***Que. : What findings of the quantum theory help in realization of a LASER?***

**Answer:**

A laser is a quantum mechanical device that emits light with a well-defined wavelength in a very narrow beam. The operation of a laser is based on the quantum mechanical process of **stimulated emission**, predicted by **Einstein** when he studied the photoelectric effect. The first lasers were made in 1960 and since then their use has become widespread, for example in compact disc and DVD players, for cutting metals in manufacturing, and in medicine.

When an electron is excited from a lower-energy to a higher-energy level, it will not stay that way forever. An electron in an excited state may decay to an unoccupied lower-energy state according to a particular time constant characterizing that transition. When such an electron decays without external influence, it emits a photon; this process is called “**spontaneous emission**.” The phase associated with the emitted photon is random. A material with many atoms in an excited state may thus result in radiation that is very monochromatic, but the individual photons would have no common phase relationship and would emanate in random directions. This is the mechanism of fluorescence and thermal emission.