

This test has 17 questions for a total of 30 points. Every three wrong test answers 1 point will be subtracted. Only one option is correct. Calculators are not allowed.

Apellidos: _____ **SOLUCIÓN** _____ Nombre: _____ Grupo: _____

1. (1p) Which are the layers defined in the OSI model stack? (in order)
 - ☒ a) physical, data link, network, transport, session, presentation and application
 - ☐ b) physical, data link, host-to-network, inter-network, transport and application
 - ☐ c) physical, data, transport, point-to-point, inter-network, session and application
 - ☐ d) data link, network, inter-network, transport, session, presentation and application
2. (1p) Which assertion from the following ones about the data link layer is false?
 - ☐ a) It provides connectivity between hosts once their MACs are known
 - ☒ b) It uses the routers when hosts are on a different network
 - ☐ c) The Ethernet protocol belongs to this layer
 - ☐ d) The ARP protocol belongs to this layer
3. (1p) Select the statement which is **FALSE**.
 - ☐ a) Multi-point links require arbitration for medium access
 - ☒ b) It's not possible to have point-to-point communication between two hosts using a multi-point link
 - ☐ c) Point-to-point links don't consider multicast and broadcast addressing
 - ☐ d) The most frequent use of point-to-point links is for the interconnection of distant routers
4. (1p) In packet switching ...
 - ☐ a) Packets follow routes established in advanced
 - ☐ b) Packets follow routes established in advanced, but that can be modified if necessary
 - ☒ c) Packets may follow different routes to get to destination
 - ☐ d) All previous assertions are false
5. (1p) Considering a classification depending on the network size, which is the one used for the interconnection of a home router to the one of the ISP?
 - ☐ a) LAN
 - ☐ b) SAN
 - ☒ c) WAN
 - ☐ d) PAN
6. (1p) Which of the following assertions about physical and logical addresses is false?
 - ☒ a) The physical address of a network interface changes when the node is connected to a different local area network
 - ☐ b) The logical address of a network interface changes when the node is connected to a different local area network
 - ☐ c) It's not possible to send and receive information in a LAN without a physical address
 - ☐ d) none of the above
7. (1p) A client _____ service.
 - ☒ a) requests a
 - ☐ b) provides a
 - ☐ c) requests or provides a
 - ☐ d) requests and provides a

8. (1p) The reason why protocol HTTP is encapsulated over TCP is because
- ☐ a) TCP provides a lower latency than UDP
 - ☒ b) TCP is a reliable protocol
 - ☐ c) TCP is a reliable protocol and provides higher bandwidth than UDP
 - ☐ d) none of the above
9. (1p) Which of the following assertions about URLs is false?
- ☐ a) It's not necessary to specify the destination port. In that case port 80 is assumed by default
 - ☐ b) It's possible to specify the location of a host using both the IP or the name
 - ☒ c) The hostname must start with the www prefix when the URL refers to a web server
 - ☐ d) All are true
10. (1p) In a persistent HTTP connection
- ☐ a) No previous connection establishment is required
 - ☐ b) The state is stored so it can be recover in future connections
 - ☐ c) Only one object is transmitted in each connection
 - ☒ d) There can be more than one object sent in each connection
11. (1p) In an HTTP request it's possible to send information to the server ... (select the two which are correct)
- ☐ a) through the GET method, included in the body of the message
 - ☐ b) through the GET method, included as part of the URL
 - ☐ c) through the POST method, included in the body of the message
 - ☐ d) through the POST method, included as part of the URL
12. (1p) Cookies are generated by _____ and stored in the _____.
- ☐ a) client; client
 - ☐ b) client; server
 - ☒ c) server; client
 - ☐ d) server; server
13. (1p) Which of the following assertions about SMTP is false?
- ☒ a) It's the protocol used between the source user agent and the email server
 - ☐ b) It's the protocol used between the origin user agent and the email server
 - ☒ c) It's encapsulated over UDP
 - ☐ d) All assertions are true
14. (1p) For the translation of xxxx@yyyy.zzzz to an IP address, protocol _____. should be used
- ☐ a) ARP
 - ☐ b) RARP
 - ☒ c) DNS
 - ☐ d) RDNS

15. (10p) The following listing shows the result of some network traffic captured in Wireshark which corresponds to the reply to a DHCP request. Using this information answer the following questions

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1
2 Source          Destination      Protocol Length Info
3 192.168.1.1      255.255.255.255 DHCP           590  DHCP ACK
4
5 Frame 5: 590 bytes on wire (4720 bits), 590 bytes captured (4720 bits) on interface 0
6 Ethernet II, Src: f4:b8:a7:f5:ba:88 (f4:b8:a7:f5:ba:88), Dst: Raspberr_5f:80:79 (b8:27:eb:5f:80:79)
7 Internet Protocol Version 4, Src: 192.168.1.1 (192.168.1.1), Dst: 255.255.255.255 (255.255.255.255)
8 User Datagram Protocol, Src Port: 67 (67), Dst Port: 68 (68)
9 Bootstrap Protocol (ACK)
10  Message type: Boot Reply (2)
11  Hardware type: Ethernet (0x01)
12  Hardware address length: 6
13  Hops: 0
14  Transaction ID: 0x47890e6c
15  Seconds elapsed: 0
16  Bootp flags: 0x0000 (Unicast)
17  Client IP address: 0.0.0.0 (0.0.0.0)
18  Your (client) IP address: 192.168.1.3 (192.168.1.3)
19  Next server IP address: 0.0.0.0 (0.0.0.0)
20  Relay agent IP address: 0.0.0.0 (0.0.0.0)
21  Client MAC address: Raspberr_5f:80:79 (b8:27:eb:5f:80:79)
22  Client hardware address padding: 00000000000000000000
23  Server host name not given
24  Boot file name not given
25  Magic cookie: DHCP
26  Option: (53) DHCP Message Type (ACK)
27    Length: 1
28    DHCP: ACK (5)
29  Option: (1) Subnet Mask
30    Length: 4
31    Subnet Mask: 255.255.255.0 (255.255.255.0)
32  Option: (3) Router
33    Length: 4
34    Router: 192.168.1.1 (192.168.1.1)
35  Option: (6) Domain Name Server
36    Length: 8
37    Domain Name Server: 87.216.1.65 (87.216.1.65)
38    Domain Name Server: 87.216.1.66 (87.216.1.66)
39  Option: (15) Domain Name
40  Option: (54) DHCP Server Identifier
41    Length: 4
42    DHCP Server Identifier: 192.168.1.1 (192.168.1.1)
43  Option: (51) IP Address Lease Time
44  Option: (125) V-I Vendor-specific Information
45  Option: (255) End
46  Padding

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- a) List ALL protocols in the capture: Ethernet; IP; UDP; DHCP
- b) IP address of the DHCP server: 192.168.1.1
- c) IP address of the name server: 87.216.1.65 / 87.216.1.66
- d) IP address of the client: 192.168.1.3
- e) Physical address of the client, if it's possible to know: b8:27:eb:5f:80:79
- f) Physical address of the DHCP server, if it's possible to know: f4:b8:a7:f5:ba:88
- g) Who does port 68 belong to? To the client
- h) Which type of port is the one in the previous question? It's a well known port, typically used by DHCP clients
- g) Who does port 67 belong to? To the DHCP server
- h) Which is the IP of the gateway of the LAN? 192.168.1.1. It's the DHCP server itself

16. (3p) Describe what are cookies necessary for in the WWW, and their working mechanism (interaction between client and server)

Since HTTP is a stateless protocol, it is necessary to have a complimentary mechanism to keep persistent information during a session, or even between several sessions. Cookies are simply a text file associated to the browser, and therefore stored in the client host. They allow the client and server to keep a relationship following these steps:

- The client performs an HTTP request
- The server creates an ID for the user
- The client stores in the cookies file the information regarding the server and the ID received from the server
- From now on, every time the client performs a new HTTP request it will include the information contained in the cookie
- The server reacts with a different action depending on the information provided by the cookie, updates the state information and returns the new content of the cookie

17. (3p) Describe in short which the differences between the use of a native e-mail client (such as thunderbird or outlook) and the web browser are. Which are the protocols used in each case? Tell some advantage or disadvantage for the use of one or another mechanism.

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