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NPTEL

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Courses » Introduction to Non-linear Optics and its Applications

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Unit 5 - Week 3

Course outline

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Pre-requisite Assignment

Week 1

Week 2

Week 3

- Lecture 11 : Classical origin of optical nonlinearity
- Lecture 12 : Miller's Rule
- Lecture 13 : Second Harmonic Generation (SHG)
- Lecture 14 : Optical Rectification, Linear electro-optic effect
- Lecture 15 : Sum & Difference frequency generation
- Quiz :

Assignment 3

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

Due on 2018-09-05, 23:59 IST.

1) ***2 points***

What is the dimension of $\chi^{(4)}$
(a) m/V (b) $(m/V)^2$ (c) $(m/V)^3$ (d)) $(m/V)^4$

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(c)

2) ***2 points***

What do you mean by the term $Re\ \chi^{(1)}\{\omega;\omega\}$
(a) dispersion (b) absorption (c) electro optic effect (d) optical rectification

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

No, the answer is incorrect.
Score: 0

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(b)

4) **2 points**

What do you mean by the term $|\chi^{(2)}\{\omega;\omega,0\}|$
(a) dispersion (b) absorption (c) electro optic effect (d) optical rectification

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(c)

5) **2 points**

What do you mean by the term $|\chi^{(2)}\{0;\omega,-\omega\}|$
(a) dispersion (b) absorption (c) electro optic effect (d) optical rectification

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(d)

6) **2 points**

What do you mean by the term $|\chi^{(2)}\{2\omega;\omega,\omega\}|$
(a) different frequency generation (b) second harmonic generation (c) electro optic effect (d) optical rectification

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(b)

7) **2 points**

What do you mean by the term $|\chi^{(2)}\{\omega_1 + \omega_2; \omega_1, \omega_2\}|$
(a) sum frequency generation (b) different frequency generation (c) electro optic effect (d) optical rectification

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a)

8) **2 points**

What do you mean by the term $|\chi^{(2)}\{\omega_1 - \omega_2; \omega_1, -\omega_2\}|$
(a) second harmonic generation (b) different frequency generation (c) electrc optic effect (d) optical rectification

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(b)

9) **2 points**

A certain crystal has an index of refraction of approximately 1.6 and $\chi^{(2)}$ is equal to 4.4 pm/V. A different material is discovered to have refractive index of 2.2. Using Miller's rule the value of $\chi^{(2)}$ in the new material is (Assume that the refractive indices are frequency independent.)
(a) 65.6 pm/V (b) 6.56 pm/V (c) 10.8 pm/V (d) 26.7 pm/V

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(a)

10) **2 points**

$\chi^{(2)}$ is measured for frequency doubling 1.064 to 0.532 μm to be $1.2pm/V$. The index of refraction for both the wavelengths is 1.654. Using Miller's rule the $\chi^{(2)}$ for SHG of 1.6 to 0.8 μm is: (The index of refraction for this interaction is 1.646.)
(a) 11.4 pm/V (b) 1.1 pm/V (c) 1.6 pm/V (d) 4.4 pm/V

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

No, the answer is incorrect.
Score: 0

Accepted Answers:
(b)

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