

Unit 6 - Week 5

Course outline

How does an NPTEL online course work?

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Week 2

Week 3

Week 4

Week 5

Optical Fiber Waveguide - III

Optical Fiber Waveguide - IV

Optical Fiber Waveguide - V

Splice Loss

Waveguide Dispersion - I

Quiz : Assignment 5

Solution : Assignment 5

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Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-03-04, 23:59 IST.

1) Find the number of zeroes in r and ϕ – directions (except at $r = 0$) for LP_{35} mode

1 point

- 5 and 10
 6 and 14
 5 and 12
 4 and 6

No, the answer is incorrect.
Score: 0

Accepted Answers:
4 and 6

2) Consider an step-index optical fiber with $n_1 = 1.5$, $n_2 = 1.48$ and $a = 4.0 \mu\text{m}$. Calculate the number of modes (without including degeneracies) at wavelength $1.3 \mu\text{m}$.

1 point

- 4
 3
 2
 1

No, the answer is incorrect.
Score: 0

Accepted Answers:
4

3) If $2.405 < V < 3.8317$, then the supported modes are

1 point

- LP_{11}, LP_{02}
 LP_{11}, LP_{21}
 LP_{12}, LP_{31}
 LP_{01}, LP_{11}

No, the answer is incorrect.
Score: 0

Accepted Answers:
 LP_{01}, LP_{11}

4) Consider an step-index optical fiber with $n_1 = 1.5$, $n_2 = 1.48$, $a = 4 \mu\text{m}$ at $\lambda_0 = 1.3 \mu\text{m}$. Calculate the total number of modes (including degeneracies) supported.

1 point

- 20
 40
 28
 12

No, the answer is incorrect.
Score: 0

Accepted Answers:
12

5) Consider an step-index optical fiber with $n_1 = 1.5$, $n_2 = 1.49$ and $a = 3.0 \mu\text{m}$. For which wavelength range the modes LP_{01} , LP_{11} , LP_{21} and LP_{02} are supported

1 point

- $0.34 \mu\text{m} < \lambda < 0.54 \mu\text{m}$
 $0.42 \mu\text{m} < \lambda < 0.62 \mu\text{m}$
 $0.23 \mu\text{m} < \lambda < 0.53 \mu\text{m}$
 $0.63 \mu\text{m} < \lambda < 0.85 \mu\text{m}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $0.63 \mu\text{m} < \lambda < 0.85 \mu\text{m}$

6) Consider an step-index optical fiber with $n_1 = 1.474$, $\Delta = 0.002$ and $a = 5 \mu\text{m}$. Calculate the mode effective index at $1.55 \mu\text{m}$ wavelength using empirical formula.

1 point

- 1.4721
 1.4617
 1.4530
 1.4498

No, the answer is incorrect.
Score: 0

Accepted Answers:
1.4721

7) Calculate the Guassian spot size (in μm) of fundamental mode at $0.9 \mu\text{m}$ wavelength for an step-index optical fiber with $NA = 0.1$ and $a = 3 \mu\text{m}$.

1 point

- 3.7
 4.2
 5.6
 7.2

No, the answer is incorrect.
Score: 0

Accepted Answers:
3.7

8) Consider two identical step-index optical fibers with $NA = 0.1$ and $a = 3 \mu\text{m}$ at wavelength $0.9 \mu\text{m}$. Calculate the fraction of power coupled from fiber 1 to fiber 2 for transverse off-set $u = 0.55 \mu\text{m}$.

1 point

- 97.8 %
 77.8 %
 29.6 %
 13.8 %

No, the answer is incorrect.
Score: 0

Accepted Answers:
97.8 %

9) Consider two identical step-index optical fibres with $NA = 0.26$, $n_2 = 1.46$ and $a = 2 \mu\text{m}$ at wavelength $1.55 \mu\text{m}$. Calculate the longitudinal off-set loss in dB for $D = 15 \mu\text{m}$.

1 point

- 0.07
 0.74
 0.54
 0.91

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.74

10) Calculate the angular off-set loss in dB for angular misalignment $\theta = 2^\circ$ of two identical step-index optical fibres with $n_1 = 1.49$, $n_2 = 1.46$ and $a = 2 \mu\text{m}$ at wavelength $1.55 \mu\text{m}$.

1 point

- 0.35
 0.79
 0.22
 2.52

No, the answer is incorrect.
Score: 0

Accepted Answers:
0.22