Course outline

How does an NPTEL online course work?

Week 0

MATLAB

Week 1

Week 2

Week 3

Week 4

Week 5

- Optical Waveguides: Theory and Design: Dispersion and Polarization of Guided Modes
- Optical Waveguides: Theory and Design: Orthogonality of Guided Modes
- Optical Waveguides: Theory and Design: Coupled Mode Theory of Guided Modes
- Optical Waveguides: Theory and Design: Coupled Mode Theory Contd..
- Week 5: Lecture notes
- Quiz: Week 5: Assignment 5
- Week 5 Feedback Form: Integrated Photonics Devices and Circuits

Week 6

Week 7

Week 8

Week 9

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Week 12

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Week 5: Assignment 5

The due date for submitting this assignment has passed.

Due on 2021-09-01, 23:59 IST.

As per our records you have not submitted this assignment.

1) In a uniform single mode waveguide, the forward propagating mode and the backward propagating mode can be coupled. ***1 point***

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

2) Any sort of abrupt perturbation can break the orthogonality condition between guided modes. ***1 point***

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

3) In a weakly perturbed waveguide, the power exchange among guided modes can be approximately estimated by coupled mode theory. ***1 point***

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

4) In a multimode waveguide, it is not possible to excite only the fundamental mode. ***1 point***

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

5) A guided TE mode is not orthogonal to any of the guided TM mode supported by a waveguide. ***1 point***

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
False

6) A well defined perturbation in a waveguide can result into a desired integrated optical function. ***1 point***

- True
- False

No, the answer is incorrect.
Score: 0

Accepted Answers:
True

7) Consider a 220 nm SOI waveguide with a width $W = 500$ nm as shown in Fig. 1(a). The distribution of the dominant electric field of the fundamental mode along $y = 0$ plane is given by

$$E(x) = \begin{cases} a\sin(bx + c); & \text{in the core region} \\ a_1 e^{-b_1 x}; & \text{in the cladding region} \end{cases}$$

where $a = 1$ [V/m], $b = 5.84 \times 10^6$ [1/m], $c = \pi/2$, $a_1 = 2.23$ [V/m], $b_1 = 6.32 \times 10^6$ [1/m].

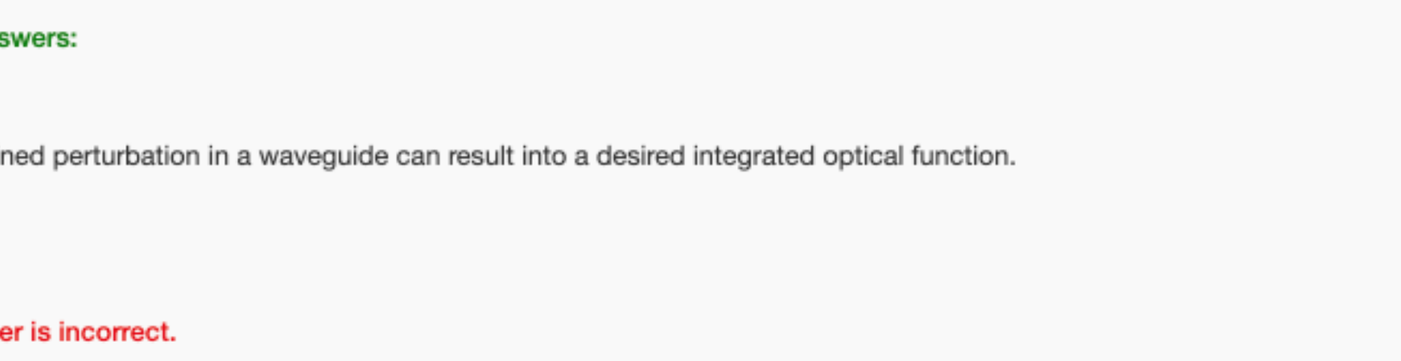

Figure 1: Cross-sectional view of (a) a 2−D SOI waveguide, (b) two closely placed SOI waveguides.

A second identical waveguide is to be placed at a distance d from the first waveguide, as shown in Fig. 1(b). What would be the minimum value of d such that the field amplitude is reduced by 99% (from origin) at the left edge of second waveguide core? _____ μm.

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 0.59,0.62

1 point