NPTEL » Integrated Photonics Devices and Circuits

Announcements

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Course outline How does an NPTEL online course work? Week 0 MATLAB Week 1 Week 2 Week 3 Week 4 Week 5 Week 6 Optical Waveguides: Theory and Design: Coupled Mode Theory Contd.. Integrated Optical Components: Y-Junction Power Splitter/Combiner and Mach-Zehnder Interferometer Integrated Optical Components: Directional Coupler: Coupled Waveguides Week 6: Lecture notes Quiz: Week 6: Assignment 6 Week 6 Feedback Form: Integrated Photonics Devices and Circuits Week 7 Week 8 Week 9

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Week 6: Assignment 6

The due date for submitting this assignment has passed.

As per our records you have not submitted this assignment.

Due on 2021-09-08, 23:59 IST.

In a photonic integrated circuit, the input and output grating coupler designs are different.

The vertical grating coupler design in SOI platform is wavelength independent.

1 point

1 point

True

False

Score: 0

No, the answer is incorrect.

Accepted Answers: False

True

False

Score: 0

Accepted Answers:

No, the answer is incorrect.

False

3) In a Y junction the phase difference between two output ports is $\pi/2$.

1 point

True

False

No, the answer is incorrect. Score: 0

Accepted Answers:

False

Common data for questions 4 – 5:

Consider a Y-junction based Mach-Zehnder interferometer integrated with a phase shifter, shown in Fig. 1. The relation between the DC voltage applied to the phase shifter (V) and the phase added to one arm of the MZI (ϕ) is given by $\phi = aV^2$, where $a = 0.005 \text{ rad/V}^2$.

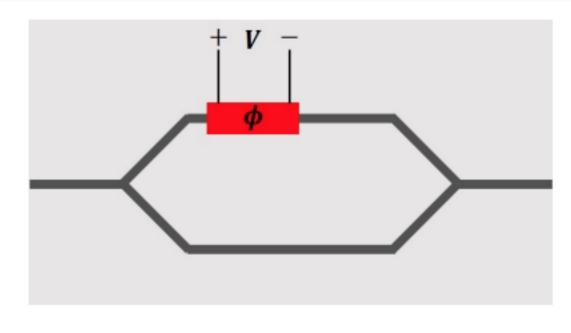


Figure 1: Y-junction based Mach-Zehnder Interferometer

NOTE: Assume lossless junctions and neglect the waveguide loss

4) The voltage applied to the phase shifter such that no light is detected at the output of MZI is V (in 2 decimal po

No, the answer is incorrect.

Score: 0 Accepted Answers:

(Type: Range) 24.8,25.2

The voltage applied to the phase shifter such that the power at output is 25% of the incident power is ______ V (in 2 decimal points).

No, the answer is incorrect.

Score: 0 Accepted Answers:

(Type: Range) 20.2,20.6

1 point

1 point

6) The dispersion characteristics of a guided mode in a SOI waveguide with air as its cladding is given by $n_{eff} = p_1 \lambda^2 + p_2 \lambda + p_3$, where $p_1 = -1.13 \times 10^{11} [1/m^2], p_2 = -3.557 \times 10^5 [1/m], \text{ and } p_3 = 3.509, \text{ over the operating range } 1520 - 1580 \text{ nm}.$

Due to the limitation in the characterization setup if my fiber can be probed only at an angle of 9° with the vertical axis, the grating period of a vertical grating coupler to achieve phase matching condition at 1550 nm wavelength is _____ nm (in 2 decimal points).

No, the answer is incorrect.

Accepted Answers: (Type: Range) 610,615

1 point

The phase velocity of symmetric super-mode is higher than the asymmetric super-mode in a typical directional coupler.

1 point

True False

No, the answer is incorrect. Score: 0

Accepted Answers:

False