

Course outline

How does an NPTEL online course work?

Week 1

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Week 12

 Lasers and Laser Amplifiers in Optical Fiber Communication

 Lasers in Nonlinear Optics

 Laser Safety

 Week 12 Feedback Form

 Quiz : Assignment 12

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Assignment 12

The due date for submitting this assignment has passed.

Due on 2021-04-14, 23:59 IST.

As per our records you have not submitted this assignment.

Instructions:

1. Answer all questions; all questions carry equal mark.
2. All symbols have their usual meanings.
3. Only one of the options is correct.
4. Take care of the units in numerical problems, to match with the units given in the options (of MCQs), and the units in which answers have to be entered (in fill in the blank type of questions).
5. In the fill in the blank type of questions, only the numerical values have to be entered.

NOTE: You can see the correct answers after the last date of submission. Marks obtained in this quiz will be counted towards your final score. You can take the quiz and submit it any number of times, and the latest submitted answers will be taken as your final submission.

- 1) State whether the following statement is TRUE or FALSE: **1 point**

Information carrying capacity of an electromagnetic wave is directly proportional to its wavelength.

- TRUE
 FALSE

No, the answer is incorrect.
Score: 0

Accepted Answers:
FALSE

- 2) Which of the following is not a requirement on the light source in a DWDM fiber-optic communication system? **1 point**

- Wavelength of emission should lie in the 1550 nm wavelength window.
 The linewidth of the light source should be small (< 0.1 nm)
 Adjacent channel separation can be 50 GHz
 Emitted light power must be very high (>100 mW)

No, the answer is incorrect.
Score: 0

Accepted Answers:
Emitted light power must be very high (>100 mW)

- 3) The output power from a laser diode, emitting at a wavelength of 1550 nm, is coupled into a fiber of length 35 km. If the input coupling efficiency is 3 dB and the fiber loss is 0.2 dB/km @ 1550 nm, then the amount of light power at the output end of fiber is ___% of the output power of the laser diode. (Assume that there are no other loss)

(Write your answer up to 1 decimal place)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 9.0,11.0

1 point

- 4) The ITU (International Telecommunication Union) has set the channel spacing for DWDM communication as 100 GHz. A particular network provider opts for a wavelength range of 1540 nm - 1560 nm for optical communication. The maximum number of DWDM channels that can be employed is ___.

(Answer must be an integer)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 25,27

1 point

- 5) The polarization response of a medium in the presence of an electric field is given by:

$$P = \epsilon_0 \chi E_0 + (\epsilon_0 \chi^{(2)} E^2 + \epsilon_0 \chi^{(3)} E^3 + \epsilon_0 \chi^{(4)} E^4 + \dots)$$

The second harmonic generation is due to which component of the susceptibility?

- χ
 $\chi^{(2)}$
 $\chi^{(3)}$
 $\chi^{(4)}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\chi^{(2)}$

- 6) In the above Q. 5, the four-wave mixing is due to which component of the susceptibility? **1 point**

- χ
 $\chi^{(2)}$
 $\chi^{(3)}$
 $\chi^{(4)}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
 $\chi^{(3)}$

- 7) State whether the following statement is TRUE or FALSE: **1 point**

 The second harmonic generation in an isotropic medium requires phase matching methods like QPM because the phase mismatch between the optical beam of frequency ' ω ' and the optical beam of frequency ' 2ω ' is very large.

- TRUE
 FALSE

No, the answer is incorrect.
Score: 0

Accepted Answers:
TRUE

- 8) Which one of the following is not an important consideration for efficient second harmonic generation using birefringent phase matching condition? **1 point**

- The intensity of the pump light
 The polarization of the pump light
 The direction of propagation of pump light
 Initial phase of the pump light

No, the answer is incorrect.
Score: 0

Accepted Answers:
Initial phase of the pump light

- 9) A safety warning label on a particular laser reads – **1 point**

Visible/Invisible Laser Radiation; Work with extreme caution; Avoid Eye and Skin Exposure to Direct or Scattered Radiation; While the laser is in operation, blinking red light and door interlocking mechanism must be ON

The Class of the laser is

- I
 II
 III
 IV

No, the answer is incorrect.
Score: 0

Accepted Answers:
IV

- 10) It is recommended to have an optical density (OD) = 5, for laser safety glasses to handle a Er- doped fiber laser with CW output of 1 W power. The minimum OD required for laser safety glasses for handling a high-power Er-doped laser giving CW output of 5 kW is ___.

(Write your answer up to 3 decimal places)

No, the answer is incorrect.
Score: 0

Accepted Answers:
(Type: Range) 8.498,8.898

1 point