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Courses » Introduction to Non-linear Optics and its Applications

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## Unit 13 - Week 11

## Course outline

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 Lecture 51 : Parametric Amplification under FWM

 Lecture 52 : Parametric Amplification under FWM (Cont)

 Lecture 53 : Optical Phase Conjugation

 Lecture 54 : Raman Scattering

 Lecture 55 : Stimulated Raman Scattering

 Quiz : Week 11 assignment 11

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## Week 11 assignment 11

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

Due on 2018-10-17, 23:59 IST.

2 points

1)  $n(\lambda) = A + \frac{B\lambda^2}{\lambda^2 + C}$  The zero dispersion wavelength is (where A,B, C are parameters)

(a)  $\sqrt{\frac{c}{2}}$       (b)  $\frac{c}{3}$       (c)  $\sqrt{\frac{c}{3}}$       (d)  $\frac{c}{2}$

- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
(c)

2) The dispersion in a particular material is given by  $n(\omega) = n_0 - \frac{\Gamma(\omega - \omega_0)}{\Gamma^2 - (\omega - \omega_0)^2}$  expression for the inverse of group velocity is ( $\Gamma$  is a constant)

(a)  $\frac{1}{c} \left( n(\omega) + \omega \frac{dn}{d\omega} \right)$       (b)  $\frac{1}{c} \left( n(\omega) - \omega \frac{dn}{d\omega} \right)$       (c)  $\left( n(\omega) + \omega \frac{dn}{d\omega} \right)$

- (a)  
 (b)  
 (c)

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
(a)

3) For Q2, the expression for group velocity dispersion parameter( $D_\lambda$ ) is

(a)  $\left( \frac{d^2}{d\omega^2} \left( \frac{\omega n(\omega)}{c} \right) \right)$       (b)  $\frac{-2\pi c}{\lambda^2} \left( \frac{d^2}{d\omega^2} \left( \frac{\omega n(\omega)}{c} \right) \right)$       (c)  $\frac{2\pi c}{\lambda^2} \left( \frac{d^2}{d\omega^2} \left( \frac{\omega n(\omega)}{c} \right) \right)$

2 points

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(b)

4)

2 points

A single mode fiber is measured to have  $\lambda^2 \left( \frac{d^2 n}{d\lambda^2} \right) = 0.02$  at  $0.8 \mu\text{m}$ . Calculate dispersion parameters  $\beta_2$  (in  $\text{ps}^2/\text{m}$ ).

- (a)  $-2.83 \times 10^{-2}$  (b)  $2.83 \times 10^{-3}$  (c)  $2.83 \times 10^{-26}$  (d)  $2.83 \times 10^{-2}$

- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(d)

5)

2 points

What type of nonlinearity is responsible for self-focusing

- (a) 2<sup>nd</sup> order (b) 3<sup>rd</sup> order (c) 4<sup>th</sup> order

- (a)  
 (b)  
 (c)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(b)

6)

2 points

The length for a perfect optical phase conjugation mirror is ( $\kappa$  has the usual meani

- (a)  $\frac{\pi}{2|\kappa|}$  (b)  $\frac{\pi}{4|\kappa|}$  (c)  $\frac{\pi}{|\kappa|}$

- (a)  
 (b)  
 (c)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(b)

7)

2 points

The phase conjugation mirror is called an oscillator if

- (a)  $|\kappa|L = \frac{\pi}{2}$  (b)  $|\kappa|L = \frac{\pi}{4}$  (c)  $|\kappa|L = \pi$

- (a)  
 (b)  
 (c)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(a)

8)

2 points

A laser light of wavelength  $488 \text{ nm}$  is incident on a hydrogen cell ,the Stokes shifted output wavelength is (the difference in energy in the vibrational spectra of the hydrogen atom is  $4156 \text{ cm}^{-1}$  )

- (a)  $306 \text{ nm}$       (b)  $612 \text{ nm}$       (c)  $1024 \text{ nm}$       (d)  $1224 \text{ nm}$

- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(b)

9)

2 points

A laser light of wavelength  $488 \text{ nm}$  is incident on a hydrogen cell ,the Anti-Stokes shifted output wavelength is (the difference in energy in the vibrational spectra of hydrogen atom is  $4156 \text{ cm}^{-1}$  )

- (a)  $406 \text{ nm}$       (b)  $812 \text{ nm}$       (c)  $1024 \text{ nm}$       (d)  $1550 \text{ nm}$

- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(a)

10)

2 points

A laser light of wavelength  $488 \text{ nm}$  is incident on a gas chamber which contains Oxygen ,the Stokes shifted output wavelength is (the difference in energy in vibrational spectra of the hydrogen atom is  $1552 \text{ cm}^{-1}$  )

- (a)  $1056 \text{ nm}$       (b)  $812 \text{ nm}$       (c)  $528 \text{ nm}$       (d)  $1550 \text{ nm}$

- (a)  
 (b)  
 (c)  
 (d)

No, the answer is incorrect.

Score: 0

Accepted Answers:

(c)

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