

*This exam consists of 14 question totalling 20 points. The maximum duration is 80 minutes. Three wrong answers subtract a point. Only an answer if correct if otherwise not stated. Calculator use is forbidden. Write legibly using only the reserved area.*

Apellidos: \_\_\_\_\_ **SOLUCIÓN** \_\_\_\_\_ Nombre: \_\_\_\_\_ Grupo: \_\_\_\_\_

1. [1p] What happens when a UDP client invokes `sendto()` to an incorrect address?
 

<input type="checkbox"/> a) The connection ends in error.	<input type="checkbox"/> c) Request forwarding.
<input type="checkbox"/> b) A <code>ServerNotFound</code> exception is raised.	<input checked="" type="checkbox"/> d) Nothing.
2. [1p] With Python, if invoking a socket in blocking mode, the return value of the `recv()` method returns an empty sequence, what it means?
 

<input type="checkbox"/> a) The sender sent nothing.	<input type="checkbox"/> c) The retransmission timer expired.
<input checked="" type="checkbox"/> b) The other peer closed the connection.	<input type="checkbox"/> d) The local process was interrupted by a signal.
3. [1p] A client has sent 200 bytes calling the `sendall()` method of a TCP socket. The server invokes the `recv()` method in a socket in the same connection. The received message on the server has a length of 150 bytes. Which is the reason?
 

<input type="checkbox"/> a) Being a connectionless there is no guarantee of delivery or order.
<input checked="" type="checkbox"/> b) It's a normal situation, since it is a stream oriented communication.
<input type="checkbox"/> c) The sent message was divided into segments and one of them is lost.
<input type="checkbox"/> d) The situation can never occur..
4. [1p] Select the FALSE statement in relation to the flow control mechanism:
 

<input checked="" type="checkbox"/> a) It prevents network congestion.
<input type="checkbox"/> b) It can be implemented at various layers of the TCP/IP stack.
<input type="checkbox"/> c) It occurs when there is an important difference between production and reception of data in a stream.
<input type="checkbox"/> d) It prevents the saturation of a slow receiver.
5. [1p] What TCP header fields are used for flow control?
 

<input type="checkbox"/> a) URG pointer.	<input type="checkbox"/> b) Offset.	<input type="checkbox"/> c) Flow tag.	<input checked="" type="checkbox"/> d) Window.
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6. [1p] In what traffic profile the AVERAGE DATA RATE is equal to the PEAK DATA RATE?
 

<input checked="" type="checkbox"/> a) Constant bitrate	<input type="checkbox"/> c) Average bitrate
<input type="checkbox"/> b) Variable bitrate	<input type="checkbox"/> d) Burst
7. [1p] What the router do when a packet arrives and the input queue is full?
 

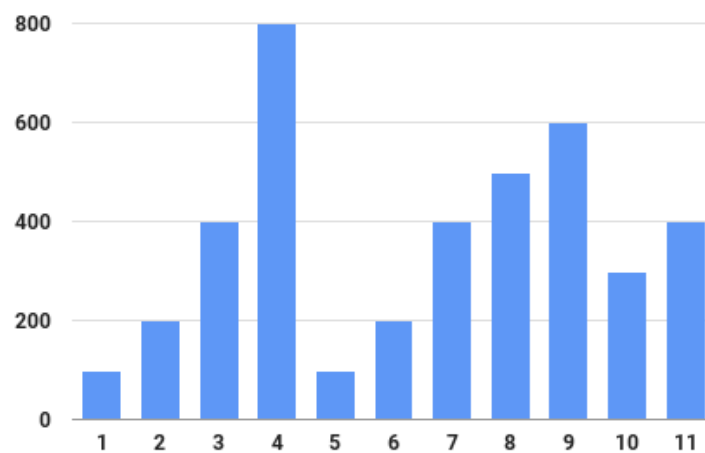
<input checked="" type="checkbox"/> a) That packet package is dropped	<input type="checkbox"/> c) The rest of the incoming packets are dropped
<input type="checkbox"/> b) It flushes the output queue	<input type="checkbox"/> d) None
8. [1p] What is the difference between **open loop** and **closed loop** congestion control?
 

<input checked="" type="checkbox"/> a) Open loop is applied to prevent congestion and closed one attempts to resolve congestion when it is already occurring.
<input type="checkbox"/> b) Closed loop is applied to prevent congestion and open one attempts to resolve congestion when it is already occurring.
<input type="checkbox"/> c) Open loop is continuously applied (although not required) and closed one is applied only when needed.
<input type="checkbox"/> d) Closed loop is applied continuously (although not required) and open one is applied only when needed.
9. [1p] Which of the following congestion techniques is *node-to-node*?
 

<input type="checkbox"/> a) Choke packet.	<input type="checkbox"/> c) Back pressure and choke packet.
<input checked="" type="checkbox"/> b) Back pressure.	<input type="checkbox"/> d) None of the above.
10. [1p] What is the maximum value that the congestion window could take during the Slow Start?
 

<input type="checkbox"/> a) Until some packet has to be resent.	<input checked="" type="checkbox"/> c) Up to the threshold.
<input type="checkbox"/> b) Until 3 equal ACKs are received.	<input type="checkbox"/> d) Up to $2^{16}$ .

11. [1p] When a router processes an incoming IP packet, how does it determine where to forward it?
- ☐ a) The route table and the source IP address      ☐ c) The IP header and the source port
- ☐ b) The destination IP address and the source MAC      ☒ d) The routing table and the destination IP address
12. [1p] Choose the correct statement regarding *packet switching*:
- ☐ a) All packages with the same identifier follow the same path.
- ☐ b) All packets belonging to the same flow are routed through the same virtual circuit.
- ☒ c) Each packet is routed independently to its destination.
- ☐ d) The end-to-end transfer rate is guaranteed.
13. [4p] The picture below shows the value of the congestion window (in bytes) for a TCP connection. Explain the reason of the value in each moment.



☐

14. [4p] The figure shows a TCP flow, including connection and disconnection phases. Complete the blank segments considering:

- A is using slow-start to prevent congestion.
- Timeout for A segments is 3 clock ticks.
- A uses a fixed data size of 200 bytes.
- A is going to send data segments whenever it can.

**A sends 1000 Bytes**

**B sends 0 bytes**

