3.1 Waveguides

Quiz

Answer these questions to get feedback on how well you understand the course. Only one of the answers is correct. You don't have to answer every question. If you don't know the answer you can just leave it blank (default option: "I won't answer this question") and this won't affect your score. Answering **correctly** will **add 2 points** to your score but on the other hand you'll **lose 1 point** if your answer is **wrong**. The questions are divided in groups of five questions.

Press **See result** after you have finished answering.

Displaying questions **1**..**10** of **10**:

Question 1

The wave propagation inside a waveguide can be described by …

Possible answers for question 1:
- ○ … beams propagating in parallel to the walls of the structure.
- ○ … successive reflections of the propagating waves from the walls of the guiding structure.
- ○ … the diffusion of the electromagnetic energy deeper and deeper to the guiding structure.
- ◉ I won't answer this question

Question 2

Waveguides are used at higher frequencies because …

Possible answers for question 2:
- ○ … the length of the waveguide has to be related to the wavelength (at lower frequencies, the waveguide is too long).
- ○ … losses in metallic walls are too high at lower frequencies.
- ○ … the cross section of the waveguide has to be related to the wavelength (at lower frequencies, the waveguide cross section is very large).
- ◉ I won't answer this question

Question 3

Electromagnetic energy propagates through the waveguide …

Possible answers for question 3:
- ○ … if its frequency is higher than the critical one.
- ○ … anytime.
- ○ … if its frequency is lower than the critical one.
- ◉ I won't answer this question

Question 4

The propagation constant …

Possible answers for question 4:
- ○ … describes the changes of wave amplitude and phase when propagating in the waveguide.
- ○ … is not used in relation to the waveguides.
- ○ … is used to formulate excitation conditions for the waveguides.
- ◉ I won't answer this question

Question 5

Energy transmission on the waveguide is described by …

○ … the phase velocity.

○ … the group velocity.

○ … velocity of light.

⦿ I won't answer this question

Question 6

In the waveguide, electromagnetic waves can propagate in different constellations (so called modes). When increasing operation frequency …

Possible answers for question 6:

○ … more and more modes appear in the waveguide – higher modes propagate at higher frequencies.

○ … a single mode propagates in the waveguide – if a higher mode is excited, a lower mode is suppressed.

○ … no wave propagates due to the enormous attenuation.

⦿ I won't answer this question

Question 7

The dominant mode is the mode …

Possible answers for question 7:

○ … of the highest energy.

○ … of the strongest field intensity.

○ … of the lowest critical frequency.

⦿ I won't answer this question

Question 8

In the waveguide …

Possible answers for question 8:

○ … transversally electromagnetic modes can propagate.

○ … transversally electric OR transversally magnetic modes can propagate.

○ … transversally electric AND transversally magnetic modes can propagate.

⦿ I won't answer this question

Question 9

When analyzing the waveguide by finite elements …

Possible answers for question 9:

○ … partial differential equations are solved by replacing derivatives by differences.

○ … integral equations are solved by a rather complicated way.

○ … the error of the approximate solution is minimized by the Galerkin method.

⦿ I won't answer this question

Question 10

Finite elements provide eigenvalues and eigenvectors:

Possible answers for question 10:

○ Eigenvalues are related to the critical wave numbers of modes, eigenvectors are not of any use.

○ Eigenvalues are related to the critical wave numbers of modes, and eigenvectors to the field distribution of modes.

○ Eigenvectors are related to the critical wave numbers of modes, and eigenvalues to the field distribution of modes.

⦿ I won't answer this question

see result