Assignment 3

Due on 2021-05-18, 23:59 IST

As per our instructor you have not submitted this assignment.

Instructions:

1. Answer all questions. All questions carry equal mark.
2. All marks have been graded internally.
3. Read the question carefully. If the unit in the question is not 1, make sure to convert to the unit of the question.
4. In the fill-in-the-blank type of questions, only answer the numerical part. For example, the unit can be omitted.
5. The unit of the answer is 1 in all the below questions. Make sure that the units match the question.
6. The question answers in the fill-in-the-blank type of questions will be converted towards your final score. You can check the pdf and gic in your university time, and the exam submitted answers will be taken as your final submissions.

1. State whether the following statement is TRUE or FALSE.
   - If an external pump, the population of animals in the energy levels increases proportionally to the life-time of the respective levels. [1 point]
   - TRUE
   - FALSE
   - No response is correct.
   - Incorrect Answer

2. State whether the following statement is TRUE or FALSE.
   - In the presence of an external pump, the population of animals in the energy levels increases proportionally to the life-time of the respective levels. [1 point]
   - TRUE
   - FALSE
   - No response is correct.
   - Incorrect Answer

3. Solve the differential equation (with constant coefficient) for three different material P, Q, and Q is shown below. Which one of them is the most stable? [1 point]
   - [Graph showing three different curves]
   - [One of the curves is labeled as P, another as Q, and the third as R]

4. The absorption coefficient (k) is different in different tissues for the external Q. The saturation intensity of L is: [1 point]
   - [Graph showing absorption coefficient for different tissues]
   - [One of the curves is labeled as L, another as M, and the third as N]

5. Which one of the following conditions would lead to population inversion in a laser-based system: PAB, the pumping rate and T is the transition rate? [1 point]
   - TRUE
   - FALSE
   - No response is correct.
   - Incorrect Answer

6. The intensity build-up during the time when amplifying media P and Q is shown below. P is and Q is the saturation intensity of P and Q respectively, then which one of the following statements is correct? [1 point]
   - [Graph showing intensity build-up over time]
   - [One of the curves is labeled as P, another as Q, and the third as R]

7. In laser medium, the total number of active atoms is 1. [1 point]
   - 10^12 atoms
   - 10^13 atoms
   - No response is correct.
   - Incorrect Answer

8. The absorption energy levels of a certain gas which acts as an emptying medium is shown below. If is the ground state energy: [1 point]
   - [Graph showing absorption energy levels]
   - [One of the curves is labeled as S, another as T, and the third as U]

9. In question 2, how, which one of the following is the laser transition? [1 point]
   - [List of options]
   - [Option 1]
   - [Option 2]
   - [Option 3]
   - No response is correct.
   - Incorrect Answer

10. Which one of the following statements is correct? (In low level, and level 3 is correct) [1 point]
    - [Option 1]
    - [Option 2]
    - [Option 3]
    - [Option 4]
    - No response is correct.
    - Incorrect Answer

11. Which one of the following statements is correct? (In low level, and level 3 is correct) [1 point]
    - [Option 1]
    - [Option 2]
    - [Option 3]
    - [Option 4]
    - No response is correct.
    - Incorrect Answer

12. Which one of the following statements is correct? (In low level, and level 3 is correct) [1 point]
    - [Option 1]
    - [Option 2]
    - [Option 3]
    - [Option 4]
    - No response is correct.
    - Incorrect Answer

A laser can operate with less than half of the total number of atoms in the ground state.