Tutorial - 7

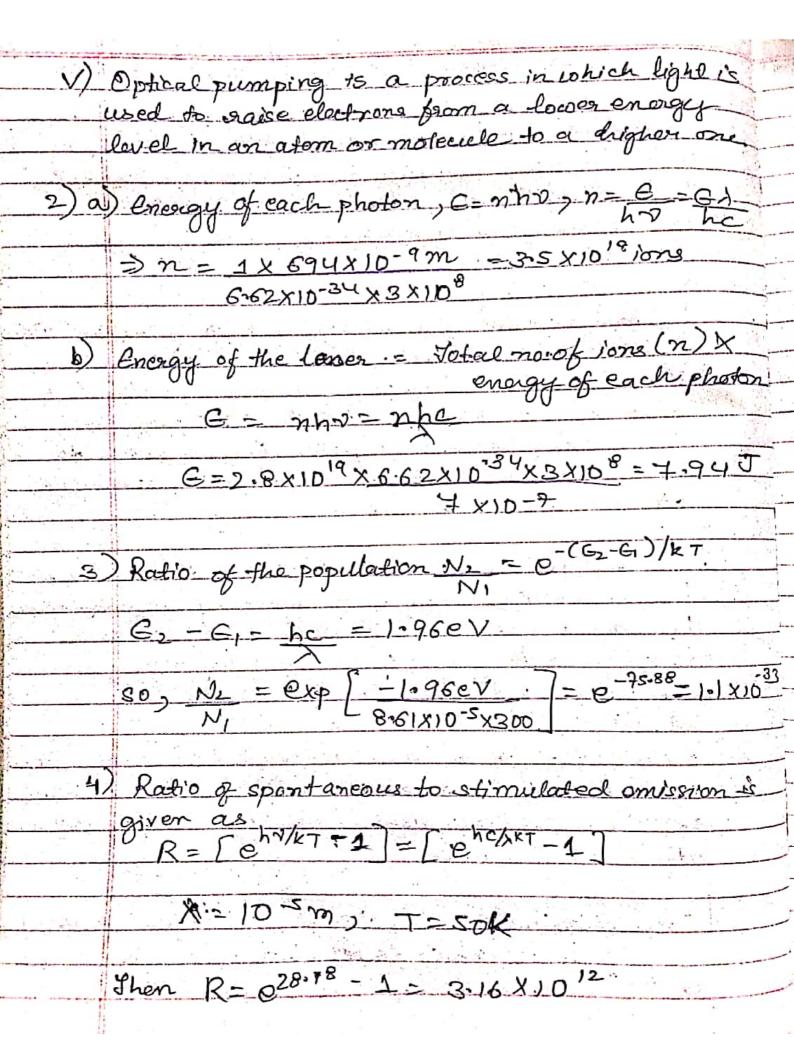
Normally the excited state is an unstable state where the life time of an atom is very short around 10-8 sec. Hence the atom is in excited state, or refugns to the ground state spontaneously by relasing one photon of energy ho. This process is called spontaneous emission.

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in In this process an incident photon is absorbed by an excited atom as a siesult of which atom becomes unstable in state 62 and makes a transition to ground state releasing two photons. This process is called stimulated emission

ivi) Meta stable state is an excited state of an atom or other system with a longer lifetime than other excited states oflowever, it has shorter lifetime than other excited states

iv) Population inversion is the redistribution of atomic energy level that takes place in a system 80 that laser action can occur.



5) Efficiency of lasor = 1% = 0.01, efficiency = Point So, Pin = Pout = 1 wate = 1 J/sec No. of atome excited in one second = 4 J 200V $\frac{20x1-6x10^{-19}}{20x1-6x10^{-19}} = \frac{3-12x10^{17}}{20x1-6x10^{-19}}$ = 8890A°, 50 N= C = 3XID8 7 = 5.09 X 1014 Hz ii) no of oscillations n= le = 2.945×10-2 589×10-7 iii) Cohosence time Zc = lc/c = 2-945×10-2 9.82×10-11 sec 7) Relative population Nz = e-CE2-G1)1k7 E2-61= bc = 1047eV at 27°C= 27 +273=300 K. (N;) = e-68.5

al 227 c = 227 + 273 = 500 K) (N) = e^y,
Now Rappo (N2/N1)3006 = 1.25 × 10-12

(N2/N1)506