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

Assignment 2

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment. Due on 2019-02-13, 23:59 IST.

1) What is the maximum value of $N_2/N$ for a two level system? ($N_2 = \text{Population of the excited state}, N = N_1 + N_2 = \text{Total population}$)

- 1
- 2
- 0.5
- None of the above

No, the answer is incorrect.
Score: 0
Accepted Answers: 0.5

2) Which statement is true for a 3-level laser system?

- The state 3 has longer life time than state 2
- The state 2 has longer life time than state 3
- Both have exact equal life times
- None of (a) and (b)

No, the answer is incorrect.
Score: 0
Accepted Answers: The state 3 has longer life time than state 2

3) Which of the states are radiatively coupled for a true 4-level laser system?

- $E_2$
- $E_3$

No, the answer is incorrect.
Score: 1 point
Accepted Answers: $E_2$

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4) Assign p and q for following TEM_{pq} mode
   - p=2; q=1
   - p=1; q=2
   - p=2; q=3
   - p=3; q=2

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Level 3 and level 4

5) Assign p and q for given TEM_{pq} mode
   - p=2; q=1
   - p=2; q=2
   - p=3; q=3
   - p=1; q=2

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:

6) What is the number of node(s) of the mode in the LASER cavity which follows the condition \( 5\lambda = 2L \)? (Note: \( \lambda \) = wavelength of light, \( L \) = length of cavity)
   - 0
   - 3
   - 4
   - 5

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   4

7) Rate of change of intensity of stimulated photons depends on: (Note: \( N_1 \) = population of ground state; \( N_2 \) = population of excited state)
   - Only \( N_1 \)
   - Only \( N_2 \)
   - Both \( N_1 \) and \( N_2 \)
   - None of the above

   No, the answer is incorrect.
   Score: 0
   Accepted Answers:
   Both \( N_1 \) and \( N_2 \)

8) Calculate the order of the mode (n) for a wavelength 500 nm that can be sustained in a LASER cavity of length (L) 1 mm.
   - 4000th

   1 point
9) For a light of wavelength 450 nm, calculate the length of cavity for which 15th order mode can be achieved.

- 7.584 μm
- 2.866 μm
- 3.375 μm
- 6.745 μm

No, the answer is incorrect.
Score: 0
Accepted Answers: 4000th

10) Calculate the wavelength of the light (in nm) that can be sustained in a LASER cavity of length (L) 1.5 mm with order of mode (n)= 5500.

- 630.4 nm
- 488.7 nm
- 545.4 nm
- 454.5 nm

No, the answer is incorrect.
Score: 0
Accepted Answers: 545.4 nm