

This test has 12 questions totalling 15 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) The length in time of every bit and their synchronization are related to the _____ layer.
☒ a) Physical
☐ b) Network
☐ c) Data Link
☐ d) Internet
2. (1p) Which of the following assertions about physical and logical addresses is true?
☐ a) The physical address of a network interface changes when the node is connected to a different local area network
☒ b) It's possible to send and receive information in a LAN without the assignment of a logical address
☐ c) It's possible to send and receive information in a LAN without the assignment of a physical address
☐ d) none of the above
3. (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
4. (1p) Which assertion about RFCs is FALSE?
☐ a) They are created by the IESG (Internet Engineering Work Group).
☒ b) All RFCs are classified in a single category/state.
☐ c) After being tested they can become an Internet standard.
☐ d) The most important internet protocols are defined in RFCs.
5. (1p) What type of connection can be used to establish a point-to-point link?
☐ a) Wired connection
☐ b) Microwave connection.
☐ c) Satellite connection.
☒ d) Any of the above.
6. (1p) Given an HTTP message, what is the largest size?
☐ a) The segment payload.
☐ b) The package payload.
☒ c) The frame payload.
☐ d) All is the same, because it is the same message.
7. (1p) Cookies are generated by _____ and stored in the _____.
☐ a) client; client
☐ b) client; server
☒ c) server; client
☐ d) server; server

8. (1p) Which of the following sentences about the use of a web cache (proxy server) for the web is TRUE?
- ☒ a) Its purpose is to reduce the traffic generated to the Internet
 - ☐ b) Its purpose is to reduce traffic in the local network
 - ☐ c) Works only as a client
 - ☐ d) Works only as a server
9. (1p) Which of the following sentences about the UA (User Agents) email is FALSE?
- ☐ a) They work with messages (outgoing and incoming) that are stored on the server
 - ☒ b) They are notified by the server when a new message arrives
 - ☐ c) They can work via web using HTTP
 - ☐ d) They can use the POP3 or IMAP protocols to access the mail
10. (1p) Which of the following assertions about DNS is true?
- ☐ a) All nameservers contain all data of all names used in the Internet
 - ☐ b) There's only one root DNS server in the Internet
 - ☒ c) The server stores registries with the IP addresses assigned to each host name, but it also includes the mail servers or the DNS servers associated to a domain
 - ☐ d) None of the above
11. (1p) If an Ethernet header is 14 bytes long, the header of an IP packet 20 bytes, and the one of a TCP segment 20 bytes, compute the percentage of bytes that are true information if we send the text "ALMENDRALEJO" codec in ASCII format. Repeat the computation if we use UDP instead of TCP, whose UDP header is 8 bytes long. Take into account that the minimum Ethernet frame is 60 bytes, so for shorter messages as many 0s as necessary are used as padding (not considered to be information). Show in both cases the structure of the Ethernet frame and the corresponding headers and payload

NOTE: Ignore the Ethernet frame tail.

With TCP: $12 / (14 + 20 + 20 + 12) = 12 / 66 \rightarrow 18,1 \%$
With UDP: $14 + 20 + 8 = 42$; $42 < 60$; $12 / 60 \rightarrow 20 \%$

12. (4p) Using the next (summarized) wireshark traffic capture, answer the following questions.

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1  Frame 1: 658 bytes on wire (5264 bits), 658 bytes captured (5264 bits) on interface 0
2  Ethernet II, Src: Dell_fa:ba:da (98:90:96:fa:ba:da), Dst: Cisco_3a:c9:40 (00:64:40:3a:c9:40)
3  Internet Protocol Version 4, Src: 192.168.1.12, Dst: 161.67.140.2
4  Transmission Control Protocol, Src Port: 53878, Dst Port: 80, Seq: 1, Ack: 1, Len: 592
5  Hypertext Transfer Protocol
6    GET / HTTP/1.1\r\n
7    Host: www.esi.uclm.es\r\n
8    User-Agent: Chrome/62.0.3202.89 Safari/537.36\r\n
9    Accept: text/html,application/xhtml+xml,application/xml;q=0.9,image/webp,image/apng,*/*;q=0.8\r\n
10   Accept-Language: en-GB,en;q=0.9,es-ES;q=0.8,es;q=0.7,en-US;q=0.6\r\n
11   \r\n
12
13  Frame 2: 481 bytes on wire (3848 bits), 481 bytes captured (3848 bits) on interface 0
14  Ethernet II, Src: Cisco_3a:c9:40 (00:64:40:3a:c9:40), Dst: Dell_fa:ba:da (98:90:96:fa:ba:da)
15  Internet Protocol Version 4, Src: 161.67.140.2, Dst: 192.168.1.12
16  Transmission Control Protocol, Src Port: 80, Dst Port: 53878, Seq: 1, Ack: 593, Len: 415
17  Hypertext Transfer Protocol
18    HTTP/1.1 200 OK\r\n
19    Date: Fri, 09 Mar 2018 11:58:03 GMT\r\n
20    Server: Apache/2.2.9 (Debian)\r\n
21    Content-Length: 119\r\n
22    Content-Type: text/html; charset=UTF-8\r\n
23    Content-Language: es\r\n
24    \r\n
25    [more]
26
27  Frame 3: 690 bytes on wire (5520 bits), 690 bytes captured (5520 bits) on interface 0
28  Ethernet II, Src: Dell_fa:ba:da (98:90:96:fa:ba:da), Dst: Cisco_3a:c9:40 (00:64:40:3a:c9:40)
29  Internet Protocol Version 4, Src: 192.168.1.12, Dst: 161.67.140.47
30  Transmission Control Protocol, Src Port: 45398, Dst Port: 80, Seq: 1888, Ack: 77781, Len: 624
31  Hypertext Transfer Protocol
32    GET /img/btnSearchSubmit.jpg HTTP/1.1\r\n
33    Host: webpub.esi.uclm.es\r\n
34    User-Agent: Chrome/62.0.3202.89 Safari/537.36\r\n
35    Accept: image/webp,image/apng,image/*,*/*;q=0.8\r\n
36    Accept-Language: en-GB,en;q=0.9,es-ES;q=0.8,es;q=0.7,en-US;q=0.6\r\n
37    \r\n
38
39  Frame 4: 1533 bytes on wire (12264 bits), 1533 bytes captured (12264 bits) on interface 0
40  Ethernet II, Src: Cisco_3a:c9:40 (00:64:40:3a:c9:40), Dst: Dell_fa:ba:da (98:90:96:fa:ba:da)
41  Internet Protocol Version 4, Src: 161.67.140.47, Dst: 192.168.1.12
42  Transmission Control Protocol, Src Port: 80, Dst Port: 45398, Seq: 77781, Ack: 2512, Len: 1467
43  Hypertext Transfer Protocol
44    HTTP/1.1 200 OK\r\n
45    Date: Fri, 09 Mar 2018 13:23:33 GMT\r\n
46    Server: Apache/2.2.9 (Debian)\r\n
47    Content-Length: 1006\r\n
48    Content-Type: image/jpeg\r\n
49    \r\n
50    [more]

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- a) List ALL protocols in the frame 1: Ethernet, IP, TCP, y HTTP
- b) On what other transport protocol would it be possible to perform that first request? None
- c) IP addresses of the computers running the servers. 161.67.140.2 y 161.67.140.47
- d) Commercial name and version of the server involved in the first request. Apache/2.2.9
- e) Physical address of computer running the server involved in the first request: You can not know because it is not a neighbor (it is in a different network)
- f) IP address of the computer running the client. 192.168.1.12
- g) Commercial name and version of the client. Chrome/62.0.3202.89
- h) Physical address of computer running the client. 98:90:96:fa:ba:da
- i) List the resources (URLs) requested by the client.
"http://www.esi.uclm.es/" and "http://webpub.esi.uclm.es/img/btnSearchSubmit.jpg"
- j) Body length of the second HTTP request. 0
- k) What is the most likely reason why the request for message 3 happens? It is requesting an image whose URL appears on the main page.
- l) Why does the client performs requests to 2 servers? Because the image URL corresponds to another server.