Computer Networks I

Partial 1 - Course 2016/17

Escuela Superior de Informática

calificación

This test has 17 questions. Every three wrong test answers 1 point will be substracted. Only one option is correct. Calculators are not allowed.

Apellidos: SOLUCIÓN Nombre: _____ Grupo: _____

1. (1p) Which is the task of the session layer?
   - ☐ **a**) Transport , compression and encription
   - ■ **b**) Session control and synchronization
   - ☐ **c**) Process to process message delivery
   - ☐ **d**) None of the above

2. (1p) Select the statement which is **FALSE** with respect to point-to-point links
   - ■ **a**) They require arbitration for medium access
   - ☐ **b**) They use a non-shared transmission medium
   - ☐ **c**) They don't consider multicast and broadcast addressing
   - ☐ **d**) Their most frequent use is for the interconnection of distant routers

3. (1p) Considering a classification depending on the network size, which is the one used for the interconnection of the hosts in a branch office of a company?
   - ■ **a**) LAN
   - ☐ **b**) SAN
   - ☐ **c**) WAN
   - ☐ **d**) PAN

4. (1p) Which of the following statements about tradicional telephone networks versus the Internet is false?
   - ☐ **a**) Telephone networks is based on circuit-switching while Internet uses packet-switching
   - ☐ **b**) When the number of users in a telephone switchboard (centralita) reaches the maximum allowed, the rest must wait for a call to finish before being able to establish a communication
   - ■ **c**) Circuits in the telephone network can be shared by several users during the transmission of the information (the calls)
   - ☐ **d**) Internet makes a more efficient use of the communication links

5. (1p) Which of the following assertions about physical and logical addresses is true?
   - ■ **a**) Generally speaking, each node in the Internet has both a physical and a logical address
   - ☐ **b**) It's not possible to change the logical address assigned to a network interface
   - ☐ **c**) The physical address of a network interface changes when the node is connected to a different local area network
   - ☐ **d**) It's not possible to send and receive information in a LAN without the assigment of a logical address

6. (1p) Which of the following assertions about the client-server model is true?
   - ■ **a**) The server process waits to be contacted by the client
   - ☐ **b**) The server process is the one that receives data
   - ☐ **c**) The server process is initiated at the moment communication takes place
   - ☐ **d**) The server process requires a previous connection establishment

7. (1p) Which of the following assertions with respect to the peer-to-peer paradigm is false?
   - ☐ **a**) There are no always-on servers
   - ■ **b**) Some peers have a server role, while the rest assume the client role
   - ☐ **c**) The IPs of the peers may change along time
   - ☐ **d**) It has better scalability than the one achieved by the client-server paradigm

8. (1p) The UDP transport protocol is the preferred option ...
   - ☐ **a)** In those cases where a large bandwidth is required
   - ■ **b)** In those cases where the response time should be kept minimum
   - ☐ **c)** In instant messaging applications
   - ☐ **d)** In file transference applications

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)** The method field specifies the protocol used by the client
   - ■ **c)** The hostname must start with the www prefix when the URL refers to a web server
   - ☐ **d)** It identifies any resource in the Web uniquely

10. (1p) What does it mean that a web page is an active one?
    - ☐ **a)** That the webmaster updates its contents constantly
    - ☐ **b)** That the page shown is generated from the execution of some programming code in the server
    - ■ **c)** That the server doesn't generate the page itself, but it provides the client with the code that will render it partially or completely
    - ☐ **d)** None of the above

11. (1p) Let the message that includes the line "HTTP/1.1 301 Moved permanently"
    - ☐ **a)** It's the status line of an HTTP request message
    - ☐ **b)** It's the request line of an HTTP request message
    - ☐ **c)** It's part of the information sent in the header lines in an HTTP reponse message, after the status line
    - ■ **d)** None of the above

12. (1p) Which of the following statements about the use of a web proxy cache is true?
    - ☐ **a)** It reduces the amount of traffic sent to the Internet
    - ☐ **b)** It reduces the latency of the web requests hitting the cache
    - ☐ **c)** It can be used to block the access to certain Internet domains
    - ■ **d)** All of the above are true

13. (1p) Which of the following assertions about cookies is false?
    - ■ **a)** They get stored at the server side
    - ☐ **b)** They get stored at the client side
    - ☐ **c)** They are updated by the server
    - ☐ **d)** They provide state information about the interaction with the server

14. (1p) Which of the following assertions about the e-mail is false?
    - ■ **a)** The incoming e-mail is stored in the mailbox of the destination user, which is part of the user agent side (the client)
    - ☐ **b)** It uses application layer protocols based in ASCII
    - ☐ **c)** E-mails are directly transferred from the outgoing mail server to the destination mail server using SMTP
    - ☐ **d)** The arrival of an e-mail to the mailbox doesn't imply that the user gets a direct alert, but it's the user herself who has to ckeck the availability of new e-mail

15. (10p) Using the following data that resulted from a wireshark capture, answer the following questions

```
Frame 1: 74 bytes on wire (592 bits), 74 bytes captured (592 bits) on interface 0
Ethernet II, Src: fc:f8:ae:30:59:71, Dst: d8:b6:b7:04:c9:6a
Internet Protocol Version 4, Src: 192.168.1.133, Dst: 87.216.1.65
User Datagram Protocol, Src Port: 39730 (39730), Dst Port: 53 (53)
Domain Name System (query)  [Response In: 2]
     Queries

Frame 2: 104 bytes on wire (832 bits), 104 bytes captured (832 bits) on interface 0
Ethernet II, Src: d8:b6:b7:04:c9:6a, Dst: fc:f8:ae:30:59:71
Internet Protocol Version 4, Src: 87.216.1.65, Dst: 192.168.1.133
User Datagram Protocol, Src Port: 53 (53), Dst Port: 39730 (39730)
Domain Name System (response)    [Request In: 1]
    Flags: 0x8180 Standard query response, No error
    Answers
        www.jaztel.com: type CNAME, class IN, cname jaztel.com
        jaztel.com: type A, class IN, addr 81.88.48.71

Frame 3: 205 bytes on wire (1640 bits), 205 bytes captured (1640 bits) on interface 0
Ethernet II, Src: fc:f8:ae:30:59:71, Dst: d8:b6:b7:04:c9:6a
Internet Protocol Version 4, Src: 192.168.1.133, Dst: 81.88.48.71
Transmission Control Protocol, Src Port: 60050 (60050), Dst Port: 80 (80), Seq: 1, Ack: 1, Len: 139
Hypertext Transfer Protocol
    GET / HTTP/1.1\r\n
    User-Agent: Wget/1.18 (linux-gnu)\r\n
    Accept: */*\r\n
    Accept-Encoding: identity\r\n
    Host: www.jaztel.com\r\n
    Connection: Keep-Alive\r\n
    \r\n
    [Full request URI: http://www.jaztel.com/]
    [HTTP request 1/1]
    [Response in frame: 4]

Frame 4: 390 bytes on wire (3120 bits), 390 bytes captured (3120 bits) on interface 0
Ethernet II, Src: d8:b6:b7:04:c9:6a, Dst: fc:f8:ae:30:59:71
Internet Protocol Version 4, Src: 81.88.48.71, Dst: 192.168.1.133
Transmission Control Protocol, Src Port: 80 (80), Dst Port: 60050 (60050), Seq: 1, Ack: 140, Len: 324
Hypertext Transfer Protocol
    HTTP/1.1 200 OK\r\n
    Date: Thu, 3 Jun 2016 21:59:22 GMT\r\n
    Server: Apache\r\n
    Last-Modified: Tue, 03 May 2016 17:30:23 GMT\r\n
    Accept-Ranges: bytes\r\n
    Content-Length: 98\r\n
    Connection: close\r\n
    Content-Type: text/html\r\n
    Content-Language: es\r\n
    \r\n
    [HTTP response 1/1]
    [Time since request: 0.109247530 seconds]
    [Request in frame: 3]
Line-based text data: text/html
```

- a) List the set of ALL protocols shown in the captures
- b) Which of them do belong to the application layer?
- c) IP address of the Web server
- d) IP address of the domain name server
- e) Physical address of the client, if it's possible to know
- f) Physical address of web server, if it's possible to know
- g) URL requested (protocol and port included), if it's possible to know
- h) Length of the body of the HTML request
- i) Which is the reason of the appearance of the first two messages in the capture?
- j) What's the meaning of the type A shown in the response provided by the DNS server?
- a) Ethernet; IP; TCP, UDP; HTTP, DNS
- b) HTTP and DNS
- c) 81.88.48.71
- d) 87.216.1.65
- e) fc:f8:ae:30:59:71
- f) It's not possible to know. It's on a different network than that where the capture is performed
- g) http://www.jazztel.com:80

16. (4p) Describe in short the process used by a user agent (no web client) in order to read the incoming e-mail. Identify the main actors involved as well as the protocols that you know that can be used for those tasks

17. (2p) Describe in short how it's possible to attach binary data to an e-mail, despite the e-mail protocols are all text-based
One of the limitations of the use of e-mail for the transference of data is that it was only conceived for the use of text, and more concretely 7-bit ASCII code. That prevents not only the use of many characters used in other languages but english, but also sending binary data.
The purpose of the MIME extensions (Multipurpose Internet Mail Extensions) is therefore being able to transmit any kind of digital information, not just text. This is achieved through the codification of binary information into a sequence of ASCII characters, so the result can be sent as text information to the destination. Once in the final mailbox, the user agent will pick the message, identify the coded part using MIME, decode it and regenerate the original binary information (image, text document, ...).
The inclusion of the MIME content into the e-mail message is done through the use of a header including several sections, such as the type of content include (GIF image, for example), the coding mechanism, the name of the original file, ...