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NPTEL

Unit 6 - Week 5 - Mode-Locking technique and types of LASER

Register for Certification exam

Course outline

How to access the portal

Week 1 - Introduction to LASERs

Week 2 - Concept of population inversion, 2-level, 3-level, and 4-level systems, Components of LASERs

Week 3 - Threshold condition, Unique Properties of LASER, various parameters of a LASER

Week 4 - Pulsing techniques

Week 5 - Mode-Locking technique and types of LASER

Lecture 21 -

Assignment 5

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. **Due on 2019-03-06, 23:59 IST.**

1) Debye-Sears effect refers to *1 point*

- Diffraction of light by a sound wave
- The production of double refraction in a substance by an electric field
- Change in optical absorption by a semiconductor when an electric field is applied
- Formation of sound waves following light absorption in a material

No, the answer is incorrect.
Score: 0

Accepted Answers:
Diffraction of light by a sound wave

2) Out of the following which is capable of giving very short pulse? *1 point*

- Nitrogen laser
- Rhodamine 6G laser
- Both of them
- None of them

No, the answer is incorrect.
Score: 0

Accepted Answers:
Rhodamine 6G laser

3) The condition of Raman-Nath regime is achieved when _____ (l = optical path length, λ= optical wavelength, L = wavelength of acoustic wave) *1 point*

- l << L/2pl
- l >> L/2pl

I << L/2pl

4) Which of the given condition has to be fulfilled to achieve passive mode locking using a saturable absorber? ***1 point***

- Lifetime of the excited state of the saturable absorber is much higher than the pulse duration of a modelocked pulse
- Lifetime of the excited state of the saturable absorber is much shorter than the pulse duration of a modelocked pulse
- Lifetime of the excited state of the saturable absorber is comparable to the pulse duration of a modelocked pulse
- None of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
Lifetime of the excited state of the saturable absorber is comparable to the pulse duration of a modelock pulse

5) Which transition results the laser emission in case of Ruby laser? ***1 point***

- $^4A_2$ to $^4T_1$
- $^4T_2$ to ^2E
- $^4T_2$ to $^4A_2$
- ^2E to $^4A_2$

No, the answer is incorrect.
Score: 0

Accepted Answers:
^2E to $^4A_2$

6) In case of Nd:YAG laser the transition which gives rise to the laser emission is _____ ***1 point***

- Splitted components of $^4F_{3/2}$ to Splitted components of $^4I_{11/2}$
- Splitted components of $^4F_{9/2}$ to Splitted components of $^4I_{11/2}$
- Splitted components of $^4F_{3/2}$ to Splitted components of $^4T_3$
- Splitted components of $^4I_{13/2}$ to Splitted components of $^4I_{15/2}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
Splitted components of $^4F_{3/2}$ to Splitted components of $^4I_{11/2}$

7) Gallium-arsenide laser is an example of ***1 point***

- Gas laser
- Semiconductor laser
- Dye laser
- Atomic laser

No, the answer is incorrect.
Score: 0

Accepted Answers:
Semiconductor laser

8) Which of the following wavelength is not obtained from a Ti:Sapphire laser? ***1 point***

- 780 nm

- 530 nm
- 800 nm
- 860 nm

No, the answer is incorrect.
Score: 0

Accepted Answers:
530 nm

9) Which of the following is a gas laser (having gaseous active medium)? ***1 point***

- He-Ne laser
- Nitrogen laser
- Copper vapor laser
- All of the above

No, the answer is incorrect.
Score: 0

Accepted Answers:
All of the above

10) A laser beam of frequency ω experiences diffraction when it passes through a medium that is under influence of a high frequency vibration. Optical path length of the beam in the medium is L. Now what will happen to the intensities of the side bands if the optical path length is changed to L' such that L' < L? ***1 point***

- Increase
- Decrease
- Remain same
- Cannot be predicted from given information

No, the answer is incorrect.
Score: 0

Accepted Answers:
Decrease

Previous Page End