

Unit 8 - Week 5 Lectures

Course outline

How to access the portal

Week- 0

Week 1 Lectures

Week 2 Lectures

Week 3 Lectures

Week 4 Lectures

Week 5 Lectures

- Linearly polarized modes
- Attenuation and power loss in fibers
- Introduction to dispersion in fibers
- Mathematical modelling of dispersion: Transfer function approach
- Pulse propagation equation and its solution: Propagation of Gaussian pulses in fiber

Quiz : Assignment-5

Assignment-5 Solutions

Week-5 Feedback

Week 6 Lectures

Week 7 Lectures

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Week 10 Lectures

Week 11 Lectures

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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 2019-09-04, 23:59 IST.

1) The LP_{12} fiber mode is a combination of

1 point

$TE_{01}, TM_{01}, HE_{21}$ modes

EH_{11}, HE_{31} modes

$TE_{02}, TM_{02}, HE_{22}$ modes

$TE_{01}, TM_{01}, HE_{22}$ modes

No, the answer is incorrect. Score: 0

Accepted Answers: $TE_{02}, TM_{02}, HE_{22}$ modes

2) A fiber of length 100 km has loss coefficient of 0.046 km^{-1} . The total loss in the fiber is

1 point

4.60 dB

19.97 dB

6.62 dB

16 dB

No, the answer is incorrect. Score: 0

Accepted Answers: 19.97 dB

3) If 4 dBm power is launched in the fiber given in Question 1, the output power is

1 point

0.025 mW

0.2 mW

0.012 mW

0.6 mW

No, the answer is incorrect. Score: 0

Accepted Answers: 0.025 mW

4) If a photo-detector which can detect minimum power of -13 dBm is used at the fiber output and a pulse having launch power of 4 dBm is launched in the fiber having loss coefficient 0.046 km^{-1} , to detect the input pulse the fiber can have maximum length of

1 point

85.1 km

140.2 km

35 km

100 km

No, the answer is incorrect. Score: 0

Accepted Answers: 85.1 km

5) Intramodal dispersion occurs in fibers because of

1 point

Different time taken by different rays passing through the fiber.

Power attenuation in the fiber.

Different frequency components passing through the fiber experiencing different amounts of delay.

No, the answer is incorrect. Score: 0

Accepted Answers: Different frequency components passing through the fiber experiencing different amounts of delay.

6) If a pulse $p(0, t)$ is launched in a fiber, the Fourier transform of the pulse ($P(z, \omega)$) in the fiber at any location (z) is given by

1 point

$P(z, \omega) = P(0, \omega)e^{-j\beta_2\omega^2 z}$

$P(z, \omega) = P(0, \omega)e^{-j\beta_2\omega z}$

$P(z, \omega) = P(0, \omega)e^{-\frac{j\beta_2\omega z}{2}}$

$P(z, \omega) = P(0, \omega)e^{-\frac{j\beta_2\omega^2 z}{2}}$

No, the answer is incorrect. Score: 0

Accepted Answers: $P(z, \omega) = P(0, \omega)e^{-\frac{j\beta_2\omega^2 z}{2}}$

7) If a Gaussian pulse having pulse width (FWHM) of 8 ps is launched in the fiber having dispersion coefficient $\beta_2 = 10 \text{ ps}^2/\text{km}$, the pulse width (FWHM) of the pulse at the dispersion length of the fiber will be

1 point

11.31 ps

13.70 ps

16 ps

13.32 ps

No, the answer is incorrect. Score: 0

Accepted Answers: 11.31 ps

8) The dispersion length of the fiber given in Question 1 is

1 point

6.4 km

3.35 km

3.84 km

2.30 km

No, the answer is incorrect. Score: 0

Accepted Answers: 2.30 km

9) A Gaussian pulse is launched in a long single-mode fiber with dispersion coefficient $\beta_2 = 10 \text{ ps}^2/\text{km}$, the input and output pulse widths (FWHM) are 8 ps and 24 ps, respectively. The fiber length is

1 point

8.91 km

18.10 km

6.53 km

6.92 km

No, the answer is incorrect. Score: 0

Accepted Answers: 6.53 km

10) If a chirped Gaussian pulse $U(0, t) = \exp\left(-\frac{(1+jC)T^2}{2T_0^2}\right)$ is launched in a fiber of length L having dispersion coefficient β_2 . The equation of the pulse at the fiber output is

1 point

$\frac{T_0}{[T_0^2 - j\beta_2 L(1+jC)]^{1/2}} \exp\left(-\frac{(1+jC)T^2}{2[T_0^2 - j\beta_2 L(1+jC)]}\right)$

$\frac{T_0}{[T_0^2 - j\beta_2 L(1+jC)]^{1/2}} \exp\left(-\frac{(1+jC)T^2}{2T_0^2}\right)$

$\frac{\pi T_0}{[T_0^2 - j\beta_2 L(1+jC)]^{1/2}} \exp\left(-\frac{T^2}{[T_0^2 - j\beta_2 L(1+jC)]}\right)$

$\frac{T_0}{[j\beta_2 L(1+jC)]^{1/2}} \exp\left(-\frac{(1+jC)T^2}{2[T_0^2 - j\beta_2 L(1+jC)]}\right)$

No, the answer is incorrect. Score: 0

Accepted Answers: $\frac{T_0}{[T_0^2 - j\beta_2 L(1+jC)]^{1/2}} \exp\left(-\frac{(1+jC)T^2}{2[T_0^2 - j\beta_2 L(1+jC)]}\right)$