Unit 7 - 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 2020-03-11, 23:59 IST.

1) Consider an step-index optical fiber with $n_1 = 1.5$, $n_2 = 1.49$ and $a = 3\ \mu m$. Using empirical formula for b, calculate the approximate value of propagation constant (μm^{-1}) at wavelength 1.55 μm. *1 point*

- 2
- 4
- 6
- 8

No, the answer is incorrect.
Score: 0
Accepted Answers:
6

2) Consider an step-index optical fiber with $n_1 = 1.5$, $\Delta = 0.0021$, $a = 4\ \mu m$. Calculate the approximate value of group velocity at wavelength at 1.55 μm. *1 point*

- $1 \times 10^8\ m/s$
- $2 \times 10^8\ m/s$
- $3 \times 10^8\ m/s$
- $4 \times 10^8\ m/s$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$2 \times 10^8\ m/s$

3) Consider an step-index optical fiber with $n_1 = 1.5$, $n_2 = 1.49$ and $a = 4\ \mu m$. Using Marcuse's empirical formula, the waveguide dispersion coefficient at wavelength 1550 nm is approximately *1 point*

- -2.2 ps/km-nm
- -4.2 ps/km-nm
- -6.5 ps/km-nm
- -9.5 ps/km-nm

No, the answer is incorrect.
Score: 0
Accepted Answers:
-9.5 ps/km-nm

4) Consider an step-index optical fiber with $n_2 = 1.48$, $\Delta = 0.75\%$ at $\lambda_0 = 1550\ nm$.Using Marcuse's empirical formula, calculate the value of V for D_W = -20 ps/km-nm. *1 point*

- 1.54
- 1.82
- 1.92
- 2.12

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.54

5) Consider a directional coupler with coupling coefficient (κ) 0.282 mm^{-1}.If we require maximum fractional power in coupled port (ζ_{max}), greater than 0.04 then the maximum difference $\Delta\beta(mm^{-1})$ at wavelength 1530 nm is *1 point*

- 1.1
- 2.8
- 5.6
- 7.4

No, the answer is incorrect.
Score: 0
Accepted Answers:
2.8

6) Consider a silica glass fiber with outer radius (b) = 70 μm, number of loops (N) = 5 at wavelength 633 nm. Calculate the radii corresponding to quarter wave plate. (For silica glass fiber: C = 0.133 at λ_0 = 633 nm). *1 point*

- 15.6 cm
- 10.4 cm
- 12.9 cm
- 2.6 cm

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

7) For a Fiber Bragg Grating (FBG) with $\Delta n_0 = 5\times10^{-4}$, V= 2. Calculate the value of overlap integral between the forward and backward propagating modes via FBG *1 point*

- 12 %
- 36 %
- 71 %
- 84 %

No, the answer is incorrect.
Score: 0
Accepted Answers:
71 %

8) Find the coupling coefficient (mm^{-1}) for a FBG with $\Delta n_0 = 5\times10^{-4}$, V= 2 at 1064 nm wavelength *1 point*

- 0.38
- 0.59
- 0.78
- 1.05

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.05

9) In a fiber Bragg grating of grating period (Λ) the peak in the reflection spectrum is obtained at 1.5 μm, wavelength. Find the effective index of the mode of the fiber. *1 point*

- 1.7
- 1.5
- 1.3
- 1.1

No, the answer is incorrect.
Score: 0
Accepted Answers:
1.5

10) For a fiber Bragg Grating (FBG) with $\Delta n_0 = 5\times10^{-4}$, and V= 2. The minimum grating length for more than 95 % reflection at 1064 nm wavelength is *1 point*

- 4 mm
- 3 mm
- 2 mm
- 1 mm

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