TCP/IP Networking 2016 Test 4

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☐1	☐1	☐1	☐1	☐1	☐1
☐2	☐2	☐2	☐2	☐2	☐2
☐3	☐3	☐3	☐3	☐3	☐3
☐4	☐4	☐4	☐4	☐4	☐4
☐5	☐5	☐5	☐5	☐5	☐5
☐6	☐6	☐6	☐6	☐6	☐6
☐7	☐7	☐7	☐7	☐7	☐7
☐8	☐8	☐8	☐8	☐8	☐8
☐9	☐9	☐9	☐9	☐9	☐9

Grading:
For each question, exactly one of the four proposed answers is correct. If the good answer and only the good answer box is crossed $\Rightarrow +1$ point. If one bad answer box is crossed and no other box is crossed $\Rightarrow -\frac{1}{3} = -0.333$ point. If 0 or more than 1 answer box is crossed $\Rightarrow 0$ point.
$\longleftarrow$ Please encode your SCIPER number here and write your full name in the box below. $\downarrow$

Name, First Name:

....

Question 1 Which statements are true ?

1. In slow start, the increase is additive.
2. Slow start is used to accelerate the convergence of Additive Increase, Multiplicative Decrease

☐ 1 and not 2. ■ 2 and not 1. ☐ Neither 1 nor 2 ☐ 1 and 2.

Question 2 We have a network with n sources and n destinations. Each link has a finite capacity. Each source sends at the same rate λ. We plot the total throughput as a function $f(\lambda)$ when λ increases to ∞.

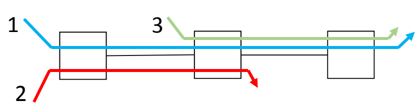
☐ $f()$ is always monotonically increasing and $\lim_{\lambda \to \infty} f(\lambda) = \infty$.

■ $f()$ may be non-monotonic in some networks.

☐ $f()$ is always monotonically increasing and $\lim_{\lambda \to \infty} f(\lambda)$ may be finite or infinite, depending on the network.

☐ $f()$ is always monotonically increasing but $\lim_{\lambda \to \infty} f(\lambda)$ is finite, equal to the network capacity.

Question 3 The capacities of the 2 links (shown as lines between boxes) is 12 Mb/s each.
There are no other constraints than the 2 link capacities. The rates x_i of the flows (shown as arrows) are allocated according to proportional fairness. What is the proportionally fair allocation in Mb/s ?



■ $x_1 = 4, x_2 = x_3 = 8$. ☐ $x_1 = x_2 = x_3 = 6$.

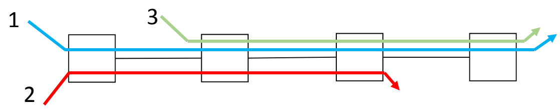
☐ $x_1 = x_2 = x_3 = 4$. ☐ $x_1 = 8, x_2 = x_3 = 4$.

Question 4 A router $R1$ uses distance vector and has two adjacent routers $R2$ and $R3$. All link costs are equal to 1. The routing information base at $R1$ contains the record shown in the table on the right. $R1$ receives from $R2$ the routing update: `dest=9.9.9/24, distance=6`. After $R1$ has processed this update, what is its distance to 9.9.9/24 ?

destination	next-hop	distance
9.9.9/24	R2	6

☐ 8. ■ 7. ☐ 5. ☐ 6.

Question 5 The capacities of the 3 links (shown as lines between boxes) is 12 Mb/s each.
There are no other constraints than the 3 link capacities. The rates of the flows (shown as arrows) are allocated according to max-min fairness. What is the rate allocated to flow 1 ?



☐ 6 Mb/s. ☐ 8 Mb/s.
☐ 3 Mb/s. ■ 4 Mb/s.

Question 6 Which statements are true ?

1. Additive Increase, Multiplicative Decrease tends to provide a fair and efficient allocation
2. Multiplicative Increase, Additive Decrease tends to provide a fair and efficient allocation

☐ 1 and 2. ☐ 2 and not 1. ■ 1 and not 2. ☐ Neither 1 nor 2

Question 7 In which case does every router keep a detailed description of the entire network ?

■ with link state and not with distance vector.
☐ neither with distance vector nor with link state.
☐ both with distance vector and with link state.
☐ with distance vector and not with link state.

Question 8 Which statements are true, for networks where rate allocation constraints can be modelled by linear inequalities ?

1. There exists one and only one max-min fair allocation
2. There exists one and only one proportionally fair allocation

☐ 1 and not 2. ■ 1 and 2. ☐ 2 and not 1. ☐ Neither 1 nor 2

Question 9 With route poisoning, when a router detects that the route to a destination n becomes unreachable...

- ■ It immediately sends to all neighbours the message "distance to $n = \infty$".
- □ It keeps n in its routing table with distance to n equal to the value that was valid before detecting unreachability and immediately sends to all neighbours its vector of distances to all destinations (including n).
- □ It removes n from its routing table and immediately sends to all neighbours its vector of distances to all destinations other than n.
- □ It removes n from its routing table and remains silent for a duration equal to the holddown timer.

Question 10 In a connected graph with n nodes, we use centralized Bellman Ford to compute the distances from all nodes to node 1.

- ■ The algorithm converges to the correct values regardless of initial conditions.
- □ If the initial conditions are $\geq$ the true distances to node 1, the algorithm converges to the correct values; otherwise it may happen that it does not converge and counts to infinity.
- □ If the initial conditions are less than the true distances to node 1, the algorithm converges to the correct values; otherwise it still converges but in some cases not to the correct values.
- □ If the initial conditions are $\geq$ the true distances to node 1, the algorithm converges to the correct values; otherwise it still converges but in some cases not to the correct values.