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9 BATCH: F6

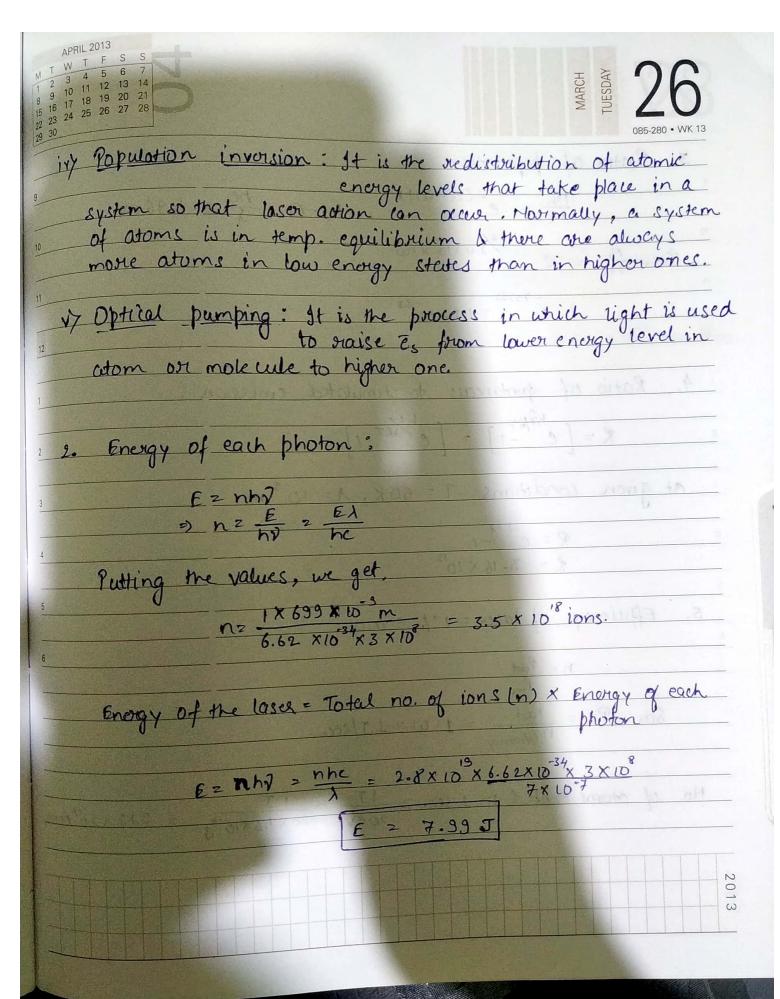
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PHYSICS - 02 (ASSINGINMENT - 03)

12 1. i) spontaneous emission: It is the process in which a quantum mechanical system transits from an excited state to lower energy state & emits quantized amount of energy in the form of photon.

in Stimulated emission: It is the porocess by which an can interact with an excited atomic &, causing it to disp to a lower energy level.

in's Metastable state: H's a particular sexuited state of an atom, nucleus or other system that has a longer life time than the ordinary excited state & that generally has a shorter lifetime than the lowest often stables enougy state, caused ground state.



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3. Ratio of population

$$\frac{N_L}{N_L} = e^{-C\epsilon_2 - \epsilon_2 t/kT}, \quad \epsilon_2 - \epsilon_1 = \frac{hc}{\lambda} = 1.36 \text{ eV}$$

10 -1.36/8.61 × 10 × 300

4. Ratio of spontaneous to stimulated emission;

3 at given conditions T=50K, 1=105 m

5. Efficiency of laser = 1° / = 0.01

No. of asoms existed in 1 sec. = 15 = 15 = 15 = 3.12 × 10¹⁷ Ar

20

ii) No. of oscillations
$$n = \frac{1}{\lambda} = \frac{2.945 \times 10^{-2}}{5.89 \times 10^{-7}} = 5 \times 10^{4}$$

At 27'c, i.e, 300 K,

At 227°C, ie, 500 K,