   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) <mark>It is a protocol used by mail servers (mail exchange)</mark>
   d) Accessing the WEB, sending HTML pages

105) What does P2P stand for?
   a) <mark>Peer to peer</mark>
   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) <mark>There is no maximum</mark>

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) <mark>All answers are correct</mark>

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) <mark>256 seconds</mark>
   b) 1 second
   c) 10 seconds
   d) 1024 seconds

109) What kind of signal flows through the optical fiber cable have?
   a) Electro-magnetic waves
   b) <mark>Light waves</mark>
   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.nontendo.com
   c)   Nds.nontendo.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) 2 bits
   b) 3 bits
   c) 4 bits
   d) 8 bits

127) Which is the correct binary representation of the following netmask: 255.255.255.128?
   a) 111111111 11111111 11111111 10000000
   b) 111111111 11111111 11111111 11110000
   c) 111111111 11111111 11111111 11000000
   d) 111111111 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) <mark>Yes, because MAC addresses are burned into the ROM of the network adapter</mark>

135) What is a private IP address?
a) It's an IP address that does not have a netmask
b) <mark>It's an IP address that is reserved for internal use behind a router or NAT device, apart from the public</mark>
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) <mark>128 – 191</mark>
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) <mark>221.17.123.63</mark>
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) <mark>To determine the MAC address when we know the IP address</mark>
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) <mark>"ubbcluj"</mark>
d) "ro"

140) What is the difference between bandwidth and throughput?
a) <mark>The bandwidth is the physical property of the transmission medium, while throughput represents the amount of data which we transmit</mark>
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) <mark>It's a logical address which is used to identify all the computers within a network</mark>
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 … . (R: broadcast)

160) The size of a class C IP address per network is … hosts. (R: 256)

161) DHCP stands for … . (R: Dynamic Host Configuration)

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 … . (R: 192.168.0.48)

163) The networks can be classified on the types of transmission as … switching and … switching. (R: circuit, packet)

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. TRUE
186) UDP is used together with IP when small amounts of information are involved, but it uses more system resources than TCP. FALSE
   Correct: UDP is used together with IP when small amounts of information are involved, but it uses fewer system resources than TCP.
187) When configuring email clients, an Internet address for an SMTP server must be entered. TRUE
188) File Transfer Protocol (FTP) provides the transmission in encrypted form to provide security for sensitive data. FALSE
   Correct: File Transfer Protocol (FTP) provides a method for copying files over a network from one computer to another.
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. TRUE
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). FALSE
   Correct: The Network Layer manages the mapping between these logical addresses and physical addresses. In IP networking, this mapping is accomplished through the 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. FALSE
   Correct: 255.255.255.224 is a class A/27 and its last 5 bits are zero => provides 8 subnets, each with 30 hosts.
192) The subnetwork address of a host with an IP address of 172.16.66.0/21 is 172.16.64.0. TRUE
193) To test the IP stack on your local host, you would ping the IP address 127.0.0.0. FALSE
   Correct: 127.0.0.1
194) A switch does not keep a record of the MAC addresses of the devices connected to it. FALSE
   Correct: A switch keeps a record of the MAC addresses of all the devices connected to it.

   COMPLETE WITH THE CORRECT WORD/S:
195) The UDP … identifies the destination port and a reply port. HEADER
196) TCP/IP allows a packet to be sent without waiting for the … of the previous packet. ACKNOWLEDGEMENT
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. LOCAL AREA NETWORKS(LANs), WIDE AREA NETWORKS(WANs)
199) … is a Computer Network diagnostic tool for displaying the route (path) and measuring transit delays of packets across an (IP) network. TRACEROUTE

200) A … defines the format and the order of messages exchanged between two or more communicating entities. PROTOCOL

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. CONGESTION

203) HTTP Protocol allows exchange of … and … . HTML, WEB DATA

204) Address Resolution Protocol (ARP) is a protocol for mapping an … to a … that is recognized in the local network. INTERNET PROTOCOL ADDRESS(IP), PHYSICAL MACHINE ADDRESS

205) UDP guarantees datagram delivery. FALSE

206) The socket type used by TCP is SOCK_STREAM. TRUE

207) With UDP, one party can overflow the other, which results in lost packets. TRUE

208) The connect system call is normally called by the client process in order to connect to a server process. TRUE

209) The listen system call indicates to the protocol that the client process is ready to accept new incoming connections on the socket. FALSE

210) At the level of a TCP client, the bind system call is mandatory. FALSE

211) The high order bits of an IP address represent the host part. FALSE

212) All the hosts from the same network can physically reach each other without an intervening router. TRUE

213) A network address can be determined based on an IP address from the network and the netmask. TRUE

214) Always, in a class of addresses, the first and last IP addresses are reserved. TRUE

215) For connecting a host with a private address to the internet, it has to be translated to a public address, process named ARP. FALSE

216) 172.16.0.0/12 refers to a private address space. TRUE

217) A DNS server is responsible with translating numerical IP addresses to domain names. FALSE

218) The network address can be obtained from an IP address and the netmask using the logical operation "OR". FALSE

219) When NAT is involved, the local network uses just one IP address as far as outside world is concerned. TRUE

220) The number of IP addresses allocated for each subnet block has to be a power of 4. FALSE

221) 209.220.186.8/255.255.255.248 is an invalid IP/netmask combination. FALSE

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. FALSE

223) A 255.255.255.240 netmask is capable of supporting 16 hosts. TRUE

224) A computer uses HTTP to look up domain names and get the associated IP address. FALSE

225) There is no routing based on MAC addresses. TRUE

226) A proxy server acts as an intermediary for requests from clients seeking resources from other servers. TRUE

227) The combination DNS server = default gateway is not possible. FALSE

228) A collection of computers (PCs, Workstations) and other devices interconnected represent a computer network. TRUE

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'. TRUE

231) SOCK_STREAM is used for UDP connections. FALSE

232) SOCK_DGRAM is used for UDP connections. TRUE

233) The optical fiber cable theoretically has unlimited bandwidth. TRUE

234) Every domain name that is not already in use is free to claim as your own. FALSE

235) 255.255.255.128 starts with 1 zero and ends with 7 zeroes. FALSE

236) 255.255.255.128 ends with 7 zeroes. TRUE

237) Port forwarding is a use of NAT. TRUE

238) MAC addressed are not guaranteed to be unique. FALSE

SWITCH

239) A switch has a lot of ports. TRUE

240) A switch doesn't understand MAC addresses. FALSE

241) A switch understands MAC addresses. TRUE

242) A switch is more performant than a hub. TRUE

243) A switch can transport UDP packets. TRUE

244) A switch can't transport TCP packets. FALSE

245) A switch can transport TCP packets. TRUE

246) A switch can transport IP packets. TRUE

247) A switch can't transport IP packets. FALSE

HUB

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

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

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

251) A hub understands MAC addresses. FALSE

252) A hub has many ports. TRUE

MAC ADDRESS

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

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

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

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

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

258) The MAC address can be changed. TRUE

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

260) 172.31.255.255 is not a private IP address. FALSE

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

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

263) 255.255.255.255 is the broadcast MAC address. FALSE

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

265) 255.255.255.255 is not the broadcast MAC address. TRUE

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

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

268) FF:FF:FF:FF:FF is not the broadcast MAC address. <mark>TRUE</mark>
269) The MAC address has 64 bits. <mark>FALSE</mark>
270) FF:FF:FF:FF:FF:FF is not the broadcast MAC address. <mark>FALSE</mark>

LEVEL LINK TRANSPORT APPLICATION NETWORK

271) SSH is not on the Link Layer. <mark>TRUE</mark>
272) SSH is not on the Transport Layer. <mark>TRUE</mark>
273) SSH is not on the Network Layer. <mark>TRUE</mark>
274) SSH is on the Transport Layer. <mark>FALSE</mark>
275) SSH is on the Link Layer. <mark>FALSE</mark>
276) SSH is on the Network Layer. <mark>FALSE</mark>
277) SSH is not on the Application Layer. <mark>FALSE</mark>
278) SSH is on the Application Layer. <mark>TRUE</mark>
279) IP is on the Transport Layer. <mark>FALSE</mark>
280) IP is on the Application Layer. <mark>FALSE</mark>
281) IP is on the Network Layer. <mark>TRUE</mark>
282) IP is on the Link Layer. <mark>FALSE</mark>
283) IP is not on the Transport Layer. <mark>TRUE</mark>
284) IP is not on the Application Layer. <mark>TRUE</mark>
285) IP is not on the Network Layer. <mark>FALSE</mark>
286) IP is not on the Link Layer. <mark>TRUE</mark>
287) HTTP is on the Transport Layer. <mark>FALSE</mark>
288) HTTP is on the Application Layer. <mark>TRUE</mark>
289) HTTP is on the Network Layer. <mark>FALSE</mark>
290) HTTP is on the Link Layer. <mark>FALSE</mark>
291) HTTP is not on the Transport Layer. <mark>TRUE</mark>
292) HTTP is not on the Application Layer. <mark>FALSE</mark>
293) HTTP is not on the Network Layer. <mark>TRUE</mark>
294) HTTP is not on the Link Layer. <mark>TRUE</mark>
295) SMTP is on the Transport Layer. <mark>FALSE</mark>
296) SMTP is on the Application Layer. <mark>TRUE</mark>
297) SMTP is on the Network Layer. <mark>FALSE</mark>
298) SMTP is on the Link Layer. <mark>FALSE</mark>
299) SMTP is not on the Transport Layer. <mark>TRUE</mark>
300) SMTP is not on the Application Layer. <mark>FALSE</mark>
301) SMTP is not on the Network Layer. <mark>TRUE</mark>
302) SMTP is not on the Link Layer. <mark>TRUE</mark>
303) DNS is on the Transport Layer. <mark>FALSE</mark>
304) DNS is on the Application Layer. <mark>TRUE</mark>
305) DNS is on the Network Layer. <mark>FALSE</mark>
306) DNS is on the Link Layer. <mark>FALSE</mark>
307) DNS is not on the Transport Layer. <mark>TRUE</mark>
308) DNS is not on the Application Layer. <mark>FALSE</mark>
309) DNS is not on the Network Layer. <mark>TRUE</mark>
310) DNS is not on the Link Layer. <mark>TRUE</mark>

311) FTP is on the Transport Layer. FALSE
312) FTP is on the Application Layer. TRUE
313) FTP is on the Network Layer. FALSE
314) FTP is on the Link Layer. FALSE
315) FTP is not on the Transport Layer. TRUE
316) FTP is not on the Application Layer. FALSE
317) FTP is not on the Network Layer. TRUE
318) FTP is not on the Link Layer. TRUE
319) TCP is on the Transport Layer. TRUE
320) TCP is on the Application Layer. FALSE
321) TCP is on the Network Layer. FALSE
322) TCP is on the Link Layer. FALSE
323) TCP is not on the Transport Layer. FALSE
324) TCP is not on the Application Layer. TRUE
325) TCP is not on the Network Layer. TRUE
326) TCP is not on the Link Layer. TRUE
327) UDP is on the Transport Layer. TRUE
328) UDP is on the Application Layer. FALSE
329) UDP is on the Network Layer. FALSE
330) UDP is on the Link Layer. FALSE
331) UDP is not on the Transport Layer. FALSE
332) UDP is not on the Application Layer. TRUE
333) UDP is not on the Network Layer. TRUE
334) UDP is not on the Link Layer. TRUE

NETWORK ADDRESS

335) The address 192.168.0.255 can't be a network address. TRUE
336) The address 127.0.0.1 can be a network address. FALSE
337) The address 193.231.20.2 can be a network address. FALSE
338) The address 193.256.20.0 can be a network address. FALSE
339) The address 192.231.20.1 can be a network address. FALSE
340) The address 192.231.20.3 can be a network address. FALSE
341) The address 43.29.45.80/27 can be a network address. FALSE
342) The address 192.168.2.160/24 can be a network address. FALSE
343) The address 43.23.87.68/26 can be a network address. FALSE
344) The address 192.168.2.160/25 can be a network address. FALSE
345) The address 192.168.0.255 can be a network address. FALSE
346) The address 193.255.20.0 can be a network address. TRUE
347) The address 193.231.20.0 can be a network address. TRUE
348) The address 193.231.20.4 can be a network address. TRUE
349) The address 193.255.20.0 can be a network address. TRUE
350) The address 192.168.2.32/27 can be a network address. TRUE
351) The address 43.23.87.64/27 can be a network address. TRUE
352) The address 192.168.2.128/25 can be a network address. TRUE
353) The network address can be computed with the broadcast address and the netmask. TRUE

354) The network address can be computed with the broadcast address and the IP address. FALSE
355) The network address can't be computed with the broadcast address and the netmask. FALSE
356) The network address can't be computed with the IP address and the netmask. FALSE
357) The network address can't be computed with the broadcast address and the IP address. TRUE
358) The network address can be computed with the IP address and the netmask. TRUE
359) There is only one computer with the address 127.0.0.1. FALSE

PRIVATE ADDRESSES

360) All the IP addresses in the class 172.0.0.0/8 are private. FALSE
361) Not all the IP addresses in the class 172.0.0.0/8 are private. TRUE
362) 168.168.168.168 is a private IP address. FALSE
363) 168.168.168.168 is not a private IP address. TRUE
364) 1.1.1.1 is a private IP address. FALSE
365) Not all the IP addresses from the class 10.0.0.0/6 are private. TRUE
366) 127.16.0.1 is not a private address. TRUE
367) All the IP addresses from the class 172.0.0.0/12 are private. FALSE
368) 127.16.0.1 is a private IP address. FALSE
369) 172.32.0.1 is a private IP address. FALSE
370) 1.1.1.1 is not a private IP address. TRUE
371) 172.15.0.1 is not a private IP address. TRUE
372) Not all the IP addresses in the class 192.168.0.0/8 are private. TRUE
373) All the IP addresses from the class 172.16.0.0/12 are private. TRUE
374) 172.16.0.1 is not a private IP address. FALSE
375) 172.31.0.1 is not a private IP address. FALSE
376) Not all the IP addresses in the class 192.168.0.0/16 are private. FALSE
377) All the IP addresses from the class 10.0.0.0/16 are private. TRUE
378) 192.168.168.168 is not a private IP address. FALSE
379) 172.31.255.255 is a private IP address. TRUE
380) 172.31.255.255 is not a private IP address. FALSE
381) Not all the IP addresses from the class 10.0.0.0/8 are private. FALSE
382) 10.10.10.10 is a private IP address. TRUE
383) All the IP addresses from the class 10.0.0.0/8 are private. TRUE
384) 172.16.0.1 is a private IP address. TRUE
385) Not all the IP addresses from the class 172.16.0.0/12 are private. FALSE
386) 192.168.168.168 is a private IP address. TRUE
387) Not all the IP addresses from the class 10.0.0.0/16 are private. FALSE

388) CLI comes from Command Line Interface. TRUE
389) ARP means Address Resolution Protocol. TRUE
390) MAC means Media Access Control. TRUE
391) DNS means Domain Name System. TRUE
392) Two computers from the Internet can have the same IP address if they have the same MAC address. FALSE
393) LAN is an acronym for Limited Area Network. FALSE

394) HTTP means Hyperspeed Transfer Protocol. FALSE

395) HTTP means Hypertext Transfer Protocol. TRUE

396) MAC means Media Address Control. FALSE

397) CLI comes from Coding Line Interface. FALSE

398) ARP doesn't mean Address Resolution Protocol. FALSE

399) DNS means Domain Name Service. FALSE

TOPOLOGIES

400) There are only two standard network topologies: Bus and Star. FALSE

401) Ring is a network topology, TRUE

402) Ring is not a network topology. FALSE

403) Star is not a network topology. FALSE

404) There are more than two standard network topologies. TRUE

405) Bus is a network topology. TRUE

406) Star is a network topology. TRUE

407) Bus is not a network topology. FALSE

PROTOCOLS

408) HTTP does not use the TCP protocol. FALSE

409) HTTP uses the UDP protocol. FALSE

410) DNS uses the TCP protocol. FALSE

411) DNS uses the UDP protocol. TRUE

412) HTTP uses the TCP protocol. TRUE

CONNECTION-ORIENTATION

413) UDP is connection-oriented. FALSE

414) UDP is not connection-oriented. TRUE

415) TCP is connection-oriented. TRUE

416) TCP is not connection-oriented. FALSE

DEFAULT GATEWAY

417) The dimension of an IP address class doesn't have to be a power of 2. FALSE

418) The dimension of an IP address class has to be a power of 2. TRUE

419) The dimension of a network is 2^n, where n is the number of 0's in the IP. FALSE

420) The dimension of a network is 2^n, where n is the number of 0's in the netmask. TRUE

421) The dimension of a network is 2^n, where n is the number of 1's in the netmask. FALSE

COMPUTER

422) A computer can have more network cards. TRUE

423) A computer can have only one network card. FALSE

424) There can't exist computers with the address 192.168.1.0. FALSE

425) A computer can have more IP addresses. TRUE

426) A computer can't have 2 gateways. TRUE

427) The DNS server configured on a computer has to be in the same network with the computer. FALSE

428) In a LAN there can't be more computers with the address 192.168.1.1. TRUE
429) There can be computers with the address 192.168.1.0. TRUE
430) 2 computers from the Internet can have the same IP address if they have the same MAC address. FALSE
431) A computer can have only one IP address. FALSE
432) A computer is connected to a switch through a Straight-Through cable. TRUE
433) 2 computers from the same network both physically and logically can't have different default gateways. FALSE
434) A router is connected to a computer with a Cross-Over cable. TRUE

SERVER

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

NETMASK

439) The netmask can't contain 0 bits embedded with 1 bits. TRUE
440) The netmask can be determined using the IP address and the network address. FALSE
441) The netmask can be determined using the IP address and the broadcast address. FALSE
442) 0.0.0.0 represents a valid netmask. TRUE
443) 255.255.224.0 represents a valid netmask. TRUE
444) The netmask of a network with 1024 IP addresses is /10. FALSE
445) 255.255.0.0 represents a valid netmask. TRUE
446) A network with the netmask 255.255.255.0 can have max. 254 computers. TRUE
447) The netmask of a network with 1024 IP addresses is /12. FALSE
448) The netmask of a network with 512 IP addresses is /23. TRUE
449) 0.0.0.0 is not a valid netmask. FALSE
450) 255.254.0.0 is a valid netmask. TRUE
451) The netmask can't be determined using the IP address and the network address. TRUE
452) The netmask of a network with 1024 IP addresses is /22. TRUE
453) The netmask can't be determined using the IP address and the broadcast address. TRUE
454) A netmask is a binary number on 48 bits. FALSE
455) A network with the netmask 255.255.255.0 has 128 IP's. FALSE
456) 255.255.225.0 is a valid netmask. FALSE
457) The netmask of a network with 512 IP addresses is /24. FALSE
458) The netmask of a network with 1024 IP addresses is /23. FALSE
459) The netmask can be computed using the broadcast address and the network address. TRUE
460) The netmask can contain 0 bits embedded with 1 bits. FALSE
461) 254.255.0.0 represents a valid netmask. FALSE
462) A network with the netmask 255.255.255.0 can have max. 256 computers. FALSE
463) A netmask is a binary number on 32 bits. TRUE

464) There are other types of sockets besides TCP and UDP. TRUE
465) There are only TCP and UDP sockets. FALSE

466) There can't be more computers with the address 127.0.0.1. FALSE
467) There are more computers with the address 127.0.0.1. TRUE
468) The address 127.0.0.1 can be a broadcast address. FALSE
469) 127.0.0.1 can't be configured on a system as default gateway. FALSE
470) 127.0.0.1 can't be configured on a system as a DNS server. TRUE
471) The localhost is not 172.0.0.1. TRUE
472) The localhost is 172.0.0.1. FALSE
473) The address 127.0.0.1 can't be a network address. TRUE
474) 83.255.255.128.0 = /23 FALSE
475) 255.255.128.0 = /17 FALSE
476) 11111111 10000000 00000000 00000000 = 255.128.0.0 TRUE
477) 193.55.44.170 & 255.255.255.128 = 19355.43.128 TRUE
478) 11111111 10000000 00000000 00000000 = 255.1.0.0 FALSE
479) TCP is always faster than UDP. FALSE
480) UDP is sometimes faster than TCP. TRUE
481) TCP is sometimes faster than UDP. TRUE
482) UDP is always faster than TCP. FALSE
483) TCP is safer than UDP. TRUE
484) The accept() call is mandatory in any TCP server. TRUE
485) The accept() call is mandatory in any UDP client. FALSE
486) The accept() call can be used in any TCP server. TRUE
487) The accept() call is mandatory in any TCP client. FALSE
488) The accept() call is not mandatory in any TCP client. TRUE
489) The recvfrom() call reads data from the UDP server. TRUE
490) The recvfrom() call reads data from the TCP server. FALSE
491) The recvfrom() call sends data to the TCP client. FALSE
492) The recvfrom() call sends data to the UDP client. FALSE
493) The recvfrom() call doesn't send data to the TCP server. TRUE
494) The recvfrom() call doesn't send data to the TCP client. TRUE
495) The recvfrom() call sends data to the UDP server. FALSE
496) The recvfrom() call sends data to the TCP server. FALSE
497) The recvfrom() call doesn't send data to the UDP client. TRUE
498) The recvfrom() call reads data from the UDP client. TRUE
499) The recvfrom() call reads data from the TCP client. FALSE
500) The connect() call is mandatory in any TCP server. FALSE
501) The connect() call is mandatory in any UDP client. FALSE
502) The connect() call can't be used in UDP clients. TRUE
503) The connect() call can't be used in TCP clients. FALSE
504) The connect() call can be used in UDP clients. FALSE
505) The connect() call can be used in TCP clients. TRUE
506) The connect() call is mandatory in any UDP server. FALSE
507) The connect() call is mandatory in any TCP client. TRUE
508) The sendto() call sends data to the UDP client. TRUE
509) The sendto() call sends data to the UDP server. TRUE
510) The sendto() call sends data to the TCP client. FALSE

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

555) LAN is not a global network. TRUE
556) Mobile phones can't connect to the internet without a network card. TRUE
557) The logical AND between the mask and IP address has as result the broadcast address. FALSE
558) The IP address can't be determined using the network address and the netmask. TRUE
559) UDP waits for the confirmation that the packets were received. FALSE
560) UDP is safer than TCP. FALSE
561) The routers use the IP addresses to transfer frames to other networks. TRUE
562) A wireless access point has a limited area coverage. TRUE
563) More websites can be hosted on the same web server. TRUE
564) An IP address is a binary number on 32 bits. TRUE
565) A router connects to a computer with a Straight-through cable. FALSE
566) TCP waits for the confirmation that the packets were received. TRUE
567) An IP address is a unique identifier for every computer in an IP network. TRUE
568) The network card doesn't transfer data to other computers. FALSE
569) A UDP socket is created with the parameters AF_INET and SOCK_DGRAM. TRUE
570) An IP address is a common identifier for more computers in an IP network. FALSE
571) The IP address can be determined with the network address and the netmask. FALSE
572) There can be more computers with the address 192.168.1.1 in a LAN. FALSE
573) A TCP is created with the parameters AF_INET and SOCK_DGRAM. FALSE
574) The DNS service runs on the TCP port 53. FALSE
575) The DNS service runs on the UDP port 53. TRUE
576) A UDP socket is created with the parameters AF_INET and SOCK_STREAM. FALSE
577) A TCP socket is created with the parameters AF_INET and SOCK_STREAM. TRUE
578) HTTPS transfers encrypted data. TRUE
579) HTTP transfers encrypted data. FALSE
580) A network card can have only one IP address. FALSE
581) A network card can have more IP addresses. TRUE
582) The address 87.35.15.63/26 can be a broadcast address. TRUE
583) The broadcast address can be computed using the network address and the netmask. TRUE
584) The broadcast address can be computed using the IP address and the netmask. TRUE
585) The address 83.35.15.8/28 can be a broadcast address. FALSE
586) The address 127.0.0.1 can't be a broadcast address. TRUE
587) The broadcast address can't be computed using the network address and the netmask. FALSE
588) The address 87.35.15.7/29 can be a broadcast address. TRUE
589) The broadcast address for the station with the IP address 192.120.0.1/16 is 192.120.255.255. TRUE
590) The network card can be external. TRUE
591) The BUS topology consists of a single cable which connects in series all the computers from the network. TRUE
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 doted decimal format: 255.255.255.192

594) How many hosts can be addressed on 10.0.0.0/16? 65534
595) A computer connects to a switch using a Cross-Over cable. FALSE
596) A web server can run on ports different than 80. TRUE
597) Given the IP address 172.16.1.1 with a mask of 255.255.255.0, how many total subnets could be created? Use the same subnet mask.
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. TRUE
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? 123
2) Considering the OSI Reference Model, what is the first layer where we can talk about the IP Protocol? The Network Layer
3) What is the minimum number of interfaces a router should have? 2
4) What is a solution for "Flat Addressing"? Classful IP addressing and CIDR
5) How many networks can we have in the class A of IP addressing? 2^8
6) Consider a block with 32 addresses. Can it begin with 193.226.40.96? Yes
7) What is the netmask that we use to represent class B? 255.255.0.0
8) Consider the following network address: 192.0.2.64. How many net masks can it be used with? 5 (/30, /29, /28, /27, /26)
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? No, there aren't enough addresses

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 discontiguous 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? 127.0.0.1

29) TCP belongs to the:

a. Application layer
b. <mark>Transport layer</mark>
c. Internet layer
d. Network Interface layer

30) A wireless device can be connected to the network through a router. <mark>FALSE</mark>

31) IP/RIP is a distance-vector routing protocol. <mark>TRUE</mark>

32) DHCP can be set up on a router. <mark>TRUE</mark>

33) 192.168.0.101 is from the class:
a. A
b. B
c. <mark>C</mark>
d. D

34) What is the default hostname for the address 127.0.0.1? <mark>localhost</mark>

35) IPv6 uses:
a. <mark>128 bits</mark>
b. 32 bits
c. <mark>16 bytes</mark>
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. <mark>Application, presentation, session</mark>

37) Which is a true end-to-end layer in the OSI Reference Model?
a. Data link layer
b. <mark>Transport layer</mark>
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. <mark>Physical layer</mark>
c. Transport layer
d. Session layer

39) The 802.13 IEEE standard is used for:
a. Ethernet
b. Wireless LANs
c. Bluetooth
d. <mark>It is unused</mark>

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. <mark>I/O multiplexing</mark>
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. FALSE

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. FALSE

56) The listen system call is normally called by the client process in order to connect to read from a server. FALSE

57) The recvfrom() system call returns the source socket. TRUE

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 B requests the mail from S2 using POP3 or IMAP Protocols

    d.   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 application process
d. 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? Yes

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. TRUE

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. FALSE

133) The listen() call is used to wait for connection requests from clients. TRUE

134) Which call creates a new socket?

    a.   Socket()

    b.   Bind()

    c.   Accept()

135) Threads use less memory than processes. TRUE

136) Send() is not a blocking call by default. FALSE

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. TRUE
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. TRUE
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. 2^{32}
     b. 2^{16}
     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. FALSE

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 Internet
     c.   It can't store information about each network individually
     d.   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. FALSE

156) IP checksum is a type of error correction code. FALSE

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. FALSE

166) TCP retransmits lost packages. TRUE

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 …. TCP

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 … . UDP

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? 1

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? 25

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? 3

192) How many bits do the flags occupy in the TCP header? 6

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. FALSE
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. TRUE
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? At connection request

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 … . High mobility

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. TRUE

219) What is the maximum port number? 65535

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 getaway

222) What is the maximum data rate for a 2 kHz channel with binary signals? 4000

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. TRUE

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. <mark>The window grows exponentially</mark>

229) What is the port on which the HTTP works? <mark>80</mark>

230) Which of the following statements about FTP are true?

  a. It uses 4 channels: control, data, active, passive

  b. <mark>It uses 2 channels: control, data</mark>

  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. <mark>20</mark>

  b. 25

  c. 30

  d. <mark>21</mark>

  e. 31

232) 127.0.0.1 can be:

  a. A network address

  b. A broadcast address

  c. <mark>Set as default gateway</mark>

  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)? <mark>No</mark>

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. <mark>TCP/IP is composed of TCP, IP and many more protocols</mark>

  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. <mark>The Data Link layer</mark>

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. <mark>The router puts the packet on the current network interface</mark>

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. <mark>the server assigns a new port for each client</mark>

238) What are the first 4 bits of Class E? <mark>1111</mark>

239) What are the 3 levels of hierarchy of IP Subnet?

  a. <mark>network, subnet, host portions</mark>

  b. network, masks, host portions

  c. <mark>host, subnet, network portions</mark>

  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 … . URL

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. FALSE

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. FALSE

255) When using NAT, if the addresses in the local network are changed, the outside world needs to be noticed. FALSE

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? 255

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? 12

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. UDP length = UDP length – UDP header's length
b. UDP length = IP length – IP header's length -UDP header length
c. UDP length = UDP length + 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
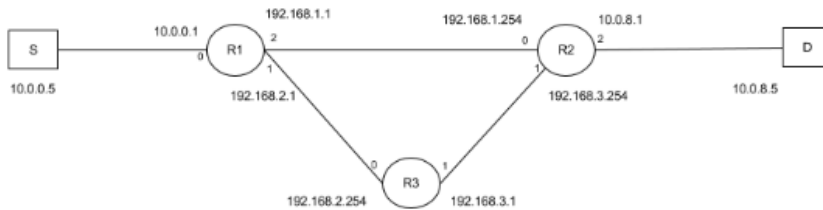d. The router drops the packet as there is no such gateway IP address

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

Network diagram with routers R1, R2, R3 and hosts S and D. Labels: S (10.0.0.5), 10.0.0.1, R1 (192.168.1.1, 192.168.2.1), 192.168.1.254, R2 (10.0.8.1, 192.168.3.254), D (10.0.8.5), R3 (192.168.2.254, 192.168.3.1).

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)
10.0.0.1,192.168.3.1,192.168.1.254,10.0.0.1

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. 0.0.0.0 255.255.255.0
c. 0.0.0.0 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. 255.252.0.0
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? 10.223.255.254
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) 62.255.254.224/27,62.255.255.0/24,63.0.0.0/10,63.64.0.0/27
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

<mark>   c. 21.20.19.18</mark>

<mark>   d. 20.19.18.17</mark>

    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? <mark>/27 or 255.255.255.224</mark>

12) Consider the following network address: 192.0.2.64. How many net masks can it be used with? <mark>5</mark>

13) What is the netmask of the largest network with the address 84.176.0.0? (as x.y.z.t) <mark>255.240.0.0</mark>

14) What is the broadcast address for IP combination 132.45.99.0/19? <mark>132.45.127.255</mark>

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. <mark>128</mark>

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) <mark>180.176.0.0/255.240.0.0</mark>

17) How many /27 networks are needed such that they can be super netted to a /24 network? <mark>8</mark>

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

<mark>   d. 8 subnets</mark>

<mark>   e. 4 subnets</mark>