Quality of Service
QoS metrics

Date: Spring
Duration: 30 min.

- There is only one correct answer for each multiple choice question.
- Each correct answer adds 1 point.
- Each incorrect answer has a penalty of $\frac{1}{3}$ points.
- No score is awarded for unanswered questions, neither positive nor negative.
- Mark out your answers with an "X". Make sure that the "X" reaches the corners of the rectangle. ⊠
- No score is awarded if you mark more than one answer.
- Pad your NIA with 0s on the left to complete the NIA field.

Write your personal data clearly.

Last name:	
First name:	
Group:	

Permutation: A

NIA:

	A	B	C	D		A	B	C	D
1					9				
2					10				
3					11				
4					12				
5					13				
6					14				
7					15				
8					16				

1.- For TCP connections, our main concern is ...

(a) the propagation time.
(b) the round-trip-time (RTT).
(c) the average hop duration.
(d) the transmission time.

2.- Why it is necessary to offer different tiers of service?

(a) To reduce the delay of all packets of the network.
(b) Because the applications that use larger volumes of traffic need to be prioritized.
(c) Because heterogeneous applications coexist in the same network.
(d) To prevent that VoIP packets are transmitted over the same link as Web packets.

3.- Which techniques can we use to deal with errors?

(a) Forward error correction (FEC), automatic repeat request (ARQ), packet loss concealment (PLC).
(b) Cell integrity metric (CIM), error dealing technique (EDT), weighted round robin (WRR).
(c) Hierarchical replication code (HRC), strong data protection (SDR), error prevention mechanism (EPM).
(d) Binary robust redundancy (BRR), spatial data duplexing (SDD), repeat-until-received (RUR).

4.- What is the name of the contract that details QoS guarantees?

(a) QoS contract (QSC).
(b) Guarantee Provision Society (GPS).
(c) High Quality Contract (HQS).
(d) Service Level Agreement (SLA).

5.- Which measure of bandwidth in common for billing in contracts between ISPs?

(a) 95 % percentile bandwith of averages of 5 minutes.
(b) Minimum bandwidth.
(c) Average bandwidth.
(d) Free bandwidth.

6.- What of the following is a good practice (a requirement, actually) in router design?

(a) Keep packets of different flows in different queues.
(b) Keep the packets of the same flow in the same queue.
(c) Keep a separate queue for each flow.
(d) Keep packets of the same flow in different queues.

7.- Which of the following is not a positive aspect of a network?

(a) Short MTTR.
(b) High $\frac{MTBF}{MTBF+MTTR}$ ratio.
(c) High availability.
(d) Short MTBF.

8.- What is the re-ordering ratio of this sequence (1, 2, 3, 4, 7, 5, 6, 8, 9, 10)?

(a) 0/10.
(b) 3/10.
(c) 5/10.
(d) 10/10.

9.- Why is defining SLA's is tricky? Take the example of bandwidth.

(a) It is difficult to measure packets that are travelling very fast (the speed of light).
(b) Bandwidth can be meaured in bits per second or bytes per second.
(c) The bandwidth changes with different operative systems and browsers.
(d) Bandwidth may have different meanings (line speed, with or without L2 headers, average or maximum, etc.).

10.- Which of the following statements is true?

(a) Web traffic has stricter delay constraints than VoIP.
(b) P2P file exchange is not an elastic application.
(c) Voice packets should be prioritized over video.
(d) Voice requires more bandwidth than video.

11.- Which of the following media is more reliable in terms of bit error rate?

(a) ADSL over twisted pair.
(b) Optical fibre.
(c) WiFi link.
(d) Satellite link.

12.- Which of the following is not a QoS metric considered in the course?

(a) Availability.
(b) Bandwidth.
(c) Confidentiality.
(d) Packet order preservation.

13.- What is a common packetizatin interval for VoIP?

(a) 20 ms .

(b) 1 ms .

(c) 100 μs.

(d) 200 ms.

14.- A router is performing load balancing using two parallel links ...

(a) It should use the ECN bit to route the packet.

(b) It should use the flow sequence number to route the packet.

(c) It should take a hash of the protocol (UDP or TCP), source and destination address and source and destination port to decide the route of the packets.

(d) It should take a hash of the QoS field to route the packet.

15.- Which of the following is not a possible cause of packet loss?

(a) Level 1 errors.

(b) Scheduling algorithms.

(c) Device failure.

(d) Full queues.

16.- Given L the packet length and R the line rate, what is $\frac{L}{R}$?

(a) The propagation time.

(b) The processing time.

(c) The queueing time.

(d) The transmission time.