

Q. What is LASER? Discuss the construction and working of He-Ne LASER.

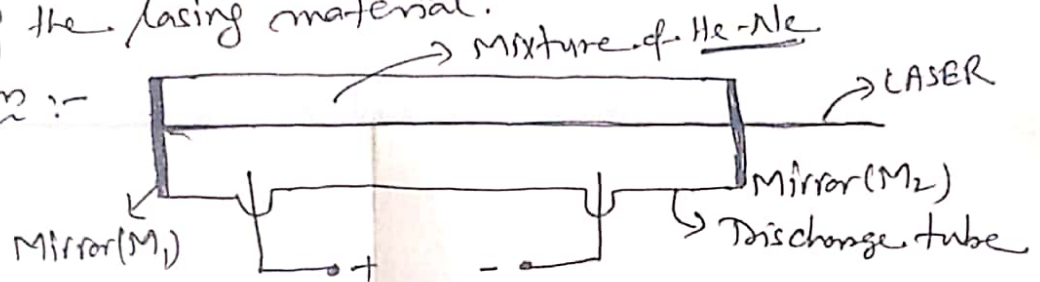
Ans. LASER which stands for Light Amplification by Stimulated Emission of Radiation, is a process by which we get a light beam which is coherent, highly monochromatic, and almost perfectly parallel. A beam of LASER can go to moon and return to the earth without much loss of intensity.

For laser action, two arrangements are necessary which are :-

- i) the metastable state with energy E_2 must all the times have longer number of atoms than the number in the lower energy state E_1 .

- ii) the photons emitted due to stimulating action should stimulate other atoms to emit more photons. To achieve this, two mirrors are fixed at the ends of cylindrical region containing the lasing material.

Construction :-



A schematic design of He-Ne LASER.

A mixture of Helium about 90% and Neon 10% at low pressure is taken in a cylindrical gas tube. Two parallel mirrors M_1 and M_2 are fixed at the ends. One of the mirrors, M_2 is slightly transmitting and LASER light comes out of it. The tube contains two electrodes which are connected to a high voltage power supply so that a large electric field is established in the tube.

The relevant energy levels of He & Ne are shown below :-

