1 point

Week 9

Week 10

Week 11

Week 12

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Week 4: Assignment 4

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

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

Progress

1) The ray optics picture accurately models the silicon photonic wire waveguide used in photonic integrated circuit applications. True

False

No, the answer is incorrect. Score: 0

Accepted Answers: False

2) The required Si device layer thickness of a Silicon-on-Insulator (SOI) substrate can be smaller than that of Silicon Nitride (Si₃N₄) on insulator for 1 point tightly confined guided modes.

O True False

No, the answer is incorrect.

Score: 0 Accepted Answers:

True

3) The effective index of a 1D symmetric waveguide (upper and lower claddings are same) is independent of the polarization of a guided mode.

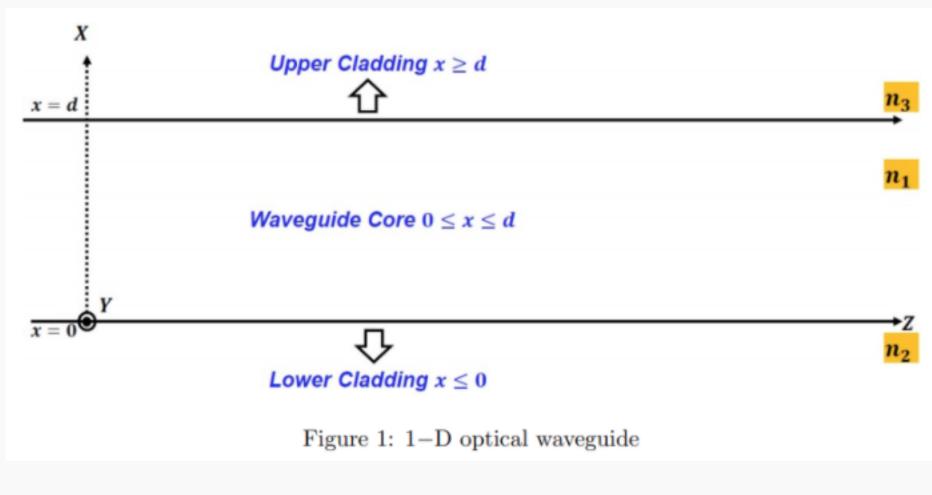
True False

No, the answer is incorrect. Score: 0

Accepted Answers: False

Common data for questions 4 – 9: For a 1D optical waveguide shown in Fig. 1, write a MATLAB script to solve for TE guided mode field profiles and their effective indices using full-vectorial analysis, at an operating wavelength $\lambda=1310$ nm. Consider $n_1=3.4778,\ n_2=n_3=1.4657$ and $d=1\mu m$.

NOTE: In the analysis, consider the cladding thickness as five times the core thickness



The effective indices of the TE₀ modes is ______. (answer in 2 decimal points)

No, the answer is incorrect. Score: 0 Accepted Answers: (Type: Range) 3.4,3.45 0.5 points The effective indices of the TE₂ modes is ______. (answer in 2 decimal points) No, the answer is incorrect. Accepted Answers: (Type: Range) 3,3.1 0.5 points The confinement factor for the TE₀ mode is ______. (answer in 4 decimal points) **NOTE:** The confinement factor is defined as the ratio of the power of given mode in the core region (x = 0 to d) to the total power $(x = -\infty \text{ to } \infty)$ No, the answer is incorrect. Score: 0 Accepted Answers:

7) If the the time-averaged power of m^{th} mode within the core region is denoted by P^{m}_{TE} , then the ratio P^{0}_{TE}/P^{4}_{TE} is _ (answer in 2 decimal points)

No, the answer is incorrect. Score: 0 Accepted Answers:

(Type: Range) 0.993,0.999

(Type: Range) 1.76,1.82

8) The phase velocity of TE₄ mode is ______ ×10⁸ m/sec. (answer in 2 decimal points)

No, the answer is incorrect. Score: 0 Accepted Answers:

(Type: Range) 1.45,1.5

increases

9) If the refractive index of the upper cladding $n_3 = 1$, the confinement factor for the supported modes

decreases remains same

10) If the dispersion characteristics of a confined mode in a 2D SOI waveguide is given by $n_{eff} = p_1 \lambda^2 + p_2 \lambda + p_3$, where

No, the answer is incorrect. Score: 0

Accepted Answers:

increases

 $p_1 = -1.13 \times 10^{11} \, [1/m^2], p_2 = -3.557 \times 10^5 \, [1/m], \text{ and } p_3 = 3.509, \text{ over the range of } 1520 - 1580 \, \text{nm}.$ The group velocity of the mode at 1550 nm is _____ x108 m/sec. (answer in 2 decimal points)

No, the answer is incorrect. Score: 0 Accepted Answers:

(Type: Range) 0.75,0.85

11) For same waveguide width and height, at a particular wavelength, the effective index of fundamental mode in rib waveguide is larger than the 1 point effective index of fundamental mode in strip waveguide.

True False No, the answer is incorrect.

Score: 0 Accepted Answers: True