EKSAMEN / EXAM	TTM4100	19	05	2015

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1.1

Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False
1.1.1... ☒	☐	1.1.2... ☐	☒	1.1.3 .. ☒	☐	1.1.4... ☐	☒	1.1.5 .. ☒	☐
1.1.6... ☒	☐	1.1.7... ☒	☐	1.1.8 .. ☒	☐	1.1.9... ☒	☐	1.1.10 ☐	☒

1.2

Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False
1.2.1... ☒	☐	1.2.2... ☐	☒	1.2.3 .. ☐	☒	1.2.4... ☐	☒	1.2.5 .. ☐	☒
1.2.6... ☒	☐	1.2.7... ☐	☒	1.2.8 .. ☒	☐	1.2.9... ☒	☐	1.2.10 ☐	☒

1.3

Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False
1.3.1... ☐	☒	1.3.2... ☐	☒	1.3.3 .. ☐	☒	1.3.4... ☐	☒	1.3.5 .. ☐	☒
1.3.6... ☐	☒	1.3.7... ☐	☒	1.3.8 .. ☒	☐	1.3.9... ☒	☐	1.3.10 ☒	☐

1.4

Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False
1.4.1... ☒	☐	1.4.2... ☐	☒	1.4.3 .. ☒	☐	1.4.4... ☒	☐	1.4.5 .. ☒	☐
1.4.6... ☒	☐	1.4.7... ☒	☐	1.4.8 .. ☒	☐	1.4.9... ☐	☒	1.4.10 ☐	☒

1.5

Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False	Riktig True	Galt False
1.5.1... ☒	☐	1.5.2... ☒	☐	1.5.3 .. ☐	☒	1.5.4... ☐	☒	1.5.5 .. ☐	☒
1.5.6... ☐	☒	1.5.7... ☒	☐	1.5.8 .. ☒	☐	1.5.9... ☒	☐	1.5.10 ☒	☐

Kontroller:	Eksamensvaktens signature / Invigilator's signature
• Kandidatenr. på alle sider • Samme kandidatenr. over alt	

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2.

2.1. **b**

2.2. **c**

Remark: 200ms + (1280 x 8 bits) / (64 kbps) = 160.2s

2.3. **e**
(If one selects "c" and explains the calculation as in the remark below but adopts 4 significant digits in the representation, it will be treated to be correct.)

Remark: 2 x 50ms + (1279 x 8 bits) / (64 kbps) + (2 x 1k x 8 bits) / (64 kbps) = 160.225s

Where the first term is due to propagation on both links, the second is due to parallel transmission on both links, and the third is due to first packet on link 1 and the last packet on link 2.

2.4. **a**

Remark: 1 k x 8 bits / (2 x 100ms + 1 k x 8 bits / 100 Mbps) ≈ 1 k x 8 bits / (2 x 100ms) = 40 kbps

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3.

3.1. **a**

3.2. **d**

3.3. **d**

3.4. **c**

Remark: In 192.53.41.0/23, the mask /23 tells that the leftmost 23 bits of the 32-bit quantity define the network prefix of the address (no matter about the bit values on the rest 9 bits).

3.5. **d**

3.6. **d**

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4.

4.1

IP address of the host: 145.254.160.237

IP address of the server: 65.208.228.223

4.2

There are 20 bytes in the IP header.

There are 28 bytes in the payload.

This is because the total length is 48 bytes and the header has 20 bytes:
48 bytes – 20 bytes = 28 bytes.

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4.3

The sequence number of the TCP SYN segment that is used to initiate the connection is: **0.**

The flag "0x002" in the segment that identifies the segment as a SYN segment.

The port number of the host used for the TCP connection is**: 3372.**

The port number of the server used for the TCP connection is**: 80.**

4.4

The sequence number of the SYNACK is 0.

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4.5

1380 bytes of data are carried by the TCP segment of "Packet 8".

In TCP segment of Packet 7 (sent from the host to the server), ACK=1381, implying the host has received all data preceding the ACK sequence number 1381.

In TCP segment of Packet 9 (sent from the host to the server), ACK=2761, implying the host has received all data preceding the ACK sequence number 2761.

This means, there are total 2761 – 1381 =1380 bytes of data are carried by TCP segments in Packet 8.

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5
5.1

Step	N-subset of nodes	c(A), p(A)	c(B), p(B)	c(C), p(C)	c(E), p(E)	c(F), p(F)
1	D	10, D	2, D	1, D	11, D	6, D
2	DC	3, C	2, D		11, D	6, D
3	DCB	3, C			3, B	6, D
4	DCBA				3, B	6, D
5	DCBAE				3, B	5, E
6	DCBAEF					

c(x). Current value of cost of path to destination x.
p(x): predecessor node along path from source to x.

In Step 4, it is possible that E is first included in the set N. Then, the table becomes:

Step	N-subset of nodes	c(A), p(A)	c(B), p(B)	c(C), p(C)	c(E), p(E)	c(F), p(F)
1	D	10, D	2, D	1, D	11, D	6, D
2	DC	3, C	2, D		11, D	6, D
3	DCB	3, C			3, B	6, D
4	DCBE	3, C				5, E
5	DCBEA					5, E
6	DCBAEF					

Both are correct.

5.2
The shortest path from D to A is DA, and the cost of the path is **10.**

It is acceptable, if one had interpreted the shortest path as "the least cost path", specified this interpretation in the answer, and under this interpreted "shortest path", given the path to be **DCA with cost 3.**

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5 .3

Step	N-subset of nodes	c(B), p(B)	c(C), p(C)	c(D), p(D)	c(E), p(E)	c(F), p(F)
1	A	infty	2, A	10, A	infty	infty
2	AC	infty		3, C	infty	20, C
3	ACD	5, D			14, D	9, D
4	ACDB				6, B	9, D
5	ACDBE					8, E
6	ACDBEF					

c(x). Current value of cost of path to destination x.
p(x): predecessor node along path from source to x.

5.4
The shortest path from A to F is **either ACF with cost 20 or ADF with cost 16.**

It is acceptable, if one had interpreted the shortest path as "the least cost path", specified this interpretation in the answer, and under this interpreted "shortest path", given the path to be **ACDBEF with cost 8.**

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6

6.1. d

6.2. d

6.3. c

6.4. c

6.5. c

Remark: In this choice, the final step (while not in the intermediate steps) of the calculation for each of the seven packet, has been rounded to the second decimal using the three significant figures setting.

If one had applied the three significant figures setting in intermediate steps, when calculating d6, if 8.02 had been used for d5 (instead of 8.016, the exact number), then d6 would be 8.216 which would round to 8.22. Considering this, **option e) is also accepted as correct as long as the related calculations are included.**

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KOMMENTARER COMMENTS

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