NAME_____MAT_____

Please reply yes or no, more than one answer can be yes (+0.5 if correct, otherwise 0)

Laser

	yes	no
Are based on amplification of the emission of light		
Cannot be pulsed		
Inversion of the population is not needed		
Are not coherent		

LED

	yes	no
Are based on emission from semiconductor		
The wavelength can be changed by changing the voltage		
Can be pulsed		
Intensity can be changed by changing the voltage		

Laser diodes

	yes	no
Are gas based Lasers		
Have narrow emission		
Can be pulsed		
Are not based on stimulated emission		

Ruby Laser

	yes	no
Is a solid state lasers		
Is a four states laser		
Is green		
Is continuous		

Black body radiation

	yes	no
Intensity inrease with temperature		
Peak wavelength shifts to the red increasing the temperature		
A big fraction of the emission is not in the visible		
Is weak at short wavelegth		

Chromophores

	yes	no
Are responsible for light absortpion		
Melanin absorb only in the UV		
CO2 is absorbed by water producing electronic excited states		
They all absorb at all the wavelength		

Heat

	yes	no
Cannot be produced by light absorption		
Photothermal effect is based on light emission		
Dissipation rate is independent on the medium		
Temperature increase caused by laser is time dependent		

Laser based hair removal

	yes	no
Is a result of light emission by hair		
Efficiency does not depend on the content of melanin		
Is definitive		
Continuous laser are normally used		

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CO_2 Lasers

	yes	no
Emit in the visible		
In most cases have low intensity		
Are absorbed by melanin		
Produce electronic transition		

PDT

	yes	no
Is based on the production of heat		
Can be type I or type II		
Formation of triplet excited state is necessary		
Presence of oxygen is necessary		

ROS

	yes	no
Can be produced with light		
Are formed also in the absence of oxygen		
Are formed via bimolecular processes		
Are all radicals		

Light sources

	yes	no
LED emits like black bodies		
LED and Laser diode can be made by the same semiconductor		
Black bodies are very efficient light sources		
LED are very efficient light sources		

Pulsed lasers

	yes	no
Are always based on Q-Switching		
Mode-locking produces a train of pulses		
Allow to avoid over-heating		
It is possible to obtain ps pulses		

LED

	yes	no
Emission is collimated		
Intensity is strongly angular dependent		
Color depends on the semiconductor material used		
They need to be “pumped”		

Tatoos

	yes	no
Inks are distributed in the skin the molecular form		
Can be partially removed with light		
Continuous lasers are typically used for tatoos removal		
For removing different color a single wavelength laser is needed		