

ELEX 4550 : Wide Area Networks
Term 201730

MID-TERM EXAMINATION 1
1:30 AM – 2:20 PM
October 30, 2017

This exam has two (2) questions on six (6) pages. The marks for each question are as indicated. There are a total of 15 marks. Answer all questions. Write your answers and all rough work in this paper and nowhere else. Show your work. Draw a box around your final answer. Numerical answers must include units. Books and notes are allowed. No electronic devices other than calculators are allowed. Show your work.

This exam paper is for:

Exam 1 A00123456

Each exam is equally difficult.
Answer your own exam.

Do not start until you are told to do so.

Name: _____
BCIT ID: _____
Signature: _____

Question	Mark	Max.
1		8
2		7
Total		15

Question 1 (8 marks)

You connect the drop cable of an HFC system to a spectrum analyzer. The spectrum analyzer's input impedance is 75Ω and it is calibrated for that impedance. At a frequency of 240 MHz you see a carrier at a level of -60 dBm.

- (a) Is this a downstream (forward) or upstream (reverse) signal? How do you know?
- (b) What is the power level in mW?
- (c) What is the signal level in dBmV?
- (d) Is the signal level within the required levels for a DOCSIS (version 1.0) cable modem?
Justify your answer.

Question 2 (7 marks)

A PON system uses OLTs with a transmitter output power of +5 dBm, 8:1 splitters that have a loss of 10 dB between the input and each output port, and optical fiber cable with a loss of 0.25 dBm/km. The ONUs have a sensitivity of -22 dBm. Each transmitter services 64 users.

- (a) How many splitters are in the path between the transmitter and each receiver?
- (b) Ignoring connector and other losses, what is the maximum link length?
- (c) What would be the maximum link length if a margin of 2 dB were required?

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This exam paper is for:

Exam 2 A00123456

Each exam is equally difficult.
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Do not start until you are told to do so.

Name: _____
BCIT ID: _____
Signature: _____

Question	Mark	Max.
1		8
2		7
Total		15

Question 1 (8 marks)

You connect the drop cable of an HFC system to a spectrum analyzer. The spectrum analyzer's input impedance is 75Ω and it is calibrated for that impedance. At a frequency of 240 MHz you see a carrier at a level of -50 dBm.

- (a) Is this a downstream (forward) or upstream (reverse) signal? How do you know?
- (b) What is the power level in mW?
- (c) What is the signal level in dBmV?
- (d) Is the signal level within the required levels for a DOCSIS (version 1.0) cable modem?
Justify your answer.

Question 2 (7 marks)

A PON system uses OLTs with a transmitter output power of 0 dBm, 8:1 splitters that have a loss of 10 dB between the input and each output port, and optical fiber cable with a loss of 0.25 dBm/km. The ONUs have a sensitivity of -27 dBm. Each transmitter services 64 users.

- (a) How many splitters are in the path between the transmitter and each receiver?
- (b) Ignoring connector and other losses, what is the maximum link length?
- (c) What would be the maximum link length if a margin of 2 dB were required?

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