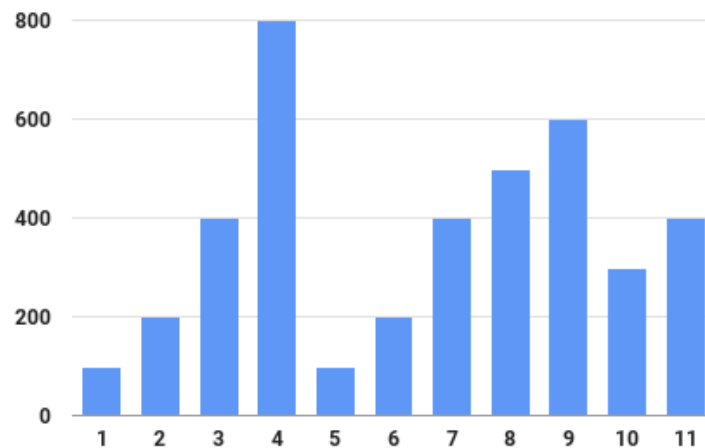


This exam consists of 14 question totalling 20 points. The maximum duration is 80 minutes. Three wrong answers subtract a point. Only an answer if correct if otherwise not stated. Calculator use is forbidden. Write legibly using only the reserved area.

Apellidos: _____ Nombre: _____ Grupo: _____

1. (1p) What happens when a UDP client invokes `sendto()` to an incorrect address?
☐ a) The connection ends in error. ☐ c) Request forwarding.
☐ b) A `ServerNotFound` exception is raised. ☐ 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?
☐ a) The sender sent nothing. ☐ c) The retransmission timer expired.
☐ b) The other peer closed the connection. ☐ 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?
☐ a) Being a connectionless there is no guarantee of delivery or order.
☐ b) It's a normal situation, since it is a stream oriented communication.
☐ c) The sent message was divided into segments and one of them is lost.
☐ d) The situation can never occur..
4. (1p) Select the FALSE statement in relation to the flow control mechanism:
☐ a) It prevents network congestion.
☐ b) It can be implemented at various layers of the TCP/IP stack.
☐ c) It occurs when there is an important difference between production and reception of data in a stream.
☐ d) It prevents the saturation of a slow receiver.
5. (1p) What TCP header fields are used for flow control?
☐ a) URG pointer. ☐ c) Flow tag.
☐ b) Offset. ☐ d) Window.
6. (1p) In what traffic profile the AVERAGE DATA RATE is equal to the PEAK DATA RATE?
☐ a) Constant bitrate ☐ c) Average bitrate
☐ b) Variable bitrate ☐ d) Burst
7. (1p) What the router do when a packet arrives and the input queue is full?
☐ a) That packet package is dropped ☐ c) The rest of the incoming packets are dropped
☐ b) It flushes the output queue ☐ d) None
8. (1p) What is the difference between **open loop** and **closed loop** congestion control?
☐ a) Open loop is applied to prevent congestion and closed one attempts to resolve congestion when it is already occurring.
☐ b) Closed loop is applied to prevent congestion and open one attempts to resolve congestion when it is already occurring.
☐ c) Open loop is continuously applied (although not required) and closed one is applied only when needed.
☐ 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*?
- ☐ a) Choke packet. ☐ c) Back pressure and choke packet.
- ☐ b) Back pressure. ☐ d) None of the above.
10. (1p) What is the maximum value that the congestion window could take during the Slow Start?
- ☐ a) Until some packet has to be resent. ☐ c) Up to the threshold.
- ☐ b) Until 3 equal ACKs are received. ☐ 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

