

## Unit 2 - Week 1

### Course outline

How does an NPTEL online course work?

#### Week 1

- Introduction
- Need for Optical Communication
- Salient Features of Optical Fiber - I
- Salient Features of Optical Fiber - II
- Optical Fiber Fabrication
- Quiz : Assignment 1

#### Week 2

#### Week 3

#### Week 4

#### Week 5

#### Week 6

#### Week 7

#### Week 8

#### Text Transcripts

#### Download Videos

#### FEEDBACK

## Assignment 1

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

**Due on 2020-02-12, 23:59 IST.**

- 1) What should be the bandwidth of a digital communication system to send 2000 voice channels simultaneously? 1 point
- 112 MHz  
 42 GHz  
 128 MHz  
 132 GHz

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
128 MHz

- 2) How many speech signals can be sent simultaneously using 1.2 GHz bandwidth analog communication system? 1 point
- $3 \times 10^5$   
  $1 \times 10^6$   
  $5 \times 10^6$   
  $1 \times 10^7$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $3 \times 10^5$

- 3) what is the limit of acceptance angle for which all the rays will be guided? If  $n_1$  and  $n_2$  are the refractive indices of the core and the cladding, respectively and the fiber is placed in air. 1 point

- $i < \sin^{-1} \sqrt{(n_1^2 - n_2^2)}$   
  
 $i > \sin^{-1} \sqrt{(n_1^2 - n_2^2)}$   
  
 $i > 0.5 \times \sin^{-1} \sqrt{(n_1^2 - n_2^2)}$   
  
 $i < 0.5 \times \sin^{-1} \sqrt{(n_1^2 - n_2^2)}$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $i < \sin^{-1} \sqrt{(n_1^2 - n_2^2)}$

- 4) Find the critical angle for glass-water interface (Refractive index of glass = 1.5, Refractive index of water = 1.33). 1 point
- $62.5^\circ$   
  $41.8^\circ$   
  $76.3^\circ$   
  $90.0^\circ$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $62.5^\circ$

- 5) If diameter of core is increased, then the number of modes will 1 point
- increase  
 decrease  
 not be affected  
 first increase then decrease

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
increase

- 6) Find the value of  $\Delta$  for weakly guiding fiber with  $n_1 = 1.5$  and  $n_2 = 1.477$ . 1 point
- $1.5 \times 10^{-2}$   
  $3.0 \times 10^{-3}$   
  $1.5 \times 10^{-3}$   
  $3.0 \times 10^{-2}$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $1.5 \times 10^{-2}$

- 7) Find the maximum acceptance angle for skew rays in air with  $\alpha = 45^\circ$  using the parameters  $n_1 = 1.5$  and  $\Delta = 0.015$ . 1 point
- $40.5^\circ$   
  $21.6^\circ$   
  $15.5^\circ$   
  $10.6^\circ$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 $21.6^\circ$

- 8) Determine the value of numerical aperture (NA) for a fiber with  $n_1 = 1.5$  and  $n_2 = 1.477$ . 1 point
- 0.01  
 0.13  
 0.26  
 0.52

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
0.26

- 9) Find the approximate value of normalized frequency ( $V$ ) for a given fiber with  $n_1 = 1.5$ ,  $n_2 = 1.477$ , and  $a = 40 \mu\text{m}$  for wavelength  $\lambda_0 = 850 \text{ nm}$ . 1 point
- 88  
 77  
 66  
 55

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
77

- 10) Number of modes supported by an step-index highly multimode fiber with  $NA = 0.3$ ,  $a = 50 \mu\text{m}$  at wavelength  $\lambda_0 = 1550 \text{ nm}$ . 1 point
- 1227  
 1442  
 1847  
 2582

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
1847